

The Guardian: Weekend: Fracking hell: Nausea, - Guardian, The (London, England) - December 14, 2013

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Veronica Kronvall can, even now, remember how excited she felt about buying her house in 2007. It was the first home she had ever owned and, to celebrate, her aunt fitted out the kitchen in Kronvall's favourite colour, purple: everything from microwave to mixing bowls. A cousin took pictures of her lying on the floor of the room that would become her bedroom. She planted roses and told herself she would learn how to garden.

What Kronvall did not imagine at the time - even here in north Texas, the pumping heart of the oil and gas industry - was that four years later an energy company would drill five wells behind her home. The closest two are within 300ft of her tiny patch of garden, and their green pipes and tanks loom over the fence. As the drilling began, Kronvall, 52, began having nosebleeds, nausea and headaches. Her home lost nearly a quarter of its value and some of her neighbours went into foreclosure. "It turned a peaceful little life into a bit of a nightmare," she says.

Energy analysts in the US have been as surprised as Kronvall at how fast **fracking** has proliferated. Until five years ago, America's oil and gas production had been in steady decline as reservoirs of conventional sources dried up. Then a Texas driller, George Mitchell, began trying out new technologies on the Barnett Shale, the geological formation that lies under the city of Fort Worth, Texas, and the smaller towns to the north, where Kronvall lives. Mitchell did not invent the technique. Hydraulic fracturing, or **fracking**, was first used in the 1940s to get the gas out of conventional wells. As the well shaft descended into the layer of shale, the driller would blast 2m-4m gallons of water, sand and a cocktail of chemicals down the shaft at high pressure, creating thousands of tiny cracks in the rock to free the gas.

Mitchell's innovation was to combine the technology with directional drilling, turning a downward drill bit at a 90-degree angle to drill parallel to the ground for thousands of feet. It took him more than 15 years of drilling holes all over the Barnett Shale to come up with the right mix of water and chemicals, but eventually he found a way to make it commercially viable to get at the methane in the tightly bound layers of shale. The new technology has turned the Barnett Shale into the largest producible reserve of onshore natural gas in the US. Other operators, borrowing from Mitchell's work, began drilling in Colorado, North Dakota, Ohio, Pennsylvania and, most recently, California. More than 15 million Americans now live within a mile of an oil or gas well, 6 million of them in Texas.

The industry has been quick to publicise **fracking**'s apparent benefits. Electricity and heating costs have dropped. The activity from the oil and gas sector has helped buoy up an ailing national economy and paid for new schools in country towns. Last October, the US produced more oil at home than it imported for the first time since 1995.

New evidence, however, has begun to emerge that **fracking**, while reducing coal consumption, is

not significantly curtailing the greenhouse gas emissions that cause climate change.

Campaigners warn that **fracking** is binding the US even more tightly to a fossil-fuel future and deepening the risks of climate change. There have been stories from homeowners of **fracking** chemicals seeping into their drinking water, video footage of flames shooting out of kitchen taps because of methane leaks. Companies have been fined for releasing radioactive waste into rivers.

In north Texas, where Kronvall lives, the number of new oil and gas wells has gone up by nearly 800% since 2000. It's impossible to drive for any length of time without seeing the signs, even after the rigs have moved on elsewhere: the empty squares of flattened earth, the arrays of condensate tanks, the compressor stations and pipelines, and large open pits of waste water. Virtually no site is off limits. Energy companies have fracked wells on church property, school grounds and in gated developments. Last November, an oil company put a well on the campus of the University of North Texas in nearby Denton, right next to the tennis courts and across the road from the main sports stadium and a stand of giant wind turbines. In Texas, as in much of America, property owners do not always own the "mineral rights" - the rights to underground resources - so typically have limited say over how they are developed.

Kronvall moved from the Fort Worth area to the small farming town of Ponder - population: 1,400 - for the peace and quiet, and the affordable house prices; it also meant a fairly easy commute to her job at the survey research centre at the University of North Texas. Wesley and Beth Howard moved into the Remington Park neighbourhood in the same year, two doors down, after making a similar calculation. It was close to where Beth works as a graphic designer at Texas Woman's University. Wesley, 41, a support engineer at IBM, works from home. The neighbourhood was still only partially built, but the developers said they were planning 150 new homes, a park and walking trails on the meadow behind their house. "This was the first home we had together," Wesley says. "We looked at being here for a good couple of decades. It was our expectation and our hope that this would grow and property values would improve and services would come up."

In February 2011, Beth, 31, had just found out she was pregnant when the couple noticed some wooden stakes with fluttering bright plastic strips had gone up in the meadow behind their home.

Kronvall had seen them, too, and assumed workers were staking out cul-de-sacs for the next phase of homes. She was away at a work conference in May 2011 when she got a call from another neighbour: crews had arrived with heavy earth-moving equipment. The meadow was about to be drilled for a well.

None of the neighbours received any official notice, either from the energy company or the town authorities. "The law at the time didn't require them to tell us or give any public notice or anything," Wesley says. "They could just spring it on us as a surprise, and so they did." At that time, Texas law did not require companies to disclose which chemicals they were using to frack the well. Residents say that, to this day, none of them has any idea, though there is now a voluntary chemical disclosure registry at fracfocus.org.

The crews proceeded to flatten the earth and install a 200ft red and white drilling tower that loomed high above their homes. Convoys of articulated lorries rumbled down the main road. "It was terrible," Kronvall says. "There was a lot of banging and clanging. The number of trucks was

just phenomenal, and the exhaust, the fumes in the air, it was 24/7."

She says the activities on the other side of her fence deposited a layer of white powder on her counter tops. The sound of the crew shouting into megaphones invaded her bedroom. Bright lighting pierced her curtains and made it difficult to sleep. The rumble of trucks and equipment rattled the glasses in her cupboard, and the smell - an acrid blend of chemicals - was all-pervasive.

"My wife was pregnant the whole time the rig was there," Wesley says. There was the din of diesel generators belching soot, and a nauseating mix of chemicals competing with the aroma of dinner. The noise and smells penetrated to the next street over, where Christina Mills lives. Like the Howards and Kronvall, Mills, 65, was attracted to Ponder because of its sleepiness, and bought the fourth house built in the entire development when she moved to the town in 2001. "But when that derrick was up, you would have thought you were in Las Vegas," she says, "and I live one street over."

Devon Energy Corporation, the firm drilling behind their homes, did install a sound curtain to try to buffer the noise. Devon - which bought out George Mitchell and has become one of the biggest operators in the extraction of shale gas - says it is committed to supporting residents. "We are always working to find new and better ways to do what we do with the smallest possible impact that we can have on our neighbours," says Tim Hartley, a Devon spokesman. "Wherever we are, we want to have a healthy, safe, best-in-class operation, so we are committed to that and we have delivered that in the Barnett Shale area for many years."

The curtain did little to muffle the sound or reduce the other effects of **fracking**, say residents. The Howards' baby, Pike, arrived several weeks early. The couple say there is no way of knowing whether that was connected to the **fracking**, but they were very nervous about exposing him to possible chemicals from the process. "He was in really good health, but he was still a newborn," Wesley says. "When you can smell diesel exhaust and you have got other unusual odours, and all the things you don't know about what is going on with industrial stuff, it can be stressful. We didn't know what we were breathing in at any given time, and he was breathing it, too. It was what made his homecoming so stressful."

Two doors down, Kronvall says, her eyes watered constantly when she was at home, stopping only after she had been at work for an hour or two. As well as bouts of nausea and low, throbbing headaches, there was blood when she blew her nose. "I had nosebleeds pretty much throughout the entire process," she says.

Devon says it is not aware of any complaints about health problems suffered after it began its activities at Remington Park, though company representatives attended public meetings from 2011, and were accused by residents of being dismissive of health concerns. In response, Hartley has said, "It would be inappropriate for us to publicly discuss asserted claims."

As well as struggling with the noise and smells, Christina Mills says, there was the dust. One morning she found a gritty white powder all over her car, so she stopped at a car wash on the drive to work. "I went there to wash the stuff off, and the black paint came off with it," she says, still shocked at the memory. "It took the paint off my car."

The three neighbours all tried to stop the **fracking**, or at least get compensation. They sought legal advice and appealed to the town authorities and state environmental regulators. Inspectors for the Texas environmental regulator came out to Kronvall's home, commiserated about the smell and collected air samples, only to report back weeks later that they were unable to detect dangerous emissions.

As the neighbours soon discovered, both they and the developer who owned the meadow behind Kronvall and the Howards were powerless because they did not control the mineral rights. The local authorities had already changed the zoning regulations to allow **fracking** close to their homes, and fought attempts to hold a public meeting about the drilling. Even now, Mills is furious at the way the council treated Remington Park: "They continued to allow them to build and sell homes, knowing full well that they were getting ready to drill behind us."

She is, somewhat to her surprise, angry at the energy company, too. This is a first for Mills. An accountant, she started her career carrying out audits in the oilfields of Oklahoma. She considered herself a supporter of oil and gas. "In 17 years in Oklahoma, never did I see them intrude on a heavily populated area. They made it personal here, and that's when I had a problem. . . They came into the back of our neighbourhood, 300ft from the back fence. That is so intrusive."

There have been cases where energy companies have compensated residents for damage to health and property as a result of **fracking**. The details of these agreements are closely held because of non-disclosure agreements. The Ponder residents, however, were unable to get their lawyer to pursue their case because their property values are too low: their lawyer told them the potential property damages were not enough to make it worth their while.

All the neighbours could do, for the eight months it took to put the wells into production, was watch. Eventually, the rig was dismantled and moved on, leaving two oilwells and three waste tanks in the area just behind their homes. Another three wells, six more waste tanks and a large open pond were erected on the other side of the meadow. Heavy trucks still pull up almost every day to empty the tanks beside the well pad.

There have been scares, too. At the start of this year, a loud whistling sound came out of the tanks and residents wondered if one of the wells was about to blow up. Some residents simply sold up - some for less than they had paid - or rented their homes and moved out.

Mills now uses an inhaler after developing asthma. "I am not ever sick," she says, "but in the past 18 months I've had pneumonia three times." She has missed about eight weeks of work.

"It just seems that this has been my whole life," Kronvall says. "It's hard to remember what it was like before, because this was such a dramatic event to go through. You feel violated. How can they come in and do this, and not even consult with the person? No respect for any kind of human decency or rights, just take what you want. And they will do it in the UK, too, if many lessons aren't learned."

Now it's Britain's time to decide whether it wants a piece of "Saudi America". A report from the British Geological Survey last July significantly increased estimates for the amount of gas sitting beneath the north of England, raising hopes of replicating America's gas rush. The report suggests

there could be as much as 1,300tn cubic feet of gas over an area stretching from Lancashire to Yorkshire and down to Lincolnshire. Depending on what fraction of that is recoverable, the gas could supply Britain for decades. The government began promoting the idea that it would be irresponsible not to take advantage, and talked of opening up lands to **fracking** not only in the north of England, but also in the south-east and Wales.

The chancellor's autumn budget statement last week included generous tax breaks for **fracking** companies. "I want Britain to tap into new sources of low-cost energy like shale gas," George Osborne said. "Shale gas is part of the future and we will make it happen." David Cameron has said that unlocking the shale will transform Britain as it has America, driving down energy prices, creating tens of thousands of jobs and providing new revenue for local councils.

Fracking has not had an easy start in Britain. In April 2011, two small earthquakes and dozens of aftershocks occurred when Cuadrilla Resources drilled its first well in Weeton, Lancashire. The tremors could be felt as far away as Blackpool. The company halted its operations for a seismic investigation, but continued work on its other wells.

Protesters forced companies to delay or back away from other well sites. Even with those challenges, however, the industry remains committed to going ahead. At least six oil and gas companies have announced plans to pursue shale gas in Britain. Cuadrilla has already drilled exploratory wells at Singleton and Beaconsall in Lancashire, and is pursuing another at Balcombe in West Sussex. Celtique Energie and Coastal Oil and Gas have applied to drill in Kent, West Sussex and Wales.

The main industry body, the United Kingdom Onshore Operators Group (UKOOG), expects a number of those exploratory wells to go into production in 2014 or 2015. The pro-industry Institute of Directors said in a report that there could be 100 well sites across the country in the next 10 to 15 years.

The industry maintains that **fracking** in Britain will be vastly different from that in America because of the nature of the geology and more stringent regulations. The Bowland shale is much thicker than the Barnett shale, for example, which, industry experts say, means energy companies will be able to dig many more wells spiralling out from a single site, and so limit the impact of **fracking** above ground. "The reality is there will be a much smaller footprint for the industry," says Ken Cronin, chief executive of UKOOG. "The other reality is that we have a vastly more comprehensive regulatory system in the UK." Unlike in Pennsylvania, where there have been multiple complaints of contaminated drinking water wells, Britain will require that drillers monitor water quality throughout the **fracking** process.

The regulations also require companies to disclose what chemicals they are using, and the British government has already restricted some chemicals used in the US.

Cronin says Britain would also have higher standards for dealing with the enormous amounts of radioactive and toxic waste water that results from **fracking** - some 280bn gallons last year alone in the US, according to a report by Environment America. That's enough to flood all of Washington DC beneath a 22ft-deep toxic lagoon.

Unlike Texas, where waste water from **fracking** is sometimes left to evaporate in open pits, Britain will require sealed disposal units. And unlike North Dakota, where producers simply burned off excess gas, spewing greenhouse gases into the atmosphere, companies will capture the gas and feed it into the national gas supply.

Perhaps most important of all, Cronin says, there would be strict standards for well quality, and regular inspections to ensure there is no escape of frack fluids or gas into the water supply.

Cuadrilla believes that these regulations put Britain far ahead of America in terms of protecting human health and the environment. The company, however, has already been warned by ministers about its performance for failing to recognise the significance of the damage to its well following the 2011 earthquakes, and for failing to report it for six months, according to documents released under the freedom of information act.

The company would respond only to written questions through its PR firm, which continues to maintain that Britain is better prepared for **fracking** than the US, stating: "The regulatory standardisation and world class performance-based regulations make the UK better prepared for a growing shale gas industry sector."

Opponents of **fracking** remain unconvinced. "No system is foolproof," says Caroline Lucas, the Green party MP arrested in August for blocking a drilling site in Balcombe. "No system is entirely robust. We have to make a judgment as to risk and trade-off, and it just seems to me that with **fracking**, even if regulations are tighter than they are in the US, there are risks we don't need to run."

Lucas says she is concerned about water shortages - huge volumes are needed to frack a well - especially in the south-east, and about the risks of bringing a new industry into a much more densely populated terrain than America's **fracking** heartland.

But Lucas's biggest fear by far is that launching a shale gas revolution in Britain will destroy any prospects of action on climate change. "Scientists are telling us that we need to leave four-fifths of already proven fuels in the ground if we are going to have any chance of avoiding two degrees' warming. Therefore to be hunting around for new sources of fossil fuel seems particularly perverse."

Another prominent opponent of **fracking**, the landowner Lord Cowdray, says that if **fracking** went ahead, he could foresee a scenario of well pads scattered across the South Downs. Some of the proposed sites around Fernhurst in West Sussex, he says, are within 600ft of private homes, about twice as far as the Ponder site from Veronica Kronvall's, but still very close.

What Cowdray fears most, however, is that the oil companies are not prepared, or sufficiently insured, to deal with a major contamination event such as a leak of **fracking** fluids or waste into the water supply. "I don't trust the industry," he says. "I think there have been too many contamination events in the past around the world - many we know about and some that we possibly don't."

Can Britain do it differently? Back in his small town in Texas, Wesley Howard says that, as **fracking**

spread from state to state across the US, he often heard that refrain. "That is the same sort of thing that got said in Ohio, when people said, 'Look what has happened in the Dakotas.' Every state in the US, you hear that story get told one way or another: that the ground here is different, that the types of shale here are different, that the rules here are different, that the companies doing it are different."

He goes on: "It's always different but, sooner or later, it is always the same." *

Captions:

Veronica Kronvall's home is the closest to the drill sites in Ponder, north Texas. Since drilling started, she has complained of nosebleeds, nausea and headaches

In **Denton, Texas**, residents gather for a public hearing on **fracking** proposals. Many complain that the drillers' arrival has affected their quality of life

Christina Mills in Ponder says, 'They continued to allow the developers build and sell homes, knowing full well that they were getting ready to drill behind us'

Ponder residents says the drilling companies need to do much more than put up a high stone wall and new landscaping to conceal their ongoing gas extraction work

Wesley and Beth Howard moved to Ponder for the peace and quiet, and to start a family. 'We didn't know what we were breathing in at any given time,' Wes says

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