The Teflon Toxin

The Case Against DuPont

Illustration: Philipp Hubert for The Intercept


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Read DuPont and the Chemistry of Deception, Part 1 of The Teflon Toxin

WHEN JEROMY DARLING WAS 26, he worked in a warehouse that was so big he rode a bike to get around it. One day, as he was pedaling from one place to another, his foot slipped and he bumped his groin on the crossbar. The initial pain was no surprise. What was odd, though, was that the spot he hit continued to hurt for days. Darling was athletic and hearty and, like many young people, hadn't seriously entertained the possibility of illness. But when the pain persisted, he went to a doctor, who diagnosed him with testicular cancer.

Darling had two surgeries to treat the disease — one to remove his testicle and another to remove lymph nodes from his abdomen. The second left him with 76 staples and a profound exhaustion. It was several months before he was able to return to work, and many more before he felt like himself again. Back then, in 1998, it didn't occur to Darling to question why he got sick. He just chalked it up to bad luck and focused on getting better.

Now 43 and living in Parkersburg, West Virginia, just a few miles from where he grew up in Belpre, Ohio, Darling has other theories about his cancer. Both towns are within "the Chemical Valley," which encompasses the hilly area of western West Virginia and eastern Ohio and is home to many big chemical companies.

DuPont's Washington Works plant, one of the area's biggest private employers, sits in a bend of the Ohio River just across the water from Belpre. Lately Darling can't help but think that the sprawling facility, whose smokestacks still poke into the sky near his home, was responsible for his bad luck.

A “Welcome to Parkersburg” sign at Point Park in Parkersburg, West Virginia.

Photo: Maddie McGarvey for The Intercept/Investigative Fund

IT MAY HAVE BEEN LUCK, too — good or bad, depending on what side of the case you’re on — that led the attorney Robert Bilott to sue the DuPont Company. In any case, he was an unlikely person to take on one of the world’s largest chemical companies. A partner at a corporate firm in Cincinnati, Bilott had spent his first eight years as an attorney on the other side of the table, defending large companies like DuPont. But in 1999 a cattle farmer named Wilbur Tennant came to see him. Tennant told him that DuPont had bought land from his family that was adjacent to his farm, for what the company had assured him would be a non-hazardous landfill, according to a letter Bilott later filed with the Environmental Protection Agency. Soon, a stream his cows drank from started to run smelly and black, with a layer of foam floating on the surface. Within a few years, hundreds of Tennant’s cattle had died. Bilott had no way of knowing at the time that what seemed like a straightforward case would lead to one of the most significant class-action lawsuits in the history of environmental law.

In 2000, after spending more than a year on the case, Bilott still didn’t have any idea what had killed the cows. None of the chemicals DuPont had informed him about could explain the die-off. DuPont even agreed to do a study with the EPA on what might have caused the deaths. The study concluded that the Tenants must have mismanaged their animals, declaring that “there was no evidence of toxicity associated with chemical contamination of the environment.”

Wilbur Tennant shot this video in the late 1990s on his property in West Virginia. He died of cancer in 2009; he was 67. This video contains graphic imagery.

It was only after one of the attorneys working on the case stumbled across a document that mentioned a compound called PFOA that he began to solve the mystery. Known within the chemical industry as a “surfactant,” because it reduces the surface tension of water, PFOA — short for perfluorooctanoic acid — was slippery, chemically stable, and a critical ingredient in the manufacture of hundreds of products, including Teflon. Almost no one had heard of the stuff back then. Also called C8 because of the eight-carbon chain that makes up its chemical backbone, PFOA was just one of tens of thousands of unregulated industrial substances manufactured and used by American companies without any significant oversight by environmental or health authorities.

After more digging, the lawyers learned that the Minnesota-based company 3M had just pulled a similar perfluorinated compound, called PFOS, from the market. That led Bilott to make a request that changed the course of the trial about the cows, his career, and the future of the chemical giant he was facing: He asked for all of DuPont’s documentation pertaining to PFOA, or C8, through the legal discovery process.

What he received made it clear that even as the company had been pleading ignorance over what might possibly have killed Tennant's cows, some DuPont employees were very well aware that C8 had seeped into local water. In fact, company scientists had been charting its presence in the Ohio River and nearby drinking water for almost two decades, and had been documenting its health effects since 1954, just three years after DuPont first used the chemical in one of its signature brands: Teflon.

The documents Bilott received included studies showing that the company had known C8 could affect the livers of dogs and humans. The studies also indicated that C8 encouraged the growth of testicular tumors in rats, that exposed workers suffered more frequently from endocrine disorders, and that the company had also documented elevated rates of certain cancers, including kidney cancer, in workers. Bilott learned that the company had been quietly monitoring public drinking water outside its plant and, since 1984, had been documenting C8's presence at potentially dangerous levels. As far back as 1991, DuPont had estimated the C8 in a stream from which cattle drank at 100 parts per billion — which was 100 times greater than an internal safety limit the company had set for drinking water. In 2001, DuPont quickly settled the Tennant case for an undisclosed sum.

Joe Kiger stands at Fort Boreman Park in Parkersburg, West Virginia on Wednesday, August 5, 2015.

Photo: Maddie McGarvey for The Intercept/Investigative Fund

C8 MIGHT SIMPLY have remained a problem for cows if not for another unlikely environmentalist, a Parkersburg elementary school gym teacher and former field coordinator for the AFL-CIO named Joe Kiger. When he first got a letter in October 2000 from the Lubeck Public Service District, the company that provides his drinking water, Kiger almost tossed it. It's easy to see why. Though it was in regular-sized type, the letter had the tone of pharmaceutical fine print — purposefully impenetrable while also clearly designed not to alarm. The district routinely monitored water, it explained, and the detection of something called PFOA didn't necessarily mean that it posed any health risk.

Kiger put the letter aside, but a few weeks later, after a friend was diagnosed with cancer, he went back and reread it. What exactly was this chemical, PFOA? And why was Lubeck telling him about it if it really didn't pose any health risk? He decided to approach the water district and the West Virginia Department of Environmental Protection with these questions. But when he did, he sensed he was being summarily — and nervously — dismissed, which made the teacher only more determined to get answers.

It took months of calls and visits to government offices before someone at the local branch of the federal EPA, who had heard that the Tennant suit had something to do with PFOA, pointed Kiger toward Bilott. The lawyer realized then that the entire water district, which today serves more than 4,000 customers, had been contaminated. In 2001, Bilott filed a class-action suit on behalf of all the people in the area who were exposed

to C8-contaminated water — a group that eventually included Kiger and his wife, Darlene, as well as Jeromy Darling, Ken Wamsley, and Sue Bailey among the roughly 80,000 class members who lived or worked in six public water systems near the DuPont plant in Parkersburg.

Joe Kiger reads a copy of the October 2000 letter from Lubeck Public Service District.

Photo: Maddie McGarvey for The Intercept/Investigative Fund

Kiger didn't realize it then, but drafts of the notification letter, despite being on the letterhead of Lubeck Public Service District, had been reviewed by DuPont, as a former public affairs manager for DuPont named Craig Skaggs admitted when he was deposed in 2002. Had much more time elapsed before Kiger went back to the letter or before he found someone in a public office who was helpful to him, the statute of limitations that had been triggered by the letter might have run out. According to West Virginia law, two years after they had been officially notified of the contamination, anyone exposed to C8 by drinking the Lubeck water would have lost their right to sue.

EVEN CONSIDERING THE remarkable persistence (and luck) of Joe Kiger, Rob Bilott, and Wilbur Tennant, the person who did the most to turn a relatively small dispute over cattle into a mega class-action suit was actually employed by DuPont. Bernard Reilly had been an in-house counsel at DuPont since 1977, and for most of that time he worked in the environmental group within the company's legal department. Reilly was assigned to help with the Tennant case, and he was worried about the possibility of somehow letting potentially incriminating information he was working on slip out. "Each time you put pen to paper or fingers to keyboard and create a new document," he warned his colleagues in an email he sent in September 2000, "assume you will have the plaintiffs' lawyers as recipients since we must produce each and every such document unless it is attorney/client privilege."

"The lawyer for the farmer finally realizes the surfactant issue. He is threatening to go to the press to embarrass us to pressure us to settle for big bucks. Fuck him."

Yet ironically it was Reilly himself who spilled the beans about C8 when he sent personal emails about the chemical through the company's computer system. Consequently, just as Reilly had warned, when Bilott asked for C8-related materials in discovery, he received Reilly's emails, which made clear not just that the company was hiding something, but also that he himself had become part of the story. One of Reilly's emails, for instance, contained the following passage: "The lawyer for the farmer finally realizes the surfactant issue. He is threatening to go to the press to embarrass us to pressure us to settle for big bucks. Fuck him."

Reilly wrote many of his emails, often to his son, from his vacation property in Vermont between October 1998 and May 2002 and interspersed musings about home repair, Otto the family dog, and his favorite snack food (goldfish cashew and almond nutty deluxe snack mix), with candid updates on his legal efforts concerning C8, which he referred to as "the material 3M sells us that we poop to the river and into drinking water."

Reilly's emails made clear that he felt the company had done wrong, first by polluting and then by not addressing the problem once it became known. He even revealed that the company knew the level of contamination had exceeded its own safety limits.

Not only do we have people drinking our famous surfactant, but levels in ambient air above our guidelines, sure we have margins of safety in our number, but we should have checked this out years ago and taken steps to remedy, guess the hills on the other side of the river cause great conditions for ambient levels, the plume hits them before it can disperse more fully. Ugh.

The DuPont lawyer was referring to his employer's "Community Exposure Guidelines," which specified safety limits of C8 in both air and water that were meant to protect the people living near the plant. Using what they knew about the chemical's health effects and how long it remained in human tissue, staff scientists in 1991 had set this drinking water guideline at one part per billion. A level measured above that would present a "risk that needs to be disclosed to the community," one document explained.

Yet the company hadn't disclosed — or remedied — the problem, even when it measured C8 above that amount. Instead, in 1991, just months after realizing that the level of C8 in Lubeck's water had exceeded DuPont's guideline, the company decided to use a new lab to analyze C8 levels in water.

The new lab came up with C8 levels that were, on average, much lower than the results of DuPont's in-house lab.

BY THE TIME THE lawsuits were underway, the company decided to find a lab that would more accurately measure the chemical. In 2001, as Reilly explained to his son, it switched back "to a much better analytical method that may bring in numbers that will alarm citizens."

We learned recently that our analytical technique has very poor recovery, often 25%, so any results we get should be multiplied by a factor of 4 or even 5. However, that has not been the practice, so we have been telling the agencies results that are certainly low. Not a pretty situation, especially since we have been telling the drinking water folks not to worry, results have been under the level we deem "safe" of 1 ppb. We now fear we will get data from a better technique that will exceed the number we have touted as safe. Ugh.

Reilly had been fretting over the company's responsibility for the contamination for some time. "We really should not let situations arise like this," he wrote to his son in 1999. "We should have used a commercial landfill and let them deal with these issues." And he also offered some hints as to why a corporation would knowingly let a toxic chemical seep into ground and water beyond its facility.

The plant tries to save money and apparently did not consider how it might look that this guy's cows are drinking the rainwater that has percolated through our waste.

When he was deposed in June 2015, though, Reilly said he didn't mean to suggest that DuPont should have to pay punitive damages.

Reilly, or "The Bernard," as he signs off on occasion, apparently wasn't privy to much of what DuPont knew about C8's effects on humans — and, at least in 1998, didn't think it harmed them. But he did know there was plenty of evidence that the chemical made lab animals sick. As he made clear to his son, the company was planning to conduct a primate study in 1999, together with 3M, which supplied DuPont with C8. 3M had conducted a monkey study 20 years before that produced disturbing, though not conclusive, findings.

Even before the new primate study was completed, however, Reilly clearly grasped the severity of DuPont's legal problems. Apparently, though, he thought some of his higher-ups did not. While DuPont pressed for a trial in the Tennant case, he felt that going to trial was a bad idea and, as he wrote to his son in 1999, he took it upon

himself to “describe to the plant folks why the guy who is suing us over his cattle grazing downstream of our landfill would crucify us before a jury. … Most simply do not believe how big and bad we would look.”

Preliminary results from the monkey study, released in 1999, only made DuPont look worse. The results showed that C8 caused monkeys to lose weight and made their livers increase in size. The hope had been to find a level at which there were no observable effects. But because even animals given the lowest doses of the chemical experienced enlargement of their livers, and one was so ill it had to be euthanized, no safe level was set after the study.

But DuPont clearly wasn’t ready to give up on its surfactant. Although 3M had decided to stop making C8 in May 2000, just months after the preliminary results of the monkey study were released, DuPont moved to start producing C8 in a new production facility in Fayetteville, North Carolina. Before the plant opened it issued a reassuring statement to the people in the area surrounding the facility: “DuPont has used [C8] for more than 50 years with no observed health effects in workers.” Charles Holliday, the company’s CEO at the time, testified in a sworn deposition in 2004 that after overseeing “very extensive scientific analysis” he believed the chemical was “safe in the way we use and handle it.”

A view of Parkersburg, West Virginia and the Ohio River from Fort Boreman Park on Wednesday, August 5, 2015.

Photo: Maddie McGarvey for The Intercept/Investigative Fund

IN SEPTEMBER 2004, DuPont agreed to settle the class-action suit filed by Bilott’s firm and two others, which covered a class that had ballooned to 80,000 people in six water districts. The agreement was approved in early 2005 for an amount that could reach $343 million and was unusual in a number of ways. Generally, a legal settlement marks the end of a case, when attorneys and clients divvy up the cash and move on. Because the burden of proving that exposure to an unregulated chemical causes health problems is so onerous, plaintiffs who get any money in such cases may be especially inclined to let the matter drop. But the 2005 settlement of the C8 class-action lawsuit was also a beginning. Instead of just cutting checks, the agreement created a health project to collect medical information on the exposed population and determine whether exposure to C8 had actually harmed people.

At first, some doubted that the health project could enroll enough people to be useful; huge numbers of participants are usually necessary to show that a chemical causes harm. But the team of local researchers, headed by a retired physician named Paul Brooks and a former hospital administrator named Arthur Maher, threw themselves into the task. In part by offering each participant $400, they managed to interview and collect blood samples from 69,000 people who had lived or worked in the six affected water districts for at least a year.

The settlement also created a separate group called the C8 Science Panel composed of three physicians, Kyle Steenland, Tony Fletcher, and David Savitz, who all had backgrounds in epidemiology and public health and were chosen and approved by both teams of lawyers. The science panel used the blood samples and questionnaires from the health project and also conducted its own studies, which were published in peer-reviewed journals and posted on the science panel's public website, to determine whether any diseases were linked. If they were, the agreement said, DuPont would filter the local water for as long as concentrations of C8 exceeded regulations and set aside $235 million for ongoing medical monitoring of the community. Plus, any of the class members who developed the linked diseases would be entitled to sue for personal injury. DuPont, moreover, agreed not to contest the fact that exposure to the chemical could cause the diseases.

By the time the C8 Science Panel completed its work in 2013, its members had spent eight years and around $33 million exploring the connections between C8 and human health. The panel even came up with a model that could estimate residents' exposure levels based on where they lived and historical concentrations of C8 in air, groundwater, and the Ohio River. Linking that information to health data helped the three scientists find likely connections to six diseases: high cholesterol; a form of bowel disease called ulcerative colitis; pregnancy-induced hypertension; thyroid disease; testicular cancer; and kidney cancer.

Their results skewered DuPont's hopes that its animal data might not apply to humans. They also flew in the face of a long-held belief about how chemicals affect people: that the dose makes the poison. That truism, generally attributed to the work of the 16th-century physician Paracelsus, has served as one of the starting points of modern toxicology. And this logic may have led DuPont scientists to conclude, or at least hope, that the small amounts of C8 people living near the plant ingested wouldn't hurt them.

But Paracelsus hadn't heard about endocrine disruptors, a recently discovered class of chemicals, to which C8 belongs, that interfere with the hormonal system. When graphed against the amount of chemical exposure, the health effects of endocrine disruptors often don't take the expected form — an upward sloping line, with the lowest point on the left, where doses are lowest, and the effects steadily increasing along with the exposure levels. Instead, when plotted, the effects of endocrine disruptors can look like an upside down "V" or an upward slope with a dent in the middle, reflecting the fact that effects can, at certain levels, drop even as exposure increases.

Even though the level of C8 contamination required for a water district to become part of the class-action suit was low — just .05 ppb — the data gathered from class members showed apparent health effects. That limit had been chosen because at the time it was the lowest level that could be reliably measured.

The science panel data has since been used to link C8 with other effects beyond those six diseases, but according to the terms of the suit, the list of diseases cannot be amended. The attorneys' clear-cut solution fell short of capturing the messy science of epidemiology. According to panel member David Savitz, a professor of epidemiology at Brown University, scientists still haven't untangled all of the ties between C8 and disease. "It is quite possible, even likely, that some of the diseases we found no probable link for will, in time, turn out to be related to C8," he said. Of course, as a careful scientist, Savitz knows that the contrary is true as well, because everything in science is potentially falsifiable. "But it's also quite likely that some of the diseases for which we did declare a probable link will turn out, with improved research, to have been incorrectly judged when they are not associated with risk of those diseases. There was very little research done before the C8 Science Panel's work, and while we extended the research considerably, it was and remains quite limited for drawing firm judgments." It's that permanent and irresolvable uncertainty that companies like DuPont are so adept at exploiting.

However, recent studies published in peer-reviewed journals such as *Human Reproduction, Occupational and Environmental Medicine,* and *The Journal of Pediatrics* have tied C8 to an incredible range of health effects, including ovarian cancer; prostate cancer; lymphoma; reduced fertility; arthritis; hyperactivity and altered immune responses in children; and hypotonia, or "floppiness," in infants.

Jeromy Darling stands outside of his home in Parkersburg, West Virginia on Tuesday, August 4, 2015.

Photo: Maddie McGarvey for The Intercept/Investigative Fund

HAD THE C8 HEALTH project not reached the number of people it did, or had the science panel not been as diligent about crunching all the data, epidemiologists might not have been able to recognize the elevated disease rates for what they were. In the water district with the highest level of exposure — Little Hocking, Ohio — there were eight cases of testicular cancer, a seemingly small number that is five times what would be expected in an unexposed population of that size. For kidney cancer, the rate of disease was up to two times higher than usual.

The link to high cholesterol, while clear enough to have been recognized and agreed upon by all three physicians on the science panel, also might have been missed because the study results were so nuanced. Yet in part because the study was so large, the researchers were able to show that the greater a person's exposure to C8, the greater his or her chance of having elevated cholesterol.

Together, these diseases became part of a pattern. Considered in isolation, however, each illness is typically seen as a chance occurrence, which is what Jodie Boylen thought when she was diagnosed with kidney cancer. A lawyer who works on child neglect cases in the prosecutor's office in Parkersburg, Boylen had been feeling exhausted before her doctor found her tumor in 2013. At that point, the link between C8 and kidney cancer had already been made by the science panel data, though she hadn't heard about it. When she did, from a colleague who was working on the class-action case, she joined the class. Boylen also began thinking about the house she had lived in with her three children between 1989 and 1998. Not only was it in one of the affected water districts, their house was right on the shore of Lake Washington, a small body of water that was just a mile from the DuPont plant. "We drank it. We swam in that lake every day we could," Boylen, now 53, remembered recently. "We lived in that lake in the summer."

Boylen had surgery to remove her kidney tumor in 2013 and is hopeful that the cancer won't return. But she still worries about her children. "They were in the water more than I was, they went to school in that district," she said in a recent interview in her Parkersburg home. "What's going to happen to them in a couple of years?"

Jeromy Darling, too, is now cancer-free. But 17 years after his diagnosis, the financial legacy of his ordeal is still with him. Because he was uninsured at the time of his illness, he wound up declaring bankruptcy after being hit with more than $75,000 in bills for his surgeries. "I had all the good cards, all the good interest rates. All that went away," he said in a recent interview. "It's embarrassing. I work forty-plus hours a week and I can't get a credit card now."

Darling was unable to buy a house because he couldn't get a mortgage, so his girlfriend of 20 years bought their current home by herself. And he hasn't married her because he didn't want his bad credit history to rub off on her good one. The couple even changed their plans about having children together after Darling's doctors told him his sperm count was greatly reduced due to his cancer diagnosis. "We didn't try because you don't want to have that disappointment," he said. "It's almost better to put it out of your mind."

When they got together, each of them had already had one child. Like Boylen, Darling is focused on the children's health and the fact that they grew up in the chemical valley, drinking the same C8-contaminated water he did.

TO DATE, SOME 3,500 personal injury claims have been filed as part of the 2005 class-action settlement. The first trial, scheduled for September in Columbus, Ohio, takes up the case of Carla Bartlett, who maintains that her kidney cancer was caused by exposure to C8. Attorneys for DuPont, because of the terms of the class-action settlement, will be unable to contest the general causal connection between kidney cancer and C8 exposure, but they will almost certainly argue that other factors are more likely to be responsible. The deposition of a DuPont expert named Douglas Weed suggests a possible line of attack: that Bartlett, who lives just a few miles downriver from the DuPont plant, developed the cancer because she's overweight. Or, perhaps, just by chance.

The role of luck — that two things often correlate just by chance — was a major point of Weed's testimony, for which DuPont paid the former employee of the National Cancer Institute more than $100,000. During his deposition in March 2015, the doctor estimated that since leaving the government agency eight years ago he has made between $5 million and $6 million providing expert testimony to companies in such corporate defense cases.

Surely, after all that they've endured, Bartlett, Darling, Boylen, and the other plaintiffs would agree that sometimes bad things just happen. But their list of unfortunate — and unlikely — occurrences would no doubt include the leakage of a toxic and biologically potent chemical into their water and the subsequent contamination of their bodies, where it may have caused diseases that have forever changed their lives.

Perhaps the most remarkable and unlikely occurrence of all is not the fact that the contamination happened, or even that it turned out to be harmful, but that it was discovered. It's easy to imagine how — without Tennant, Bilott, or Kiger; without Reilly's revealing emails; and without the exuberance of the health project and the diligence of the science panel — DuPont's secrets might never have emerged. Had the stars aligned that way, C8 would still be largely unknown, just one of the tens of thousands of unregulated chemicals we don't notice as they silently pollute our world.

EDITOR'S NOTE: DuPont, asked to respond to the allegations contained in this article, declined to comment due to pending litigation.

In previous statements and court filings, however, DuPont has consistently denied that it did anything wrong or broke any laws. In settlements reached with regulatory authorities and in the class-action suit, DuPont has made clear that those agreements were compromise settlements regarding disputed claims and that the settlements did not constitute an admission of guilt or wrongdoing. Likewise, in response to the personal injury claims of Jodie Boylen, Jeromy Darling, and others, DuPont has rejected all charges of wrongdoing and maintained that their injuries were "proximately caused by acts of God and/or by intervening and/or superseding actions by others, over which DuPont had no control." DuPont also claimed that it "neither knew, nor should have known, that any of the substances to which Plaintiff was allegedly exposed were hazardous or constituted a reasonable or foreseeable risk of physical harm by virtue of the prevailing state of the medical, scientific and/or industrial knowledge available to DuPont at all times relevant to the claims or causes of action asserted by Plaintiff."

When contacted by The Intercept *for comment, 3M provided the following statement. "In more than 30 years of medical surveillance we have observed no adverse health effects in our employees resulting from their exposure to PFOS or PFOA. This is very important since the level of exposure in the general population is much lower than that of production employees who worked directly with these materials," said Dr. Carol Ley, 3M vice president and corporate medical director. "3M believes the chemical compounds in question present no harm to human health at levels they are typically found in the environment or in human blood."*

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Coming next: Part 3, How DuPont slipped past the EPA

This article was reported in partnership with The Investigative Fund at The Nation Institute.

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