Covering Up the PFAS Poisoning of Parkersburg

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On my honor as a University Student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments

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Introduction

In 1998, a farmer in Parkersburg, West Virginia named Wilbur Tennant sought legal assistance from environmental attorney Rob Bilott against DuPont; he believed the chemical manufacturer was responsible for leaking chemicals into the water supply that were killing his cattle. After an investigation, Bilott uncovered that DuPont not only had been knowingly leaking a chemical known as C8 into the nearby water supply, but they had also been aware of a variety of environmental and health concerns related to C8 for decades (Lerner, 2015). Of course, it is widely accepted that DuPont is morally responsible for the contamination of the Parkersburg community, and it is understood that uncertainty or lack of knowledge about new chemicals cause difficulty in regulation, allowing incidents such as this to slip through the cracks. This interpretation does not consider other actors who may be responsible and obscures the burden of responsibility by assigning it to a faceless company. Without considering the full set of responsible actors, we cannot fully understand how the interplay of multiple individuals' behaviors ultimately resulted in this case; thus, we wrongly assign a collective or hierarchical model to the distribution of responsibility.

I will use actor network theory (ANT) coupled with the conditions of responsibility to argue that the responsibility for the contamination of the Parkersburg community can be directly attributed to specific individuals associated with the chemical companies DuPont and 3M. ANT is a conceptual framework in which human and non-human actors are only defined within a network by their relationships with each other (Cressman, 2009). I will begin by mapping the relevant actors to a network, identifying the responsible actors as individuals within DuPont and 3M, including specific scientists. Next, I will draw on primary sources including internal

company documents and existing interviews with Parkersburg citizens to explain how elements of the conditions of responsibility are fulfilled.

Background

Polyfluoroalkyl substances (PFAS) are a class of chemicals that are commonly known as "forever chemicals" due to their inability to break down in the environment, bioaccumulating in both wildlife and humans. Perfluorooctanoic acid (PFOA or C8, named for its eight carbon chain) is a type of PFAS that, prior to 2006, DuPont used to manufacture Teflon, a non-stick coating technology used in many cooking products (Lerner, 2015). PFAS are present in the blood of 99.7% of Americans and have been linked to a variety of serious health effects and birth defects (Calafat et al., 2007). In the early 2000s, it was discovered that DuPont and the manufacturer of the PFAS, 3M, had been aware of the dangers of PFAS since as early as the 1950s and had still continued their usage (Lerner, 2015). In particular, the DuPont plant Washington Works in Parkersburg, West Virginia had been aware of PFAS seeping into the local water supply and took no action, even when concerns about human and animal health were raised.

Literature Review

There is a clear consensus among scholars that DuPont and 3M are responsible for the poisoning of Parkersburg, West Virginia; some individuals have even been called out by name, despite facing no real consequences. Scholars have also examined the role of uncertainty and ignorance in the regulation of or lack thereof chemical contaminants; however, scholars have not yet adequately considered the interplay of *all* of the relevant actors and how these actors weaponize uncertainty and ignorance in a failed attempt to absolve themselves of responsibility.

Broadly, in *Moments of Uncertainty: Ethical Considerations and Emerging Contaminants*, Cordner and Brown (2013) discuss the ethics of decision making in chemical policy in the face of scientific uncertainty, identifying four areas where uncertainty may arise: "1) choosing research questions or methods, 2) interpreting scientific results, 3) communicating results to multiple publics, and 4) applying results for policy making." With regard to the third moment of uncertainty, Cordner and Brown point out that scientists are concerned that when interpreting biomonitoring results, "they are unable to accurately decipher the meaning of individual-level exposure levels for the individual's well-being, as well as epistemological unease that they may lack full knowledge of the significance of exposure levels." They assume that when faced with uncertainty, scientists are hesitant to be fully transparent about results out of good faith. They do not consider that scientists, policymakers, or companies may take advantage of this uncertainty as justification to not inform the public of the potential dangers of certain chemicals for financial gain.

Choosing to limit the dissemination of results to the public can lead to areas of ignorance when it comes to policymaking, which is highlighted by Richter, Cordner, and Brown (2020) in *Producing Ignorance Through Regulatory Structure: The Case of Per- and Polyfluoroalkyl Substances (PFAS).* Richter *et al*. explore the multiple types of ignorance, including selective ignorance and nescience, in connection with the regulation of PFAS. They argue that the design and implementation of the Toxic Substances Control Act "produce selective ignorance, instill a culture of forbidden knowledge within EPA, and, absent substantive regulatory or litigation-related intervention, magnify nescience for downstream stakeholders." This partially fills the previously discussed gap; however, this still does not address the morality of every actor involved. There were individuals who actively made the decision to suppress the findings of the

dangers of PFAS. It is hardly a simple case of selective ignorance when studies are actually carried out and people are fully aware of the conclusions of these studies, yet the conclusions are purposefully hidden. Primarily placing the liability on corporations or industry as a whole clouds the understanding of the layers of unethical behavior that led to the devastating health consequences on thousands of people.

Cordner and Brown highlight how scientific uncertainty impacts policy and the actions of corporations. Richter builds off of this to illustrate how this uncertainty can be transformed into selective ignorance through regulatory law when it is beneficial for a company to take advantage of it. In my argument, I will deploy the framework of actor network theory to address the gap in understanding of the complete set of actors who are morally responsible for the PFAS contamination in Parkersburg, West Virginia according to certain conditions of responsibility and the flaws in applying the problem of many hands to this case.

Conceptual Framework

My analysis of the contamination of the Parkersburg, WV community by the DuPont chemical plant draws on actor network theory (ANT) and the conditions of responsibility, which allows me to map all of the relevant actors and their relationships to each other to better understand the multiple layers of unethical behavior that compounded to result in the final outcome. ANT, as described by science and technology studies scholars Bruno Latour and Michel Callon, seeks to characterize a network builder that identifies a problem and recruits the human and non-human actors needed to solve it. Each actor only has power within the network, and the measure of the power of each actor is a function of the strength of its relationships with other actors in the network. Callon (1986) describes the process of forming actor-networks, "translation," in four stages: problematization, interessement, enrollment, and mobilization. In

problematization, the network builders are established as indispensable to the network when they identify the other actors and their roles, interests, and relationships within the network. The network builders define the problem and the actors required to solve it. Next, in interessement the network builders try to recruit actors from competing networks and convert them to align with the interests of the network builders. In enrollment, roles are assigned to all of the actors and each actor accepts and performs their role. In mobilization, the network builders take on the role of spokesperson or representative for the other actors. Ultimately, the network functions should function as a stable entity, or black box.

The distribution of responsibility among the actors can be determined by measuring the extent to which the four conditions of responsibility are fulfilled: 1) wrongdoing, 2) causal contribution to the problem, 3) knowledge of the problem and its likely consequences, or foreseeability, and 4) freedom of action (van de Poel & Royakkers, 2011). This is known as the moral fairness requirement. Another important concept is the problem of many hands, which refers to when a collective may be held responsible for some outcome, but no individuals reasonably can. This may be caused by the distribution of information, the amplification of the impact of a collective's actions compared to the individual's, or the disconnect between those with the information and those with the freedom to act.

Drawing on ANT, I will begin by mapping the network of the Teflon technology in the context of the poisoning of Parkersburg, WV, specifically identifying the actors who are morally responsible. I will also analyze the distribution of responsibility in the case by expanding on the following three elements of the criteria of responsibility: wrongdoing, foreseeability, and freedom of action.

Analysis

Network Formation

Before delving into the distribution of moral responsibility in the Parkersburg case, I will first describe the actors comprising the network of the Teflon/PFAS technology. Figure 1 is an overview of the network with the most important relationships between actors drawn. The social actors consist of (i) DuPont – the chemicals company that patented Teflon and leaked PFOA into the water supply of Parkersburg, (ii) 3M – the multinational conglomerate that created PFOA and sold it to DuPont for use in Teflon, (iii) scientists hired by 3M to conduct studies on the health effects of PFOA, (iv) 3M employees who were used in the studies on the effects of PFOA, unbeknownst to them, (v) the community of Parkersburg which not only received the brunt of the effects of DuPont and 3M's actions but also relied on DuPont for employment, and (vi) consumers of Teflon around the world (Lerner, 2015). The technical actors are (vii) Teflon and (viii) PFAS, in particular PFOA or C8 (Lerner, 2015). While the network is centered around these technologies, the primary actors or network builders can be considered to be DuPont and 3M, highlighted in green in Figure 1. There are also more abstract actors: (ix) the monetary profits associated with Teflon and continuing the operation of the DuPont plant and (x) the diseases and other harmful health effects of PFAS in humans as well as any other living things.

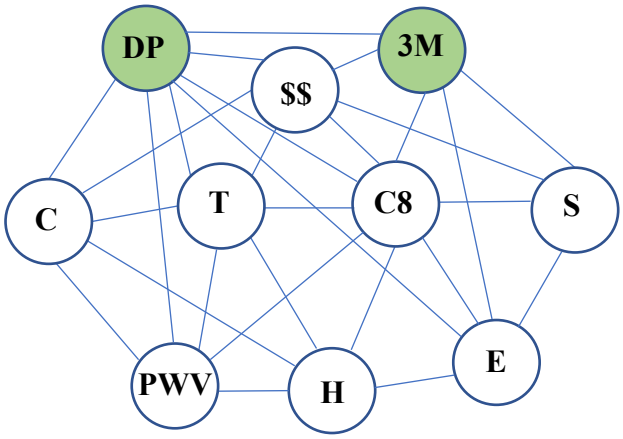


Figure 1. Teflon/PFAS Network: T = Teflon, C8 = PFAS/PFOA, DP = DuPont, 3M = 3M, $$ = economic gain, C = consumers, S = scientists, PWV = Parkersburg community, H = environmental/health hazards, E = DuPont and 3M employees

During the first stage of translation, problematization, the primary actors DuPont and 3M identify the PFAS technology and its usage in Teflon as well as the profitability of this technology. DuPont has a plant in Parkersburg where it employs many of the locals. DuPont and 3M also recognize that PFAS may have adverse health effects. During interessement, 3M enlists scientists to conduct studies involving its employees to investigate these suspected health effects. DuPont recruits its own employees as volunteers for a study. Meanwhile, the DuPont plant in Parkersburg is benefiting the town economically while simultaneously polluting its waters and inhabitants. In enrollment, the scientists perform their role in carrying out several studies on the DuPont and 3M employees. At this point, the network ceases the translation process – it fails to stabilize the moment the dangers of PFAS are discovered and DuPont and 3M, along with the scientists who conducted the studies, make the decision to keep quiet and continue operating as usual.

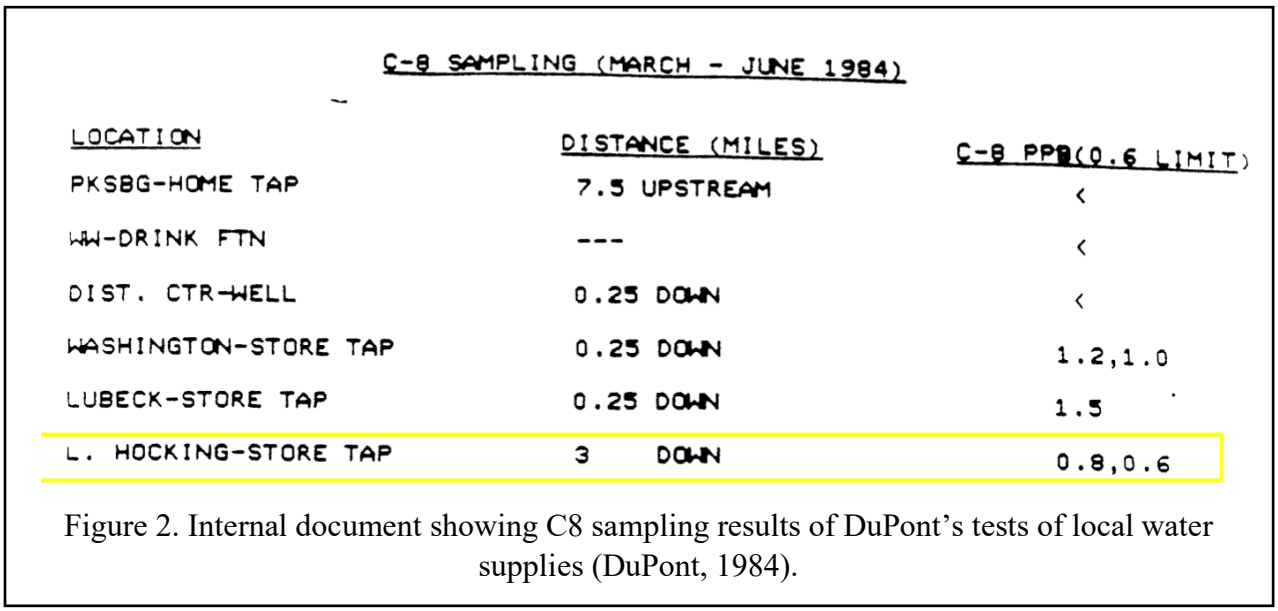
Morally Responsible Actors

The harmful effects of PFAS can be seen as a rogue actor that disrupts the network, but the failure ultimately occurs when DuPont and 3M prioritize economic gain over public and environmental safety. This may seem to be a clear case of the problem of many hands, where these two companies as a whole can be held morally responsible for the Parkersburg case. It is true that there is no *single* individual responsible. However, the poisoning of the Parkersburg community is certainly the result of the conscious decisions of specific people, and so responsibility may be allocated with the individual model rather than the collective or hierarchical models – it did not occur through mere scientific uncertainty, ignorance, or miscommunication between hierarchies. Although I will often refer to "DuPont" and "3M" as singular entities, it was actual people who made these choices, not soulless corporations. In this

analysis, I will examine the distribution of responsibility among several individuals according to three conditions: wrongdoing, foreseeability, and freedom of action.

Wrongdoing

This condition pertains to some violation of a norm carried out by the actor in question. In this case, DuPont and 3M violated the norms that the public and the environment should be kept safe and that companies should be transparent about the potential risks of their actions. In 1984, DuPont tested the tap water in Little Hocking, Ohio, which is downstream of the Parkersburg plant. As seen in Figure 2, C8 was not only present but it was above the specified 0.6 limit.



C-8 SAMPLING (MARCH - JUNE 1984)

LOCATION	DISTANCE (MILES)	C-8 PPB (0.6 LIMIT)
PKSBG-HOME TAP	7.5 UPSTREAM	<
WW-DRINK FTN	---	<
DIST. CTR-WELL	0.25 DOWN	<
WASHINGTON-STORE TAP	0.25 DOWN	1.2,1.0
LUBECK-STORE TAP	0.25 DOWN	1.5
L. HOCKING-STORE TAP	3 DOWN	0.8,0.6

Figure 2. Internal document showing C8 sampling results of DuPont's tests of local water supplies (DuPont, 1984).

DuPont did not inform the local water authority nor the community of its tests or the results (Environmental Working Group, 2002). Putting aside the fact that DuPont was also cognizant of C8's persistence in the environment and within organisms, there was no reason why DuPont should not have told the community of its tests. This dishonest behavior suggests that individuals at DuPont were hoping to avoid having to change plant operation or having to face any potential repercussions for leaking C8 into the water. Someone at DuPont decided that it was necessary to

conduct these tests, and the same person or another individual decided not to inform the community either of the test or of the results, despite knowing these C8 levels could impose harm.

Further evidence of DuPont's wrongdoing is found in the 2003 Weinberg memo, in which P. Terrence Gaffney of the Weinberg Group consulting firm proposes a method of defense for DuPont against impending litigations (Lerner, 2015). As part of his broad technical defense strategy, Gaffney stated:

> The primary focus of this endeavor is to strive to create the climate and conditions that will obviate, or at the very least, minimize ongoing litigation and contemplated regulation relating to PFOA. This would include facilitating the publication of papers and articles dispelling the alleged nexus between PFOA and teratogenicity as well as other claimed harm (Gaffney, 2003, p. 2).

Gaffney is careful to never admit that PFOA has been shown to cause harm, but in preparing such a thorough defense against lawsuits or regulations that have not even happened yet, he shows that these claims are hardly unfounded. He also outright states that they will be actively shaping the narrative by pushing for certain publications that support their position. Operating under nearly any ethical framework, the norm would be that scientific studies should seek the truth and that this information should be used to effectively keep people safe; here, this norm has certainly been violated. The entire memo details a strategy to save DuPont from facing any repercussions for its use of PFAS, even suggesting that DuPont should push the idea that PFAS has health *benefits*, without any regard for the possibility that people could truly have been harmed by it and the regulations may indeed be necessary.

Foreseeability

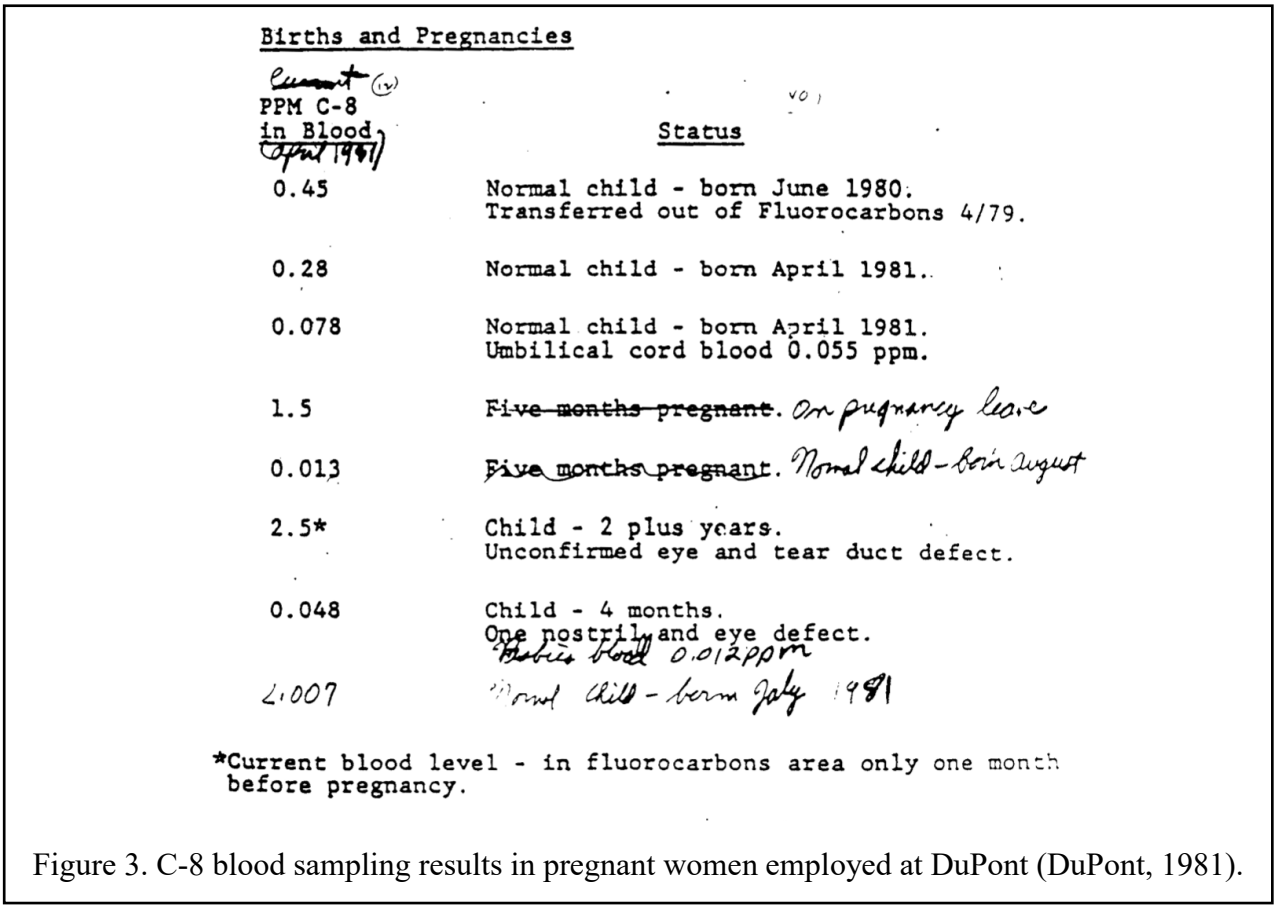
To be held responsible for something, one must have had knowledge of the consequences of their actions. Scientists at DuPont and 3M each conducted numerous studies on both animals and their own employees, identifying correlations between PFAS exposure and

birth defects, buildup in blood, and increased cancer risk and organ damage. The following is an excerpt from a standby press statement from 3M in 1981:

> As a precautionary measure, approximately 25 women of childbearing potential have received job reassignments at the 3M Decatur plant this week so they will not be exposed to a type of fluorochemical that can cause birth defects in rats.
> Preliminary results of a recent 3M toxicology study showed that three related fluorochemicals affected eye development in the fetuses of rats, according to Phil Raths, manager of the Chemical Resources Division plant. (Ludford, 1981, para. 1-2)

DuPont knew of the results of the rat study and took the same action. At first glance, DuPont and 3M behaved morally by proactively reassigning these female workers to protect them from possible harm. The chemical that supposedly may have caused birth defects is PFOA, one of the original components of Teflon, and yet no effort was made to investigate the potential implications of the widespread use of this material in cooking. If it was deemed necessary to reassign these women as a precaution, why was this substance still being manufactured and sold to the public? Why had it been deemed acceptable to dump these chemicals in the waters of Parkersburg, simply because PFOA was not yet regulated by the EPA? Sue Bailey, an employee at the DuPont plant in Parkersburg who worked with PFOA, gave birth to a son in 1981 with the same eye deformities seen in the rats and in cattle living near where DuPont dumped its waste (Kanzinger, 2019). By the time she returned to work later in the year, the female employees had been reassigned. Not only did DuPont and 3M have reasonable suspicion of the dangers from the rat study, but there was an employee who very possibly had already suffered the effects of PFOA. DuPont maintains that Bailey's son's deformities are genetic, and its later studies seem to find no evidence of ties between PFOA and birth defects; one might argue that DuPont did all that it was legally or morally obligated to do. Nevertheless, the mere fact that there was any indication of possible harm as a result of PFOA is sufficient to fulfill the foreseeability condition. Despite claiming that there was no link between PFAS and defects, DuPont had even confirmed

C8 to be present in the blood of female employees at the Parkersburg plant and secretly monitored any later pregnancies and births, as seen in Figure 3.



Births and Pregnancies

PPM C-8 in Blood	Status
0.45	Normal child - born June 1980. Transferred out of Fluorocarbons 4/79.
0.28	Normal child - born April 1981.
0.078	Normal child - born April 1981. Umbilical cord blood 0.055 ppm.
1.5	~~Five months pregnant~~. on pregnancy leave
0.013	~~Five months pregnant~~. Normal child - born August
2.5*	Child - 2 plus years. Unconfirmed eye and tear duct defect.
0.048	Child - 4 months. One nostril and eye defect. Babies blood 0.012ppm
2.007	Normal child - born July 1981

*Current blood level - in fluorocarbons area only one month before pregnancy.

Figure 3. C-8 blood sampling results in pregnant women employed at DuPont (DuPont, 1981).

Out of seven babies born, two had birth defects. What is more concerning, however, is that not only was C8 present in the blood of these women, but it was also even in the umbilical cord of one woman. DuPont had collected data describing how C8 stays in the body and is even passed down from mother to child, and yet it continued to manufacture Teflon without any changes. At the very least, DuPont and 3M were preparing for the possibility that their actions would have harmful consequences. They were not completely negligent in that they were conducting tests and trying to remove the female employees from harm, but this does not excuse the fact that they were clearly aware of dangers and did not take any substantial action to eliminate the problem.

Freedom of Action

The responsible actor must have had the freedom to act; that is, it must not have faced any coercion to make a certain choice nor been impeded in any way. One individual who fulfills this condition and partly shares some moral responsibility is John Giesy, an expert ecotoxicologist credited with being the first to discover PFAS in the environment (Lerner, 2018). As such, Giesy was fully aware of the bioaccumulation of PFAS in wildlife and the associated dangers and thus also received large monetary compensation to review articles about PFAS. In an email to a 3M lab manager in 2008, Giesy offered to decline to review two articles that had been assigned to him so that someone at 3M could review them instead, stating that "others … will not allow an industry to review a paper about one of their products. That is where I come in… In time sheets, I always listed these reviews as literature searches so that there was no paper trail to 3M." Giesy was not being forced in any way by 3M to obscure its involvement in reviewing these articles; being on their payroll does not absolve him of any responsibility. He openly admits that he purposefully misrepresents these particular literature reviews to be deceptive and protect 3M. I am in no way arguing that he is solely or even majorly responsible for those who have suffered from PFAS exposure, but Giesy is one example of many individuals whose combined immoral actions contributed to the outcome in Parkersburg. The only barrier to making the moral choice in any of the decisions made by individuals at DuPont or 3M was the risk of economic loss. At any time, people had the freedom to choose to minimize harm. Some may also argue that individuals do not have the ability to enact such a change within a powerful company. This ignores that the company is completely comprised of identifiable people who may also have the freedom to act ethically – sometimes there is no need to obscure the individuals by citing the problem of many hands. During the discovery process preceding the

trial for a lawsuit against DuPont, several DuPont executives and lawyers were questioned and fully admitted to being aware of the risks of C8 and doing nothing to stop its production. For example, 3M announced that it would phase out PFOA by the end of 2002, following studies on its harmful effects. The CEO of DuPont at the time, Charles O. Holliday, stated that "we concluded to manufacture the product [PFOA], and to continue using the product" in that same year, when DuPont had the exact same information that 3M had (Soechtig, 2018). Another former DuPont chemist, Glenn Evers, confirmed that higherups reacted to the news that 3M was phasing out PFOA with excitement that DuPont could take over the market, despite being well aware of the reason for 3M's decision (Soechtig, 2018). Any individual could have acted, whether that could have been making an executive decision as the CEO or coming forward as a whistleblower. Humans very often act in the best interests of a group that they are a part of. This may explain why so many people at DuPont and 3M made questionable decisions in the coverup, but this does not take away their freedom to act. Any of them had complete freedom in making their choices to hide, modify, or downplay the situation in Parkersburg. The DuPont employees felt they were acting in the best interest of DuPont as a company, which should not have taken precedent over the best interests of the public.

Conclusion

The poisoning of Parkersburg is not merely the fault of the company DuPont, but rather the responsibility of specific individuals at both DuPont and 3M who behaved in an actively deceptive manner – there is no hiding behind the collective or the excuse of ignorance in this case. They clearly committed wrongdoing, the studies conducted indicate foreseeability, and the actors involved had freedom of action. With this deeper understanding of how the incident occurred and how responsibility was distributed, the morality of individuals can be more easily

scrutinized. We avoid handwaving the blame away onto some corporation. Going forward, this understanding can help engineers exercise their freedom to act when faced with moral dilemmas. Acting in the interest of a company may very well often lend itself to acting against the interests of the general public, so it is important that individuals are held accountable.

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