CHAPTER 3

DuPont Washington Works: A History of Contamination

By the time the Tennants' attorneys discovered C8 in their water in the summer of 2000, the chemical had already made its way into at least six nearby public water supplies. But that was no secret to DuPont officials, who had been monitoring the migratory progress of the substance for more than fifteen years.

First alerted to the presence of PFOA in a neighboring trailer park and municipal well field, the company had been covertly testing area water supplies specifically for the purpose of detecting the substance. Instead of going through the typical channels to obtain a sample of water from the supplier, company officials clandestinely collected their own from a store and a residence. The testing was most likely prompted by a body of evolving evidence indicating that C8 levels in workers were higher than anticipated, while very low doses caused problems for some laboratory animals.

In 1984, as shared data from 3M and DuPont led to ever more disturbing questions about the safety of PFOA, DuPont received internal test results indicating that three old unlined waste disposal ponds at the plant site were leaching C8 into ground water and migrating into nearby public water supplies. Sampling performed secretly indicated that Lubeck, West Virginia, drinking water, which had supply wells located near the ponds, was delivering supplies containing as much as 1.5 parts per billion in 1984, an amount that would increase to 2.2 parts per billion by 1988.

The results provoked the company to act immediately to remove the most apparent source of C8—the sludge from the bottom of the old digestion ponds. They dug up approximately 7,100 tons of

contaminated sludge and dumped it into the newly acquired Dry Run Landfill as part of a major project that concluded in 1988.

According to court documents, the Tennant cattle began to die shortly after the massive dumping project began.

Interestingly, DuPont didn't stop with the removal of the presumed source of the discovered C8 contamination, but the corporation also took the preemptive move of relocating the Lubeck Public Water District's well field. In a clever scheme that went unquestioned at the time, DuPont arranged to purchase the tainted well field, which was located directly beside the plant along the Ohio River, claiming it was needed for expansion. The corporation purchased land for a new well field and helped the district with the necessary improvements—all without mentioning the true motivation for the project. In 1988, it seemed like a win-win situation for the residents of Lubeck, West Virginia. However, within just a few years, the new water source would also become contaminated with measurable amounts of C8. That's because even though DuPont had taken steps to treat the surface problem, they may have overlooked or underestimated the chemical's amazing ability to migrate.

In addition to the Dry Run Landfill near the Tennant property, which started the public awareness of the controversy, DuPont Washington Works has historically been associated with several other chemical dumping sites for PFOA.

In 2002, DuPont provided the EPA with a history of its disposal methods for C8.

From the experimental phase in the 1940s to the rise of consumer use in the late 1960s, C8-related industrial waste was initially disposed of in the Riverbank Landfill located at Washington Works. The landfill is reported to be 4,500 feet long, or about 250 acres, and situated near the Ohio River.

The landfill included the three old anaerobic digestion ponds mentioned previously. The cells were operated from 1964 to the middle 1980s.[1] According to state permits, approximately 144 tons of waste per year was disposed of in the landfill. One pond was put into use beginning in the 1950s. Two more were added in the 1970s. The ponds received C8 and other waste until 1988 when the contents were removed and dumped at the Dry Run Landfill. Following its closure, the landfill was covered with soil, paved over, and a portion of it was built upon. However, given the chemical's remarkably pervasive properties, these extensive methods did nothing to address the problem of groundwater contamination.

Beginning in 1948 through 1965, DuPont employed a burning ground located in the central portion of the manufacturing facility for the disposal of C8. Since 1990 the former burning ground has been excavated and backfilled, and has become the site of new construction. From 1959 to 1990, DuPont also operated two brick-lined waste incinerators at Washington Works. After their use was discontinued, they too were excavated.

In the early 1960s, DuPont began operating the Letart Landfill, which lies thirty-five miles southwest of Washington Works and just north of Letart, West Virginia, in Mason County, for portions of its perfluorochemical-related industrial waste. The landfill covers about 17 acres of a 205-acre parcel owned by DuPont. It was operational until 1995 and finally capped in 2001.[2]

Long before DuPont operated the Dry Run Landfill, which started in 1986, the company was dumping C8-related waste into the Letart Landfill. DuPont's own documents indicate that it was trucking industrial/chemical waste from Washington Works to Letart for disposal from the early 1960s to 1995. During that time DuPont reports disposing of about five million pounds of waste per year at the site.[3] More recently, Washington Works was asked to quantify the total amount of C8 dumped at the Letart Landfill. In a July 2006 report to the EPA, Robert Ritchey, the plant's senior environmental control consultant, estimated the C8 contained in the waste at around 21,400 pounds.[4]

DuPont's own historical sampling data indicate that levels of C8 in leachate from the site have reached as high as three parts per million. In 1991 and again in 1994, C8 in surface water samples from an upper pond on the site contained more than four parts per million.

A document filed with the EPA says in April 2001 DuPont completed work on an engineered cap system designed to prevent materials in landfills from coming into contact with surface water.[5] The two most contaminated ponds at the Letart Landfill, the Upper and Lower Ponds, no longer exist. They were sealed off as part of the capping project.[6] However, two points of concern remain—the leachate basin and a stream located slightly east of the property along West Virginia State Route 33. DuPont assumes that ground water contaminated with C8 eventually makes its way into the Ohio River, but the company claims this happens only at very low levels, although no data exist on the precise amount of contamination still making its way into the river.

Interestingly, in a historical data report to the EPA, DuPont officials also recognize the potential for people and the environment to become exposed to materials from landfills, and therefore C8, via storm runoff. However, they seem to minimize the prospect.[7]

Several data gaps exist with regards to the Letart Landfill. For instance, in the 2003 report, company officials were not able to conclusively report on the status of any seeps or leaks in the valley walls, which may be contributing to local environmental pollution. They were also not able to provide information regarding the amount of C8 in the Ohio River or in a number of area lakes and streams in proximity to the chemical dump.

Unfortunately, people who live in Mason County, West Virginia, were not made aware that their water was contaminated with C8 until 2005. Even then, they weren't told directly.

In the summer of 2005, a groundbreaking scientific study, the C8 Health Project, began as a means of settling the class action lawsuit filed against DuPont for the contamination of water supplies near Washington Works. The project was a condition of the settlement and its purpose was to determine once and for all if any health effects were caused in people by exposure to C8. Its outcome will be a major factor in determining the final cost of PFOA for the corporation.

Despite the 2002 discovery of C8 in local water supplies, word about the contaminated water had not reached some of the isolated portions of the exposed population. Specifically, the folks in rural Appalachian Mason County were not aware they were exposed until the C8 Health Project initiated community meetings as a means of encouraging participation. In other words, until that time, they had no idea they were part of the class affected by the contamination in the suit against DuPont. They had no idea their water source lay in close proximity to the perimeter of one of the largest C8 dumping grounds—the Letart Landfill.

The Dry Run Landfill was put into operation by DuPont in 1986, after the land was purchased from the Tennant family. It covers about 17 acres of a 535-acre parcel owned by DuPont.[8]

In the late 1980s the company landfilled the contents of three polluted ponds from Washington Works at Dry Run. Sludge dumped into the landfill from the ponds contained high levels of C8,[9] as the ponds were some of the original disposal sites for the plant's manufacturing waste. A letter from attorney Robert Bilott to the EPA claims, "DuPont confirmed C8 levels as high as 610 parts per

million (or 610,000 ppb) in the sludge taken from the three ponds."[10] In all, Dry Run received 7,100 tons of sludge and waste dug up from the old disposal ponds at Washington Works. The materials were estimated to contain 4,500 pounds of C8.[11]

DuPont has taken surface water samples to detect C8 since 1996, and the levels appear to be diminishing over time, from a high of 62 parts per billion down to 27.4 parts per billion. Groundwater sampling also began in 1996, but the concentration of C8 has not steadily decreased over time.[12]

Soon after the huge excavation projects of the late 1980s and early 1990s, DuPont company officials learned that even their extreme removal measures, which were taken to clean up the seemingly most exposed sites, were not enough to prevent further environmental contamination. Despite the post-1990 excavation and construction at the Riverbank Landfill, its ponds, and the burning ground, in 1992 an internal DuPont investigation found evidence that C8 was still being released into the soil and groundwater.

Surface water outfalls measured at the plant site in 2000 and 2001 displayed erratic results, ranging from 1.43 to 199 parts per billion. However, in 2001 DuPont Washington Works began to see a significant decrease in the amount of surface water contamination as the result of the installation of a carbon absorption treatment system in the fluoropolymer division. The system was designed to remove a percentage of C8 from the process wastewater.

While there was some hope initially that this type of carbon filtration technology might provide a cost-effective solution for people with contaminated drinking water who were seeking to lower their PFOA exposure, there is only minimal evidence that commercially available home filtration systems would be effective in removing C8.

DuPont's granular-activated carbon treatment system at Washington Works uses a special type of industrial food-grade carbon product made by Calgon, which is quite different from the sort of carbon used in a typical store-bought water filter to remove taste and odor. So far it has not been proven that any filtration product on the market is capable of removing C8.[13]

Carbon, in this case the anti-Teflon, removes certain impurities from water by adsorption, or by making them stick to the carbon surface. Over time the carbon gets used up or saturated and must be replaced. The life of the carbon is dependent on many factors. Carbon that is not replaced can be an ideal breeding ground for nasty bacteria, which can also easily make its way into the water.

So the specific filtration technology developed by DuPont for use in its plants may not be practical without industrial maintenance.

While Washington Works has its own production wells, which are also contaminated with C8, strangely enough they are not nearly as contaminated as some of those belonging to the facility's neighbors. The plant's own water supply, which is used both for employee consumption and industrial processing, historically indicated readings of 0.213 to 0.589 parts per billion. Groundwater testing revealed that concentrations below the ground at the plant were widely variable, ranging from less than 0.1 parts per billion to 13,600 parts per billion. The highest concentrations were detected in monitoring wells near the old digestion ponds.

Nearly all of DuPont's reported disposal sites for C8 from Washington Works, including both the Dry Run Landfill and the Letart Landfill, eventually drain into the Ohio River. However, the corporation has not yet determined the exact amount of contamination that has been—or is still—being discharged into the river.

In the late 1980s DuPont's medical and science experts at Haskell Laboratories set about to define an acceptable level of C8 exposure for the environment and people surrounding the plant site. This internal guideline for determining how much was too much signifies the company's search for a "safe level" or a level of C8 exposure that would not produce negative effects.

Subsequently in 1987, DuPont toxicologist Gerald Kennedy concluded "an acceptable level for C8 in the blood of workers would be 0.5 parts per million (or 500 parts per billion)," based on the accumulation of PFOA observed in new workers who were exposed by inhaling steady airborne concentrations for eight hours each day. In a memo to the manufacturing division, Kennedy further reported, "An acceptable level for community drinking water would be 5 parts per billion for drinking water."[14] However, by 1991, DuPont would revise their Community Exposure Guideline (CEG) or safe level down to 1 part per billion.

At some point in the early 1990s, realizing the problems associated with the continued dependence on C8, DuPont officials drafted a strategic plan for dealing with the chemical.[15] At the time, the corporation was clearly looking to supplant the substance, but having tested dozens of alternatives, they were still unable to find a suitable replacement.

The document hinted at widespread uses for the substance, saying it was "used for the manufacture of Teflon fine powder, dispersion,

fluorinated ethylene propylene copolymer (FEP), perfluoroalkoxy (PFA), and micropowder fluoropolymers and Viton and Kalrez fluoroelastomers."

Interestingly, the report also included a few rare words on actions taken to protect employees.

"Historically, it had been received as a dry powder. However, to reduce employee exposure to C8 purchase and use has been shifting to aqueous solutions."

Some of the older Teflon division plant workers still talk about being up to their elbows in the stuff. They are often heard to explain C8 is "just soap," because some of them have quite literally had their bare hands in the stuff in the form of a white powder. But once concerns about health risks began to surface, the company transitioned its processes to make use of a liquid form, in part to reduce the chances of exposure by inhalation. In time, DuPont would take other measures to shield employees. By 2003, workers in the Teflon division at Washington Works had to wear protective gloves, masks, and goggles when handling C8.

Perhaps the most startling piece of information contained in the planning document was the matter-of-fact admission that the company was willfully discharging the unregulated substance into several rivers. The DuPont study, dated September 15, 1994, said, "C8 is released into the Ohio, Delaware, James and Merwede Rivers, and Sugura Bay."[16]

"C8 is found in the groundwater below the Dordrecht[17] and Washington Works sites and at low levels in the Parkersburg Lubeck water system and in the water supplying the sanitary water to the Washington Works site. C8 levels in these waters are all below the Community Exposure Guideline of 1 part per billion except that Washington Works groundwater has 2 to 3 parts per billion. C8 has been found in the surface and groundwaters around the landfills used by Dordrecht and Washington Works. The Letart Landfill, primary landfill at the Washington Works, is scheduled to close at the end of 1995. C8 containing materials are no longer placed in the other two landfills used by Washington Works."

Over decades of testing, DuPont's best scientists had been unable to come up with a fully appropriate substitution. As much as company officials might have liked to replace it, they were still looking for an alternative that would preserve their bottom line and salvage the miraculous properties of PFOA while losing those less desirable pervasive and toxic attributes.

"Search for replacements date back to 1979. The initial efforts indicated that Zonyl TBS was the best potential candidate. Initial use of Zonyl TBS was in 1986 in the FEP process. Use grew to 25 percent of the FEP product line, but has since been reduced to less than 10 percent due to operational difficulties."[18]

During the time the company was discussing alternatives, it planned to begin landfilling what they called "Teflon waste" at a new facility—the Dry Run Landfill in West Virginia.

While working as a beat reporter for a local newspaper in 2003, my coverage of C8 led to a rare invitation to tour the Teflon division of DuPont Washington Works, located about seven miles southwest of Parkersburg, West Virginia on State Route 68 on the Ohio River.

At the time, I served in the humble capacity of government reporter for *The Marietta Times*, a small daily paper serving Washington County, Ohio, which lies just across the mighty Ohio River from Wood County, West Virginia. The tour came in the midst of hearings on the class action suit filed against the company by people whose water was contaminated with C8. The tone was friendly, as have been all my dealings with DuPont personnel, and it was no secret that the company was looking to deflect some public criticism and improve its lawsuit-battered image.

Washington Works' manager Paul Bossert, Teflon plant superintendent Robbin Banerjee, and media liaison Dawn Jackson all were available to explain the company's plans and processes.

The tour gave me a new appreciation for the difficult technical subject of my writing. For perhaps the first time, C8 was a tangible thing I could see, housed in oversized plastic containers and barrels in warehouses. The controversial chemical also became more authentic with the realization that the mysterious manufacturing recipes that provide mommies like me with the miracles of modern science were being concocted in this place every day.

Interestingly, upon arriving at Washington Works at 10:00 A.M. on Thursday, August 14, 2003, we were not immediately permitted to enter because one area was in the process of evaluating an industrial accident. It turned out to be some sort of spill that was quickly contained and explained away as nothing more than a minor inconvenience.

During the brief delay as the sirens blared sporadically, alerting thousands of busy workers, we sat in a quiet lobby, shielded from the regimental hazmat drill inside. Even though the alarms were

sounding, the workers we did come in contact with were obviously unfazed by the incident and well acquainted with their protocols.

It impressed upon me that although I found the situation a little unnerving, hazardous materials are simply part of the culture of the economy of the Polymer Alliance Zone. The chemicals and their smells are as routine and customary to a child of the Mid Ohio Valley as the noxious fumes of a cattle yard are to the papoose of the prairie.

In an attempt to diffuse fears over the contamination problem since the 2001 public discovery of PFOA in public water supplies, DuPont has aggressively pursued technology to clean up emissions from Washington Works.

In 2002, DuPont finished construction on a state-of-the-art, leak-proof plant in North Carolina in preparation for taking over the nation's C8 manufacturing business. Of the $23 million cost, nearly $7 million was used to pay for pollution-control measures. The intent was to provide the company with an emission-free means of producing the vital substance. By October 2003, all of DuPont's PFOA was made at the new Fayetteville Works and then transported to Washington Works for manufacturing applications.

On the tour of Washington Works in 2003, plant manager Paul Bossert and Teflon plant superintendent Robbin Banerjee explained the hurdles the company was facing in the development of cleaner PFOA technology—and the specific steps they were taking to overcome them.

In the process of developing methods to clean up emissions from the plant site, the corporation discovered a means of capturing PFOA for reuse, which instantly became valuable technology. In an unprecedented move, the company shared this proprietary knowledge—specific technology that otherwise would have been considered confidential business information—with their industrial competitors around the world to further the global cleanup effort.

Since the corporation's scientists were refining their knowledge about constraining C8 even as pollution-control equipment was being constructed, at one point Washington Works was fitted with more than $1.5 million worth of scrubbers that were not practical or effective at removing PFOA from the steamy air emissions. The detergent properties of the substance caused it to expand and bubble, defeating the intent to capture and minimize. With the new equipment already in place, the company's technicians went back to the drawing board and engineered a honeycombed columnar system

that used the steam to force the C8 through the filtration system where it is recaptured and contained—all with another multimillion dollar price tag.

All these efforts came in the midst of a class action suit filed in Wood County Circuit Court on behalf of tens of thousands of people whose water had been contaminated with C8.

The pinnacle of the DuPont tour involved climbing the recently constructed cylindrical scrubber stacks, which seemed so small from the road. The landmark came to life as we scaled ten-story-high columns with zigzags of stairs. From the view at the top, Little Hocking, Ohio, appeared only a stone's throw away, illustrating exactly how that small rural community came to be the most contaminated place on earth.

CHAPTER 4

Welcome to Little Hocking, Ohio: The Most C8-Contaminated Place on Earth

The rural community of Little Hocking, Ohio, covers miles and miles of rolling hills mixed with the prettiest prairie farmland and riverfront property in southeastern Ohio. Named for the Little Hocking River, it's a patchwork of pastures dotted with farmhouses and subdivisions and lined with fishing and trailer lots—the places where people gather to recreate and enjoy the convergence of the Little Hocking and Ohio rivers.

If Little Hocking sounds like a strange name for a river, according to local legend, the Adena Indians called the river Hock-hocking, a word meaning bottleneck or twisted.[1] No doubt the mound builders were describing the path of the river itself, with all of its bends and turns. The organized village of Little Hocking lies close to where the Little Hocking River spills into the Ohio River.

About twelve thousand people live in and around the sprawling Little Hocking area—from retired couples enjoying a quiet, virtually crimeless, rural life to young families with children attempting a slower, more traditional way of life than the city can give them. Parts of the community include neatly planned subdivisions full of new construction, while others are heritage farms that have been owned and worked by generations.

The rural nature and culture of the people of Little Hocking extend even to the amount of water they use. Water usage in rural areas is typically less than for "city dwellers." It's generally assumed that "country folk" are more accustomed to private wells, which produce less, so they naturally learn to conserve. Talk to a resident and ask him if he lets the water run while he brushes his teeth.

He'll just laugh and look at you with an incredulous stare. Who would waste water that way? This rural concept of water usage is borne out by the numbers. According to the Ohio Environmental Protection Agency (OEPA), Little Hocking customers used an average of approximately 67 gallons per capita from 2001 through 2005. But in the neighboring city of Belpre, customers used an average of 135 to 172 gallons per person from 2000 to 2003. Compare these usages with the United States Geological Survey statistics showing average water use nationwide of 80 to 100 gallons per person per day and there's a glimpse into the "waste not, want not" mindset throughout the rural valley community.

Although DuPont officials had knowledge at least as early as 1984 that the public water supply that served the area was tainted with C8, the people who drank the water weren't notified until 2002. Unlike some other contaminants, there are no apparent signs of C8 exposure. There is no telltale smell or taste. PFOA is invisible, and it degrades silently. For two decades the rural water company remained unaware that its water had been sampled for C8. Some time after the fact, internal documents revealed that DuPont personnel went to a local store, collected water, analyzed it secretly, and kept the information hidden away in their own confidential business files. There were no federal, state, or local regulations requiring testing for the substance. And due to the proprietary nature of the industry, there were no publicly available laboratories qualified to test for the chemical. In short, nobody realized there was a problem with Little Hocking's water, and nobody could have verified it even if they had suspected.

In 2001, there were rumblings about something in the water. Samples collected late that year signaled the beginning of the end of the company's ability to keep the C8 in the water a secret. These and subsequent tests would reveal that Little Hocking had the highest levels in water on record for a public water supply. This evidence would turn Little Hocking into ground zero in the battle over PFOA, and the little water district that served thousands of people would become a leader in the fight for cleaner pollution-control technology.

The village of Little Hocking has its own unique place in the history of the world.

Future president George Washington camped in the beautiful wilderness at Little Hocking along the mighty Ohio River in 1770.

In 1788, an organized group of Revolutionary War veterans and their families known as the Ohio Company settled first Marietta and then Belpre, Ohio. However, they decided that the Little Hocking area was too dangerous because the Indians loved it too much and frequented the area too often. The prevailing notion was that they might also be willing to defend it more vigorously, so the founding fathers decided to leave it alone.

One year later, a lawyer named Nathaniel Sawyer overlooked this advice and independently began building his homestead in the place that would become Little Hocking. In time others joined him and a village was organized.

In the subsequent two hundred years, the population of the village of Little Hocking has never grown beyond a few thousand. The surrounding area has remained primarily rural with a strong agriculture-based economy despite industrial growth and commercial development.

When it was incorporated in 1968, the Little Hocking Water Association was formed to serve about 360 households. Land for a well field was purchased along the Ohio River where the water was abundant and it was relatively easy to design wells with sufficient capacity for a public supply. Many areas of Washington County have bedrock with low water yields, so large water supplies are confined primarily to river valleys.

Coincidentally, industry typically has a need for large volumes of water and also located along these river valleys where water for processing, cooling, and transportation was abundant. Due to the growth and modernization of the rural area, over time the nonprofit Little Hocking Water Association became the largest rural water system in Washington County, Ohio, with more than 4,000 water taps, 250 miles of water lines, 7 booster pump stations, 8 water tanks, and 4 water wells. In 2002, it was learned that all of them were contaminated with the manufacturing substance C8—most likely as the result of emissions from DuPont Washington Works. The largest polymer engineering facility in the world is located just across the river from Little Hocking's well field.

Apart from its modern-day proximity to Washington Works, local historians recognize the well field as the setting of a legendary tale. Within yards of the corner of the property lies a memorial stone dedicated to an early pioneer named Major Nathan Goodale. He was a native of Massachusetts, a Revolutionary War officer, and the first commandant of the Belpre settlement, which was first known

as Farmer's Castle. He arrived in Ohio in August 1788. The marker says he was "Kidnapped by Indians on this farm March 1793 *never returned.*"[2]

Part of the difficulty in envisioning just how close the Washington Works plant is to the Little Hocking well field is a common misconception about geography. The Washington Works plant, after all, is in West Virginia, while Little Hocking's well field is in Ohio. Since we are talking about two different states, one might have the impression that there is some distance involved. However, from the banks of the river in the Little Hocking well field, the plant stretches out on the horizon like a sprawling city. Even the sounds of the manufacturing facility are evident, muddled only by the hum of occasional river traffic. Only a few hundred yards of the Ohio River separate DuPont's towering plant from the land above the rural water supply.

For the largest percentage of Americans, tap water is provided by a public water company. According to the EPA,[3] 90 percent of all Americans, or about 268 million people, receive their household water from publicly supplied sources. As such, a body of elected officials oversees operations and may be held accountable for quality—both to consumers and the EPA.

In the case of Little Hocking, the rural public water company serves customers in several voting districts and even in different counties. The service territory includes parts of eight townships (Barlow, Belpre, Decatur, Dunham, Fairfield, Palmer, Watertown, and Wesley townships) in Washington County, Ohio, and Rome Township and Troy Township in Athens County, Ohio. Because of this, every year on the first Monday in March, the association holds an annual meeting to elect a seven-member board of directors. Every customer has the right to vote as a member of the association. The water belongs to each and every member; the responsibility for overseeing the production, conveyance, operation, maintenance, and expansion of the water system belongs to members of the board.

Board members were officially alerted to the presence of C8 in the Little Hocking system in 2002. Having an unknown and unregulated contaminant in its water supply suddenly catapulted a slowly and deliberately expanding system concerned primarily about pipes and towers and leaks into new and unfamiliar territory. Plans for growth were halted indefinitely. The board had a new set

of problems, and there were infinitely more questions than answers. To their credit, even when faced with the burden of additional work and under the stress of engaging in potentially uncomfortable negotiations with an industry giant, and even as their water supply became known as "the system with the highest levels of C8 in the world," the seven-member board of the Little Hocking Water Association changed by only one member from 2001 to 2006. In March 2006, one retired DuPont worker decided not to seek another term, and a new board member was elected to take his place. For the most part, several prior elections were uncontested.

The story of C8 might have turned out quite a bit differently if not for the actions of some key people. The Tennants and their attorney Rob Bilott, for instance, are responsible for discovering the local pollution from Washington Works and calling in the authorities. Another crucial figure to the local story is Robert Griffin, an engineer who served as the general manager for the Little Hocking Water Association.

Griffin was paying attention to DuPont's relocation of the Lubeck well field long before he knew the water system under his direction was contaminated with C8. Unconstrained by "state line mentality,"[4] he was acutely aware that industrial situations in West Virginia could have an impact across the river in his backyard.

In 2001, Griffin learned that the WVDEP had entered into a consent agreement with DuPont over the testing of area water supplies. The state agency held a public meeting in Lubeck, West Virginia, as part of its mandatory information process. Griffin and a board member attended the public meeting out of curiosity. When they realized the nature of the sampling, they asked if any Ohio locations had been considered for the project.

Without getting into specifics, Andrew Hartten, DuPont hydrogeologist, mentioned some "historical data" in response.

But in all of his thirteen years as the association's manager, Griffin was unaware of any testing. So he asked for Little Hocking to be included in the West Virginia sampling order. Officials agreed.

Only it wasn't quite that simple. Following the verbal request at the meeting, WVDEP's Dave Watkins decided the water company's request needed to be in writing. Griffin complied.

During this time, the Little Hocking Water Association began pursuing avenues for testing the water for C8 exposure at its own expense. Upon searching for labs capable of fulfilling the need, association members quickly discovered that only one laboratory in the

entire United States had the ability to test for C8 or PFOA—Exygen Research of State College, Pennsylvania.

"At the time we had this notion that we could just send in the samples and have it checked," Griffin said.[5]

Not so. Exygen promptly informed the Little Hocking Water Association that its laboratory was working exclusively under contract with DuPont and would not be able to analyze the data. The water company's efforts at testing its own water for C8 contamination were stalled.

Once the WVDEP received Griffin's written request, it finally relented and formally agreed to include Little Hocking in its water-testing program. Griffin says that same day he also received a call from Exygen saying the lab would be happy to perform the testing after all.

Robert Griffin grew up in Little Hocking and spent most of his adult life there. He left only for a few years to serve his country in the U.S. Navy. In 1989, Griffin was an engineer working with Burgess and Niple on some improvements for the Little Hocking Water Association. Because he lived in the area and was a customer, he attended the board meetings. When the position of general manager came open, he saw an opportunity to put his skills to work for his community.

That was five years after DuPont knew about the contamination—and thirteen years before Griffin would learn that the system under his direction was exposed to a potentially harmful substance.

"I was blissfully ignorant until West Virginia held that meeting," Griffin explained. "We had no idea. I never expected to see it there, but I thought we should check."

Months of wondering came to an end on January 15, 2002, when the Little Hocking Water Association learned conclusively that PFOA or C8 had been detected in its wells.

When the implications of the contamination were realized, Griffin's role at the water association began to change. He began collecting and absorbing information in order to become an expert on PFOA. His common-sense approach to the issue didn't assume any problems or health consequences would ever be linked to the manufacturing chemical. He simply felt strongly that a manmade substance should not be in the water.

Early on, he described it this way: "It's like coming home and finding a stranger on your porch. You don't really know whether he

intends to do you harm or not, but you know you don't want him there."

On January 23, 2002, test results would finally and publicly confirm that C8 was being delivered through the Little Hocking water system at a concentration of 1.81 parts per billion.

One of the association's wells was contaminated at a value as alarmingly high as 37 parts per billion. Little did they know that the levels would be more than twice that amount in subsequent sampling events.

The same day the water company received the news, the information was disclosed to its customers. In the interest of openness, Griffin began to post all information on a website as well so that customers could see the levels of C8 in the water as they were provided to the association.

Because there were measurable differences in the amounts of C8 detected in individual wells, the Little Hocking Water Association quickly instituted an immediate action designed to increase consumer protection. The well with the highest levels of C8—the most contaminated well—was removed from use, thereby immediately reducing the level of exposure for customers. This required the remaining wells to be pumped more continuously and more frequently—a practice not recommended in good well field management. However, Little Hocking would "baby the system along" and reserve the most contaminated well only for a dire emergency in the interest of protecting its customers from the unknown.

However, the role of the Little Hocking Water Association did not stop with just removing one well from service and going back to business as usual. The association did not wait for others to figure out what was going on and what could be done. Instead, Griffin found out that DuPont wanted to drill wells and take samples in the Little Hocking well field. He worked with the OEPA to provide technical comments on collecting those samples and spent many hours supervising sampling events. Board members also took an active role in overseeing the well drilling and sample collection.

As the extended community served by the little company became central to the debate over C8, the water office became an information clearinghouse for consumers seeking answers to questions about C8. To the staff, some months it seemed the telephone was used more as a C8 hotline than for the typical utility calls.

Before all was said and done, the Little Hocking Water Association also became one of only two nonindustry interested parties to stick with the EPA's lengthy regulatory process. At a great commitment of time and expense, the association was represented at every plenary session held by the EPA on the topic in Washington, D.C.

Under different circumstances, the leadership role filled by Griffin and the water association might have been borne by a politician—or worse yet—a series of politicians. But lacking a mayor, city council, or other local community representation, save a small body of township trustees charged with oversight of roads and bridges, the responsibility of leading the neighborhood through the water controversy fell to the water association. And the water company, with its customer-elected board and consistent management, capably served the function of a representative body on behalf of the people.

In time, the expansion of the WVDEP water-testing program into Ohio, prompted by Little Hocking, also paved the way for neighboring Ohio water systems to be tested. Consequently, C8 was detected in measurable quantities in three other public water supplies: the city of Belpre, the rural Tuppers Plains-Chester Water District, and the village of Pomeroy.

Belpre, which is located immediately north of the Little Hocking service area, is the setting of Steven Soderbergh's low-budget independent film *Bubble*. Ironically, in the film Soderbergh repeatedly featured long camera shots of the city's distinctive skyline, which is crowned by Belpre's signature twin water towers sitting high atop a hill. In 2005, when the movie was filmed, the towering structures were still filled with C8-contaminated water.

Pomeroy lies thirty miles south of Little Hocking in Meigs County and is home to perhaps the narrowest strip of downtown in the United States, if not the world. One road, Main Street, is wedged between the Ohio River and the natural rise of a cliff. The small county seat is home to fewer than two thousand people.[6]

The well field for the Tuppers Plains-Chester Water District is located about fifteen miles downriver from Little Hocking near Reedsville, Ohio, a place widely known throughout the region for its bountiful harvests of sweet corn. In 2002, Tuppers Plains' water won second place in a nationwide taste test sponsored by the National Rural Water Association. The small water company's jovial general manager Don Poole likes to muse that perhaps it was because of the C8 in the water.

Of the four C8-contaminated water systems in Ohio, three of them—Little Hocking, Belpre, and Tuppers Plains—were each delivering around a million gallons of water a day.

The Lubeck water system with water wells on property adjoining DuPont Washington Works seemed the most likely place for C8 to migrate. It was one of the first places the company sampled and the only place it seemed to have a plan for handling.

This may be a sign of how DuPont's scientists underestimated the chemical's ability to travel. If so, Little Hocking exemplifies what went wrong with C8.

As mentioned, the Little Hocking Water Association's well field is located directly across the Ohio River from DuPont Washington Works. It was known that pipes from the plant discharged waste directly into the river, but nobody measured how much PFOA waste was released. However, the notion that C8 was simply traveling through the water from one side of the river to the other defies logic—as well as the powerful current of the mighty Ohio River.

The Ohio River is controlled for navigation by a series of dams. The water is deeper and flows more slowly than it did before the dam was put into operation. The sediment in the bottom of the river tends to accumulate and not flush downriver as quickly, which could be a contributing factor.

Air emissions from DuPont's stacks would prove to be a significant factor in the migration of the chemical across the river, as would rain. In all, the water, air, and soil in the Little Hocking area were all contaminated with PFOA.

In Lubeck, West Virginia, the municipality closest to the plant, C8 was detected in the air and water, but that's exactly where DuPont officials expected to find it. As the exposure became more radiant in nature, expanding out to unsuspected locations, the corporate executives seemed either less willing to accept the situation or less able to handle it.

In the end, it was revealed that Little Hocking's samplings dwarfed even Lubeck's high readings. Considering DuPont's handling of Lubeck, officials appear to have expected it to have the highest exposure levels. But at a delivery rate of 7.2 parts per billion by December 2004, Little Hocking water was at least three times as contaminated as Lubeck public water, which at its peak contained a documented concentration of 2.09 parts per billion.

Shortly, Little Hocking's residents became members of one of the most-studied groups in chemical science history. As word of the

community's high exposure levels spread as a result of the class action lawsuit filed against DuPont by valley water consumers, the people who lived in the Little Hocking area and consumed the water became the largest study group of human guinea pigs for DuPont's Teflon surfactant, and quite possibly the largest living study group that has ever existed for any known contaminant in the world.

The Little Hocking Water Association made arrangements for twenty-five customers to have their blood tested for the presence of PFCs. In July 2005, the results verified that Little Hocking consumers had much higher C8 concentrations than the general public. The levels varied erratically from the lowest at a concentration of 112 parts per billion in a female who consumed area water for nine years to a high of 1,040 parts per billion, or 1.04 parts per million, in a male who consumed area water for thirty-seven years.

There were no apparent trends in the small collection of data. Inexplicably, the second-highest C8 level, a concentration of 629 parts per billion, belonged to a young man under the age of fifteen who had lived in the area for only three years. The highest concentration observed in a female was 488 parts per billion. She was a young woman who had consumed area water for sixteen years.

At any rate, the limited sampling did prove that Little Hocking consumers had C8 concentration levels in their blood at 112 to 1,040 parts per billion, far higher than levels detected in the general public at 5 parts per billion.

One of the earliest public studies of the Little Hocking community—and the first to be completed—was conducted by Dr. Edward Emmett of the University of Pennsylvania School of Medicine. When he learned about the C8 contamination in the area, he wrote and secured a grant from the National Institutes of Health. The purpose of Dr. Emmett's study was to determine whether people who live in the Little Hocking area had C8 levels in their blood that were higher than the general population, and if so, what were the likely routes of exposure. The study would also attempt to identify "biomarkers of effect, indicating the possibility of present or future health effects."[7] In the end, much more information was gained from the small sampling of Little Hocking customers. It was the first community study of its kind and the first community impact study specifically on C8.

In August 2005, when Dr. Emmett released the results of his study, DuPont officials responded with an announcement the same day that they would be providing bottled water to the customers of Little Hocking for drinking and cooking until a filtration system could be developed and constructed. Without making any statement on the potential for risk as a result of exposure, the study revealed that the amount of C8 in the blood of those people who lived in the area and drank the water were as much as sixty to eighty times that of the general population.

DuPont provided the Little Hocking consumers with bottled water within thirty days initially through a refund program. Each household member was to be reimbursed for the cost of up to three gallons of drinking water per day. For several years, the Little Hocking Water Association had been negotiating privately with DuPont to provide an alternative source of water free of C8 to association members. It was a unique demand under the circumstances, but Little Hocking was in a matchless situation.

Corporate officials agreed to construct a filtration system for Little Hocking water. In the meantime, Little Hocking entered into a series of tolling agreements with DuPont while the details were being worked out, in order to preserve its legal rights. A tolling agreement serves to extend a statute of limitations as a wait-and-see measure. The association focused its efforts on working toward a more permanent solution. For four-and-a-half years, the corporation and the small rural water company negotiated privately for a filtration system.

Finally, in May 2006, the Little Hocking Water Association filed suit against DuPont in a separate action alleging the contamination not only of their water wells, but also near-permanent contamination of their aquifer with C8 expected to take two thousand years to leave by natural means. David Altman, the association's attorney, said they were forced to file suit when DuPont refused to extend a tolling agreement. Altman said it was the only way for the little water company to preserve its rights and prevent the expiration of any statute of limitations.

In its complaint, the water company asked for a new, pristine water source to serve the needs of its consumers—a new well field and the appropriate infrastructure to support the entire system.

The legal action effectively put a grinding halt to any progress on plans for a filtration system. So a few months later, in September

2006, Little Hocking dropped its claim against DuPont in order for both parties to focus their full attention on the construction of the proposed water treatment plant. Since the suit was dismissed without prejudice, the move would also preserve the water association's legal rights by extending the statue of limitations for another year.