

PFAS Exposure: A Comprehensive Look at Emerging Facts and Studies, Risk and Liability Assessment, Litigation History, Evolving Regulations and Future Predictions

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A simple laboratory accident resulted in the remarkable creation of Per- and Polyfluoroalkyl Substances (“PFAS”). These substances enabled mankind to overcome the natural limitations of fire, oil and water. Their discovery was lauded as a modern-day miracle, and the titans of industry and commerce produced a litany of highly beneficial consumer and industry products. But as we were celebrating this victory over the laws of nature, science responded with concerning reports. Could triumph have become tragedy, or

were the alarms about PFAS just a lot of hype? This article tackles this important question by conducting a comprehensive review of the key emerging PFAS facts, studies, risk assessment, related litigation, regulations, and concludes with predictions for the future.

I. Background

A. PFAS Facts

PFAS is the generic term for a class of man-made chemicals with oil and water-resistant properties found in a variety of consumer products like nonstick cookware, stain resistant and weather proof textiles, and food packaging.¹ They are also used as surfactants in the aerospace, construction, and electronics industries and as an ingredient in public, commercial, and civilian and military firefighting foams to put out fuel-based fires.² Originally developed by accident in 1938 by scientists in a lab,³ the two most recognized PFAS were introduced in commerce in the 1940s: DuPont's perfluorooctanoic acid (PFOA) – used to create Teflon and a byproduct of many other



processes— and 3M's perfluorooctane sulfonate (PFOS) – used in Scotchgard, firefighting foam, and semiconductor devices.⁴

Due to the incredibly strong chains of carbon and fluorine atoms that make up the structure of their molecules, PFAS are slippery, resilient, and resistant to breaking down or dissolving.⁵ Accordingly, they were eventually incorporated into numerous everyday products. As a result, many people have now been exposed to PFAS, which can

¹ Christopher Lau, "Perfluorinated Compounds: An Overview," in JAMIE DEWITT, ED. TOXICOLOGICAL EFFECTS OF PERFLUOROALKYL AND POLYFLUOROALKYL SUBSTANCES, 1-2 (Springer, 2015): 1-21.

² Benjamin J. Place, and Jennifer A. Field, *Identification of Novel Fluorchemicals in Aqueous Film-Forming Foams Used by the U.S. Military*, 46 ENVIRON. SCI. TECHNOL. 7120 (2012).

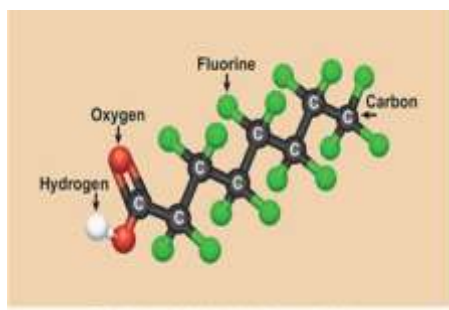
³ Megan Noonan, *The Doctor Can't See You Yet: Overcoming the "Injury" Barrier to Medical Monitoring Recovery for PFAS Exposure*, 45 VT. L. REV. 287, 291-292 (2021).

⁴ Callie J. Lyons, STAIN-RESISTANT, NONSTICK, WATERPROOF, AND LETHAL: THE HIDDEN DANGERS OF C8 (Praeger, 2007).

⁵ Abrahm Lustgarten, *How the EPA and the Pentagon Downplayed a Growing Toxic Threat*, PRO PUBLICA (Jul. 9, 2018), available at <https://www.propublica.org/article/how-the-epa-and-the-pentagon-downplayed-toxic-pfas-chemicals> (last visited March 29, 2022); see also Chemours, *History of Teflon Fluoropolymers*, available at <https://www.teflon.com/en/news-events/history#:~:text=Scientists%20described%20the%20invention%20of,limitless%20applications%20that%20benefit%20mankind> (last visited March 29, 2022) ("[T]he invention of PTFE [has been described] as 'an example of serendipity, a flash of genius, a lucky accident—even a mixture of all three.'").

accumulate and remain in the human body for long periods of time, giving rise to their nickname, “Forever Chemicals”. Recently, some scientific studies have shown that exposure to certain PFAS may lead to adverse human health and environmental effects, creating much concern over the use of PFAS.

B. Profile of PFAS Potential Damages



PFAS are a diverse group of thousands (estimates range between four and six thousand) of chemicals. These chemicals have two things in common: (1) they are man-made; and (2) they contain linked chains of carbon and fluorine, the bond of which is one of the strongest in nature. As such, they do

not degrade easily. Once exposed to the human body, water, or the environment, whether through contact with consumer goods, contaminated food and water and/or in workplaces, they will remain virtually forever.

Exposure to PFAS typically occurs through inhalation; ingestion of contaminated food, soil, or water; or the use/consumption of commercial products containing PFAS. Once released into the environment, they easily disperse into the air, dust, food, soil and water ending up in the human body and settling in the blood, kidneys and liver. Given the ubiquity of these chemicals, at least some people have had measurable exposure to PFAS; research reveals detectable levels of certain PFAS in the blood of many Americans. Scientists have found, and the Center for Disease Control (CDC) has confirmed, that the blood of 95% of Americans contains some type of PFAS chemicals.⁶ Studies show exposure has the potential to cause a host of adverse health effects.

In response to this unsettling news, many manufacturers in the

⁶ Kayoko Kato et al., *Trends in Exposure to Polyfluoroalkyl Chemicals in the U.S. Population: 1999-2008*, 45 ENVIRON. SCI. TECHNOL. 8037 (2011); see also Center for Disease Control, *National Health and Nutrition Examination Survey: Fourth Report on Human Exposure to Environmental Chemicals*, Updated Tables, Vol. 1 (Jan. 2019), <https://www.cdc.gov/exposurereport/>.

United States removed the two most common PFAS chemicals, PFOA and PFOS, from their products. They replaced them with other members of the PFAS family of chemicals commonly referred to as “next-generation” PFAS chemicals. Next-generation PFAS are not as well understood. PFAS, in some form or another, remain in the products most Americans encounter every day.

C. Exposure

Since the 1930s, PFAS have been incorporated into common consumer goods like paper products, wire insulation, surface coatings, cleaning products, personal care products (like cosmetics, shampoos, and dental floss), and firefighting foam.⁷ Today, American consumers may be exposed to PFAS through a wide range of common commercial and household products such as paints, water-resistant fabrics and apparel, cosmetics, dental floss, firefighting foams, nonstick cookware, pizza boxes, polishes, waxes, stain resistant carpet, leather, textiles, grease resistant paper and packaging, rubber, plastics, and cleaning products. People may be exposed to PFAS more easily from

nonstick cookware and the flame retardant foams used by the military.⁸ Environmental contamination occurs from PFAS contaminated waste-water at facilities where products containing PFAS are used, processed or manufactured.

To provide concrete examples, we may be ingesting PFAS through:

Food- When hot food is placed in takeout containers and/or fast food wrappers made with PFAS chemicals, it allegedly triggers the rapid release of PFAS chemicals which we ingest when we consume the food. We are exposed in the same way when we consume food that was cooked in non-stick cookware. We also ingest PFAS through dust and hand-to-mouth contact with cosmetics, textiles, and lotions. We may also become exposed by consuming fish, livestock or wildlife grown on or raised in contaminated soil or water. Nursing mothers can pass PFAS to their infants via breastmilk.

⁷ United States Environmental Protection Agency (EPA), *Drinking Water Health Advisory for Perfluorooctanoic Acid (PFOA)* (May 9, 2016) available at <https://www.epa.gov/sites/prod/files/2016-05/documents/>

[pfoa_health_advisory_final_508.pdf](#) (last visited March 30, 2022).

⁸ Samuel Boden, *Presumptive Innocence v. the Precautionary Principle: The Story of PFAS Regulation in the United States*, 44 ENVIRONS 37 (2020).

Water- One-third of Americans are drinking water from public drinking water systems and private drinking water wells contaminated with PFAS. Contamination can occur from runoff from firefighting foams, from irresponsible manufacturing practices, and even from the laundering of PFAS-laden clothing and textiles. PFAS exposure can occur from showering/bathing as human skin can absorb PFAS.

Air- PFAS are highly mobile and disperse through indoor and outdoor air. Walking on carpet containing PFAS, wearing clothing treated with PFAS, or sitting on a stain-resistant sofa may cause the PFAS to become airborne, which in turn will settle on the dust we inhale.

D. Who is at risk?

Consumers, bystanders, workers, and people living on or near military bases, airports, manufacturing facilities, wastewater treatment plants, and other such facilities are at greater risk of exposure. These include:

Workers- Workers at highest risk who inhale, swallow or have physical contact with PFAS are at the

highest risk for exposure. Those who work the fields of industrial chrome plating, electronics manufacturing, oil recovery, the processing of flammable and combustible liquids, the production of cookware, fiberglass, plastic, paper, footwear, and carpeting products and fire-fighting foam are at greater risk of exposure. Workers who manufacture packaging for microwave popcorn, bags, sandwich wrappers, takeout containers, fast food wrappers are also at risk. Construction industry workers who use paints and sealants or who install treated carpets and furniture also have the potential for exposure.

Bystanders- People living or working near military bases or airports where drinking water or groundwater is contaminated with PFAS may sustain exposure. Those whose main source of drinking water is in close proximity to manufacturing/processing plants, landfills, wastewater treatment plants, or firefighter training facilities are at risk. Babies born to mothers exposed to PFAS can be exposed during

pregnancy and/or while breastfeeding.

Consumers- Average consumers/users of stain and water-repellent fabrics, nonstick products, polishes, waxes, paints, cleaning products have shown the potential for exposure, as is anyone eating fish caught from water contaminated by PFAS. Users of certain personal care products and cosmetics like shampoos, conditioners, sunscreens, dental floss, nail polish, eye makeup can be added to the list. Users of grease-resistant paper, lunch meat paper, disposable plates and bowls, fast food containers/wrappers, microwave popcorn bags, pizza boxes, and candy wrappers, and those who wear durable water repellent outdoor gear are included as well.

E. Causation and Significant Research Studies

Since PFAS chemicals have been widely used since the 1940's, scientists have had the benefit of time to study and generate a still-growing body of research to determine the health impacts associated with PFAS exposure. So much has been written on the subject that there was even a published study,⁹ funded by a Battelle Memorial Institute Independent Research and Development grant, to determine the exact number of studies that have actually been conducted. More than 1,000 studies over the past 40 years, including some commissioned by the military, have been conducted. Manufacturers such as DuPont and 3M conducted own studies in the 1960s and 1970s; these showed that PFAS had the potential to cause adverse health effects in animals and potentially humans as well.¹⁰ Since 2005, most of the large scale PFAS epidemiology

⁹ Nicole M. Brennan, Abigail T Evans, Meredith K. Fritz, Stephanie A. Peak, and Haley E. von Holst, *Trends in the Regulation of Per- and Polyfluoroalkyl Substances (PFAS): A Scoping Review*, 18 INT. J. ENVIRON. RES. PUBLIC HEALTH 10900 (Oct. 17, 2021).

¹⁰ Sharon Lerner, *3M Knew About the Dangers of PFOA and PFOS Decades Ago, Internal Documents Show*, THE INTERCEPT (July 31, 2018), available at <https://theintercept.com/2018/07/31/3m-pfas-minnesota-pfoa-pfos/> (last visited March 30, 2022) (explaining that 3M

research in the United States has been conducted by a scientific panel called the C8 Science Panel. This panel was formed as part of a class action lawsuit against DuPont.¹¹ The currently accepted scientific research points to the conclusion that exposure to high levels of certain PFAS “may” pose adverse health risks to humans.¹²

While there is nothing conclusive and there remains much to be studied on PFAS, the following studies of concern led the U.S. Environmental Protection Agency (EPA) to declare that PFAS may have the potential to cause health concerns:

<u>Year</u>	<u>Study</u>
1956	Stanford University study finds that PFAS binds to proteins in human blood. ¹³
1962	Volunteers who smoke PFAS-laced cigarettes get “polymer fume fever.” An “epidemic” of polymer-

conducted studies finding “a positive association between the amount of PFOA in workers’ blood and their levels of cholesterol and triglycerides”).

¹¹ For more information about the C8 Science Panel, see <http://www.c8sciencepanel.org/>.

¹² See EPA, *Our Current Understanding of the Human Health and Environmental Risks of PFAS*, <https://www.epa.gov/pfas/our-current-understanding-human-health-and-environmental-risks-pfas>.

¹³ G.L. Nordby and J.M. Luck, *Perfluorooctanoic acid interactions with*

<u>Year</u>	<u>Study</u>
	fume fever involved 36 of 61 employees in one industry over a 90-day period. All of those involved demonstrated the classic history of an influenza-like syndrome, with fever and chills occurring several hours after exposure to the products of pyrolysis of Teflon. ¹⁴
1965	DuPont Rat Study showed liver damage and increased spleen size. ¹⁵
1978	3M scientists Hugh J. Van Noordwyk and Michael A. Santoro published an article on 3M’s hazardous waste program in the journal <i>Environmental Health Perspectives</i> . ¹⁶ 3M considered “thermal

human serum albumin, 219 J. BIOL. CHEM. 399 (1956).

¹⁴ Charles E. Lewis and Gerald R. Kerby, *An Epidemic of Polymer-Fume Fever*, 191 JAMA 375 (February 1, 1965).

¹⁵ Francis X. Wazeter, *Ninety-Day Feeding Study in the Rat*, Unpublished report (1965).

¹⁶ Hugh J. Van Noordwyk and Michael A. Santoro, *Minnesota Mining and Manufacturing Company’s Hazardous Waste Program*, 27 ENVIRON. HEALTH PERSPECT. 245 (Dec. 1978).

<u>Year</u>	<u>Study</u>
	destruction of hazardous wastes” as the “best method for their disposal,” and by 1978, 3M had built seven incineration facilities throughout the United States on 3M manufacturing plant sites.
1980s	A U.S. Navy study found that AFFF has “adverse effects environmentally” and kills aquatic life. ¹⁷ Research conducted by 3M showed that employees had PFOA and PFOS in their blood. Also, DuPont discovered that PFOA passes from a mother to her unborn baby via the umbilical cord. ¹⁸
1987	A toxicological profile with guidelines was published in the Federal Register on April 17, 1987. ¹⁹
1999	The EPA and 3M found PFOS contamination in

<u>Year</u>	<u>Study</u>
	blood banks around the country. A farmer sued DuPont after his cattle began to die under mysterious circumstances in Parkersburg, West Virginia. At trial, Plaintiff was able to show that a DuPont plant located nearby was dumping tons of PFOA into a local landfill, which may have poisoned the cattle’s water supply as well as the Ohio River, polluting the drinking water of some 80,000 people. ²⁰
2000	John Giesy and Kurunthachalam Kannan reported that PFOS was a fluorinated organic contaminant. Based on the findings, the authors said that “PFOS were widely detected in wildlife throughout the world” and that “PFOS is widespread in the environment.” ²¹

¹⁷ Amy Linn, *Toxic Timeline: A Brief History of PFAS*, SEARCHLIGHT NEW MEXICO (Feb. 19, 2019), available at <https://searchlightnm.org/toxic-timeline-a-brief-history-of-pfas/>.

¹⁸ *Id.*

¹⁹ A toxicological profile with guidelines was published in the Federal Register on April 17, 1987.

²⁰ See Linn, *supra* note 17.

²¹ Meg Sedlak, *Profile – Perfluorooctane Sulfonate (PFOS)*, SAN FRANCISCO ESTUARY INSTITUTE (2016), available at https://www.sfei.org/sites/default/files/general_content/PFOS_profile_0.pdf (last visited March 30, 2022).

<u>Year</u>	<u>Study</u>	<u>Year</u>	<u>Study</u>
2005	An EPA advisory panel concludes that PFOA is a “likely” human carcinogen. ²²		perfluorooctanoic acid (PFOA): a retrospective exposure assessment of a community (1951-2003).”
2006	An EPA program encourages all major manufacturers to stop making long-chain PFAS, citing potential birth defects and other risks. DuPont and others agreed to phase out production by 2015.	2010	While listing six probable links, researchers concluded in a published, peer-reviewed paper that “[e]pidemiologic evidence remains limited, and to date data are insufficient to draw firm conclusions regarding the role of PFOA for any of the diseases of concern.” ²⁴
2007	A study by the U.S. Centers for Disease Control and Prevention estimated that PFAS chemicals could be detected in the blood of 98% of the U.S. population. ²³	2011	The Department of Defense acknowledged the PFAS crisis in an internal study that 594 military sites were likely to have contaminated groundwater. ²⁵
2007	Dennis Paustenbach, founder of ChemRisk, co-authored an article entitled “A methodology for estimating human exposure to		

²² <http://www.epa.gov/fedrgstr/EPA-SAB/2006/January/Day-30/sab583.htm>.

²³ Antonia M. Calafat, Lee-Yang Wong, Zsuzsanna Kuklennyik, John A. Reidy, and Larry L. Needham, *Polyfluoroalkyl Chemicals in the U.S. Population: Data from the National Health and Nutrition Examination Survey (NHANES) 2003–2004 and Comparisons with NHANES 1999–2000*, 115 ENVIRON. HEALTH PERSPECT. 1596–1602 (Nov. 2007).

²⁴ Kyle Steenland, Tony Fletcher, and David A. Savitz, *Epidemiologic Evidence on the Health Effects of Perfluorooctanoic Acid (PFAO)*, 188 ENVIRON. HEALTH PERSPECT. 1100 (2010).

²⁵ Complaint, *State of New Mexico v. United States*, No. 1: 19-cv-00178 (D. N. Mex. March 5, 2019), available at <https://www.law.nyu.edu/sites/default/files/new-mexico-pfas-complaint.pdf> (last visited March 31, 2022).

<u>Year</u>	<u>Study</u>	<u>Year</u>	<u>Study</u>
2011	Links were found between PFAS chemicals and breast cancers. ²⁶		the 2019 movie <i>Dark Waters</i> . ²⁸
2012	A landmark medical study by the C8 Science Panel found a probable link between PFOA exposure and six diseases: testicular cancer, kidney cancer, high cholesterol, ulcerative colitis, thyroid disease and pregnancy-induced hypertension. ²⁷	2014	The Environmental Protection Agency classified PFOS and PFOA as “emerging contaminants,” signaling that these chemicals are a real or perceived threat to human health or the environment. As a result, the Safe Drinking Water Act required larger water systems to monitor the levels of PFOA and PFOS in their water.
2013	Elevated body levels of the chemical PFOA were associated with a greater risk of non-Hodgkin’s lymphoma and kidney, testicular, prostate, and ovarian cancers, according to a study of 70,000 people living in the Mid-Ohio Valley. The drinking water there was contaminated with PFOA, which the chemical company DuPont used to make Teflon, as dramatized in	2015	The Agency for Toxic Substances and Disease Registry (ATSDR) issued a Public Health Statement stating that studies in humans have shown that exposure PFOA and PFOS may affect infants and children, affect the immune system, decrease fertility, interfere with the body’s

²⁶ Eva C. Bonefeld-Jorgensen et al., *Perfluorinated compounds are related to breast cancer risk in Greenlandic Inuit: A Case Control Study*, 10 ENVIRON. HEALTH 88 (Oct. 6 2011).

²⁷ C8 Science Panel, *Probable Link Reports*, (updated 29 October 2012), available at http://www.c8sciencepanel.org/prob_link.html (last visited March 30, 2022).

²⁸ Veronica M. Vieira, Kate Hoffman, Hyeong-Moo Shin, Janice M. Weinberg, Thomas F. Webster, and Tony Fletcher, *Perfluorooctanoic acid exposure and cancer outcomes in a contaminated community: a geographic analysis*, 121 ENVIRON. HEALTH PERSPECT. 318–323 (2013).

<u>Year</u>	<u>Study</u>	<u>Year</u>	<u>Study</u>
	natural hormones, increase cholesterol counts, and heighten the risk of some cancers. ²⁹	2017	A study by the Silent Spring Institute found PFAS in one-third of all fast food wrappers, where it can potentially migrate into greasy foods. ³²
2016	Harvard University researchers reported that public drinking water supplies serving more than 6 million Americans tested for the chemicals at or above the EPA's current suggested threshold of 70 parts per trillion. ³⁰	2018	MPART Science Advisory Committee report entitled "Scientific Evidence and Recommendations for Managing PFAS Contamination in Michigan," ³³ led by David Savitz, Associate Dean for Research at Brown University, examined the effects of PFAS on human and environmental health. The report sets forth evidence-based recommendations for how to clean up the
2016	The EPA established new drinking water advisories for PFOA and PFOS levels lower than its prior advisories. This impacted state and local agencies that manage water supplies. ³¹		

²⁹ ATSDR, *Public Health Statement on Perfluoroalkyls* (August 2015), available at <https://www.atsdr.cdc.gov/toxprofiles/tp200-c1-b.pdf> (last visited March 30, 2022).

³⁰ Harvard H.T. Chan School of Public Health, Press Release, *Unsafe levels of toxic chemicals found in drinking water for six million Americans* (August 9, 2016), available at <https://www.hsph.harvard.edu/news/press-releases/toxic-chemicals-drinking-water/> (last visited March 31, 2022).

³¹ EPA, *Fact Sheet: PFOA and PFOS Drinking Water Health Advisories* (Nov. 2016), available at https://www.epa.gov/sites/default/files/201606/documents/drinkingwaterhealthadvisories_pfoa_pfos_updated_5.31.16.pdf (last visited March 31, 2022).

³² Chuck Dinerstein, *Fluorinated Chemicals in Fast Food - Real Science, Fake News* American Council on Science and Health (Feb. 2, 2017), available at <https://www.acsh.org/news/2017/02/02/fluorinated-chemicals-fast-food-real-science-fake-news-10808> (last visited March 31, 2022).

³³ Scott Bartell, Jennifer Field, Dan Jones, Christopher Lau, Susan Masten, and David Savitz, *Scientific Evidence and Recommendations For Managing PFAS Contamination In Michigan*, (Dec. 7, 2018), available at https://www.michigan.gov/documents/pfasresponse/Science_Advisory_Board_Report_641294_7.pdf (last visited March 31, 2022).

<u>Year</u>	<u>Study</u>	<u>Year</u>	<u>Study</u>
	contamination. The panel concluded that there was a probable link between PFOA exposure and high cholesterol, ulcerative colitis, thyroid disease, testicular cancer, kidney cancer and pregnancy-induced hypertension.	2018	ATSDR drafted a Toxicological Profile on PFAS for review and comment in the Federal Register.
2018	A draft report ³⁴ from the ATSDR indicated that the “minimal risk levels” for oral exposure to PFOS and PFOA should be lower than the threshold currently recommended by the EPA. The report found that the EPA’s levels were 10 and 6.7 times higher, respectively.	2019	Between 2005-2013, the C8 Science Panel conducted studies on health and exposure in communities located in the Mid-Ohio Valley suspected to have been affected by PFOA (or C8) emissions dating back to the 1950s from the Washington Works plant in Parkersburg, West Virginia. They focused on identifying links between C8 exposure and certain diseases. ³⁶
2018	A report from the nonprofit Environmental Working Group found that more than 100 million Americans may have PFAS in their drinking water. ³⁵	2019	Researchers conducting a small observational study with limited control over confounding factors reported that study subjects exposed to the highest cumulative internal dose of PFOA had a statistically

³⁴ ATSDR, *ATSDR’s Minimal Risk Levels (MRLs) and Environmental Media Evaluation Guides (EMEGs) for PFAS* (Nov. 2018), available at <https://www.atsdr.cdc.gov/pfas/resources/mrl-pfas.html> (last visited March 31, 2022).

³⁵ Environmental Working Group, *Report: Up to 110 Million Americans Could Have PFAS-*

Contaminated Drinking Water (May 22, 2018), available at <https://www.ewg.org/research/report-110-million-americans-could-have-pfas-contaminated-drinking-water> (last visited March 31, 2022).

³⁶ C8 Science Panel, *supra* note 11.

<u>Year</u>	<u>Study</u>
	significant increase in risk for liver cancer, liver cirrhosis, diabetes, malignant neoplasms of lymphatic and hematopoietic tissue in both comparisons. ³⁷
2020	Researchers found that PFAS chemicals can act like established cancer-causing chemicals and that they all exhibited at least one of the key characteristics of carcinogens. The study was paid for by advocacy group, Environmental Working Group, which conducted the study with researchers from Indiana University. ³⁸

E. Limits to Causation Analysis

Experts studying the research on PFAS have begun to realize that the ability to specifically state with certainty which PFAS may cause which adverse health effects is not so straightforward. The studies available for review are limited to

the more widely recognized PFAS compounds, a mere drop in the bucket when considering the enormous amount of PFAS that exist, all with varying degrees of potential toxicity.

Since there are many different ways for people to be exposed to PFAS over their lifetimes, this factor alone has proven frustrating to researchers. They are finding that tracking and evaluating the adverse effects of exposure on human health is difficult as the types of PFAS used in differing applications continues to evolve over time. Pinning down a static cohort to study has proven to be a cat and mouse game.

Despite the fact that studies have associated no signature illness with PFAS exposure, studies are showing that numerous potential impacts on human health due to PFAS exposure. For example, exposure to PFAS via contaminated drinking water has been linked to kidney and testicular cancer, ulcerative colitis, pregnancy and fertility problems, liver diseases, thyroid disease, and high cholesterol.³⁹ Studies have also linked PFAS exposure to immune-toxic effects, including decreased

³⁷ Paolo Girardi and Enzo Merler, *A mortality study on male subjects exposed to polyfluoroalkyl acids with high internal dose of perfluorooctanoic acid*, 179 ENVIRON. RES. 108743 (2019).

³⁸ Alexis M. Temkin et al., *Application of the Key Characteristics of Carcinogens to Per and*

Polyfluoroalkyl Substances, 17 INT. J. ENVIRON. RES. PUBLIC HEALTH 168 (2020).

³⁹ ATSDR, *Toxicological Profile for Perfluoroalkyls* (May 2021), available at <https://www.atsdr.cdc.gov/toxprofiles/tp200.pdf> (last visited March 30, 2022); C8 Science Panel, *Probable Link Reports*, *supra* note 27.

response to vaccines and possible increases in COVID-19 severity.⁴⁰

Even low-level exposure has potentially serious health consequences. Multiple studies have linked prenatal PFAS exposure with low birth weight. Associations with higher risk of cardiovascular disease, respiratory disease and diabetes in adulthood, and impaired cognitive development and lower lifetime earnings are also sources of significant concern.⁴¹ At this time, one thing is for certain: scientists need to conduct further research to fully understand how PFAS may (or may not) affect human health.

II. PFAS Related Litigation

While scientists conducted studies, scholars analyzed the resulting research, and state regulators introduced bills to address the issue, plaintiff personal injury firms and various States' Attorneys General have unleashed a wave of PFAS-related lawsuits. Such cases have flooded State and Federal court dockets. These cases tend to fall into two distinct categories: personal injury claims and environmental contamination and remediation actions initiated by

government authorities on behalf of the constituents that they serve.

While PFAS litigation is not new, the recent uptick in scientific testing and State and Federal regulation has reinforced the potential health risks associated with PFAS in a way that has led the nation's legal analysts to draw comparisons to asbestos, tobacco, and lead paint litigation.

A. Types of Cases

Litigation stemming from PFAS related injuries is not limited to the predictable product liability, occupational exposure and nuisance claims for personal injury and property damage. Plaintiffs' firms are filing actions demanding a wide range of remedies; alleging all manner of injuries; and based on a variety of different legal theories. Pending PFAS-involved actions include: multidistrict litigation; class actions over contamination; a class action alleging violations of securities laws targeting 3M and DuPont; corporate lawsuits (including a high-profile case between DuPont and Chemours over who holds the bag for PFAS liability); a myriad of state actions targeting chemical companies; military cases; and finally, utility

⁴⁰ Philippe Grandjean et al., *Severity of COVID-19 at elevated exposure to perfluorinated alkylates*, PLOS ONE (Dec. 31, 2020), available at <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0244815> (last visited March 31, 2022).

⁴¹ European Food Safety Authority, Panel on Contaminants in the Food Chain, *Risk to human health related to the presence of perfluoroalkyl substances in food*, 18 EFSA J. 6223 (2020).

cases currently pending in New York, California, New Jersey, and Alabama.

Multi-District Litigation (MDL) 2873,⁴² which is comprised of approximately five hundred cases, was established in the United States District Court for the District of South Carolina. The consolidated cases all involve varied causes of action and claims relating to PFAS. Plaintiffs generally allege that aqueous film-forming foams (AFFFs) containing PFOA and/or PFOS contaminated groundwater near various military bases, airports, and other industrial sites where AFFFs were used to extinguish liquid fuel fires. The plaintiffs allege that they sustained personal injury manifestations and now need medical monitoring of their conditions. They also alleged they incurred property damage or other economic losses as a result.

B. PFAS Litigation Highlights

Given the ramped-up resolve to enact regulations at both the local and national level since a 1999 bellwether case filed against PFAS manufacturer DuPont, it should surprise no one that a rapid flurry of legal action was filed in courts across the country.

So far, the litigation has targeted manufacturers who produced the chemicals, some resulting in jaw

dropping trial verdicts and eye-opening settlements. Due to the recent regulations and growing body of research potentially linking PFAS to adverse health effects, one can expect to see a wider net of target defendants brought into the litigation. Potential defendants include:

- Manufacturers that produced PFAS and then sold them to third parties for use in other products.
- Retailers and/or distributors who sold PFAS-containing products.
- Municipalities that oversee sewer systems and water supplies.

A representative sample of some of the most noteworthy verdicts and settlements are set forth below:

Jury Verdicts:

2015	\$1.6 Million Verdict	A federal jury in the case of Ohio resident Carla Bartlett took one day to find DuPont liable for negligence and awarded her \$1.6 million. Bartlett alleged that she
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⁴² Aqueous Film-Forming Foams (AFFF) Products Liability Litigation (MDL No. 2873);

see <https://www.scd.uscourts.gov/mdl-2873/index.asp>.

		developed kidney cancer after drinking water contaminated with a chemical formerly used to make Teflon. The jury declined to award punitive damages but did award \$1.1 million for negligence and \$500,000 for emotional distress. ⁴³		after one day of deliberation, that DuPont acted with malice and awarded Freeman another \$500,000. ⁴⁴	
2016	\$5.1 Million Verdict	After a five-week trial, a federal jury awarded \$5 million to David Freeman, an Ohio man who alleged that his testicular cancer was the result of exposure to drinking water contaminated with PFOA from a DuPont plant in West Virginia. The jury also found,	2017	\$10.5 Million Verdict	A federal jury in Ohio ordered DuPont to pay \$2 million in compensatory damages to Kenneth Vigneron, who alleged that he developed testicular cancer from exposure to a toxic chemical leaked from one of the company's plants. The jury, finding that DuPont acted with actual malice, awarded an additional \$10.5 million in

⁴³ Barlett v. E. I. du Pont de Nemours & Co. (*In re* E. I. du Pont De Nemours & Co.), Civil Action 2:13-md-2433 (S.D. Ohio Feb. 17, 2016).

⁴⁴ Freeman v. E. I. du Pont de Nemours & Co., No. 2:13-CV-1103 (S.D. Ohio April 29, 2016).

2020 \$50 Million Verdict	<p>punitive damages.⁴⁵</p> <p>An Ohio jury awarded \$50 million to Travis Abbot and against DuPont in a case alleging that drinking water tainted with per- and polyfluoroalkyl substances attributable to DuPont caused Abbott's testicular cancer. The award included \$40 million in compensatory damages for plaintiff Abbot along with \$10 million for "loss of consortium" awarded to his wife.⁴⁶</p>	2020 Deadlocked Jury	<p>A jury deadlocked for Angie Swartz and her husband Teddy of Gallipolis, Ohio. They alleged that drinking water tainted with DuPont's PFAS caused Mrs. Swartz's kidney cancer. Plaintiffs are currently seeking a new trial.⁴⁷</p>
<u>Settlements:</u>			
		2002 \$100+ Million Settlement	<p>The Tennant litigation, the bellwether case for PFAS litigation, was filed in the United States District Court for the Southern District of West Virginia against manufacturer DuPont in 1999. The Plaintiff was a</p>

⁴⁵ Vigneron v. E. I. du Pont de Nemours & Co. (In re E. I. du Pont De Nemours & Co. C-8 Pers. Injury Litig.), Civil Action 2:13-md-2433 (S.D. Ohio Nov. 7, 2016).

⁴⁶ Abbott v. E. I. du Pont de Nemours & Co., No. 2:17-cv-998 (S.D. Ohio Feb. 27, 2020).

⁴⁷ Swartz v. E. I. du Pont de Nemours & Co., No. 2:18-cv-136 (S.D. Ohio Feb. 27, 2020).

		<p>West Virginia farmer whose land was allegedly contaminated by DuPont. The suit alleged that pollution from a nearby landfill contaminated with PFOA sludge caused the loss of their cattle. As part of the settlement, DuPont agreed to pay \$107 million to fund a scientific panel to study the effects of PFOA exposure.⁴⁸</p>			<p>Tennant litigation. The 2005 settlement agreement provided that DuPont would pay up to \$235 million for medical monitoring for over 70,000 people living in six water districts around the DuPont plant in Parkersburg. DuPont funded a health project to gather data from the class members where a panel of three epidemi-ologists jointly chosen by the parties would analyze the data and determine whether a “probable link” existed between PFAS exposure and any diseases.⁴⁹</p>
2005	\$235 Million Settlement	<p>Filed in 2001 on behalf of 80,000 people living in districts where PFOA had leaked into the water supply, plaintiffs used information about PFOA uncovered in the</p>	2017	\$921 Million Settlement	<p>DuPont and the Chemours Company agreed to pay up to \$921 million to settle roughly 3,500 Ohio Valley lawsuits over illnesses linked to a toxic chemical known as C-8 used</p>

⁴⁸ Tennant et al v. E.I. du Pont de Nemours & Co, Civil Action No. 6:99-0488 (S.D. W. Va. 1998).

⁴⁹ Leach v. E.I. du Pont de Nemours & Co., Case No. 01-C-608 (W. Va. Cir. Ct. filed Aug. 31, 2001).

		during the manufacture of Teflon. Each company agreed to each pay half of the overall settlement. The suit consisted of roughly 30 wrongful death claims, 270 claims of kidney or testicular cancer, and over 1,300 claims of thyroid disease. Neither company admitted any wrong-doing, but each will pay about \$1.5M to each plaintiff with cancer with lesser amounts dole out to the remaining claimants. ⁵⁰		sought \$5 billion in damages for harm resulting in drinking the water and contamination to the environment. In 2018, the case settled for \$850 million. The state used to fund drinking water and water sustainability projects in the areas affected by the contamination. ⁵¹	
2018	\$850 Million Settlement	The State of Minnesota filed one of the leading cases involving PFAS contamination against 3M Corporation for discharges of PFAS to surface and ground water used as a source of drinking water in Minneapolis and St. Paul. The state	2019	\$4 Million Settlement	The West Morgan East Lawrence Water and Sewer Authority reached a \$4 million settlement agreement with Daikin over PFOA and PFOS contamination in the Tennessee River. The \$4 million will repay money the water authority borrowed to install a temporary filter that removes PFOA and PFOS from drinking water before it is pumped out to the utility's 57,000 customers in north Alabama.

⁵⁰ *In re* E.I. Du Pont De Nemours & Co. C-8 Personal Injury Litigation (MDL 2433), No. 13-2433 (S.D. Ohio).

⁵¹ Agreement and Order, State of Minnesota v. 3M Corp., Case No. 27-cv-10-28862 (Minn. Dist. Ct. Feb. 20, 2018).

2019	\$69.5 Million Settlement	A federal judge approved a \$69.5 million settlement between the state of Michigan and Wolverine World Wide to pay for public water extensions in areas affected by PFAS contamination. The Michigan Department of Environment, Great Lakes and Energy, Plainfield and Algoma townships sued Wolverine Worldwide, a global footwear company, for contaminating residential drinking wells and the environment. The suit alleged that Wolverine dumped its waste from its old leather tannery, which began using 3M Scotchgard in 1958, in unlined trenches and lagoons at its House Street disposal site in northern Kent County in the 1960s. As a result, the plaintiffs alleged	the PFAS chemicals seeped into the ground-water, which eventually polluted nearby residential water wells.
2019	\$2.7 Million Settlement	The city of Lake Elmo, Minnesota and 3M settled a lawsuit over drinking water contamination. Under the settlement, 3M will pay \$2.7 million into the city's water account, which pays for maintaining its water system. The company will also transfer 180 acres of farmland to the City. ⁵²	
2019	\$35 Million Settlement	A lawsuit filed in 2015 by West Morgan East Lawrence Water Authority alleged that perfluorinated chemicals produced by 3M contaminated the drinking water supply for about 100,000 people. ⁵³ In 2019, 3M agreed to pay \$35 million to settle the	

⁵² City of Lake Elmo v. 3M Co., Civil No. 16-2557 ADM/SER (D. Minn. 2017).

⁵³ W. Morgan-East Lawrence Water & Sewer Auth. v. 3M Co., 208 F. Supp.3d 1227 (N.D. Ala. 2016).

		<p>suit. 3M also agreed to cover the costs of any current and future lawsuits against the water authority alleging liability or damages related to 3M's PFAS.</p>	<p>with a Michigan family whose drinking water was allegedly poisoned by toxic fluorochemicals that were in manufacturing waste dumped near their home decades ago. The lawsuit was brought by Seth and Tobyn McNaughton of Belmont in December 2017. 3M was added as a defendant later. The McNaughtons said their health and property values were harmed by toxic PFAS chemicals discovered in their well in Belmont, MI in 2017. Their home is about a half mile south of Wolverine's House Street dump, the waste of which was tainted by 3M Scotchgard that Wolverine used to waterproof shoe leather at its Rockford tannery. The blood of the plaintiffs' four-year-old son tested positive for extremely high PFAS</p>
2020	\$55 Million Settlement	<p>Wolverine Worldwide reached a \$55 million settlement with 3M in a Michigan lawsuit over PFAS contamination. Wolverine filed the federal lawsuit claiming it followed 3M's instructions on disposing of waste created by using Scotchgard, a substance containing PFAS that contaminated groundwater. The lawsuit accused 3M of knowing the chemicals used in Scotchgard posed environmental and health risks.</p>	
2020	\$113 Million Settlement	<p>In the first homeowner lawsuit filed over PFAS-tainted wells, Wolverine World Wide and 3M confidentially settled</p>	

		<p>levels — 484,000 parts-per-trillion — which the McNaughtons believe caused problems with his immune system and vaccination uptake. In filings, the family has also blamed high cholesterol, pregnancy complications and miscarriages on their exposure to high levels of PFAS in their drinking water.</p>	<p>(AFFF) used by its subsidiary Tyco Fire Products. Plaintiffs claimed they were exposed to PFAS through contaminated drinking water in local wells near a Wisconsin Tyco Fire Technology Center that routinely used firefighting foam from the early 1960s to 2017. The settlement covers an area in Marinette/Peshtigo that includes about 300 homes with an estimated 1,200 residents. Out of the \$17.5 million, \$11 million is for loss of property value and \$4 million is for exposure without current disease, according to a January 2021 settlement agreement. The remaining \$2.5 million is for individuals who claim they developed</p>
2021	\$83 Million Settlement	<p>DuPont, Corteva, Inc., and The Chemours Company resolved nearly 100 personal injury claims and agreed to a cost-sharing arrangement to address up to \$4 billion in PFAS legacy liabilities which were pending in multi-district PFOA litigation in Ohio.</p>	
2021	\$17.5 Million Settlement	<p>Johnson Controls agreed to pay \$17.5 million to settle a class action lawsuit and individual injury lawsuits stemming from chemicals found in aqueous firefighting foam</p>	

2021 \$23.5 Million Settlement reached a \$23.5 million settlement in a class action lawsuit brought by residents of the Rensselaer County. The lawsuit against Taconic alleged the company allowed contamination during its production of Teflon-coated fabrics and tapes to seep into groundwater.⁵⁴

water supplies and other natural resources.⁵⁶ More lawsuits are likely to follow. Case watchers have signaled that the injury requirement is posing a barrier for recovery in tort actions, because there remains a lack of established research needed to definitively link exposure to a specific disease.⁵⁷ Claims that survive dispositive motions still face the significant burden of proving the elements of a prima facie case at trial.⁵⁸ Despite these difficulties, as regulators implement more PFAS regulation and lawmakers introduce more PFAS legislation, more PFAS-related lawsuits will be filed.

In addition to tort actions against manufacturers, shareholders have also filed claims alleging failure to disclose material information about potential PFAS liability.⁵⁹ Rural water utilities sought a class action seeking injunctive relief for water testing and data collection,⁶⁰ and there was a proposed nationwide class action seeking to empanel a scientific study of PFAS.⁶¹ Finally, a citizen suit filed under the Resource Conservation and Recovery Act sought to abate

C. Litigation Trends

Attorneys General in Arkansas, Delaware (settled), Maine, Michigan, Minnesota (settled), North Carolina, New Hampshire, New Jersey, New Mexico, New York, Ohio, Vermont and Wisconsin have filed suits against many manufacturers of PFAS chemicals alleging damages including the contamination of

⁵⁴ Order, *Campbell v. Tyco Fire Products*, No. 2:19-cv-00422-RMG (D. S.C. Oct. 13, 2021).

⁵⁵ Notice, *Burdick v. Tonoga, Inc.*, No. 00253835 (N.Y. Sup. Ct. Oct. 1, 2021).

⁵⁶ A summary of current State level policies is available at <https://www.saferstates.com/toxic-chemicals/pfas/> (last visited March 30, 2022).

⁵⁷ Noonan, *supra* note 3, at 312.

⁵⁸ *Id.*

⁵⁹ *Consol. Am. Compl., In re 3M Co. Sec. Litig.*, No. 2:19-cv-15982 (D. N.J. Dec. 12, 2019), ECF No. 44.

⁶⁰ *Am. Compl., City of Millington v. 3M Co.*, No. 2:20-cv-01034 (D.S.C. 2020), ECF No. 40.

⁶¹ *Am. Compl., Hardwick v. 3M Co.*, No. 2:18-cv-1185 (S.D. Ohio 2019), ECF No. 96.

and enjoin disposal of PFAS-containing wastes.⁶²

In a departure from the initial claims seeking medical monitoring, personal injury damages and diminution in property value, we have noticed other claims asserted under consumer protection statutes. These complaints allege false or misleading advertising, asserting that consumer products were marketed as “compostable,” despite containing PFAS, the defining feature of which is their inability to break down.⁶³ Interestingly, a recent putative class action lawsuit was filed in California federal court against a feminine hygiene products company whose menstrual underwear was tested by a third party and reportedly contained PFAS.⁶⁴ The complaint alleges that the company misled consumers by making false marketing claims that its underwear was safe and free from harmful chemicals.

Currently, there are two cases pending involving the cosmetic industry: (1) a class action in New York against Shiseido alleging false advertising with regards to its bareMinerals® line of “clean” and “pure” cosmetics which a 2015 scientific study concluded actually

contain PFAS; and (2) a lawsuit filed in the District of Columbia against cosmetic giants CoverGirl and Coty, which also alleges claims of false advertising. These cases are expected to the test cases to evaluate the feasibility of bringing such actions on a nationwide scale. Recent developments such as these can only mean that PFAS litigation will continue for years to come.

III. PFAS Regulation

Until very recently, PFAS was left mostly unregulated by the Federal Government. In 2016, the U.S. Environmental Protection Agency (“EPA”) issued a lifetime health advisory of 70 parts per trillion for two PFAS compounds (PFOA and PFOS) in drinking water. In 2019, the EPA released a PFAS Action Plan designating PFAS contamination as a crisis.

This Action Plan was the catalyst for a whirlwind of regulatory and legislative action culminating in President Biden’s vow to “accelerate toxicity studies and research,” to “designate PFAS as a hazardous substance,” and to “set enforceable limits on PFAS.”⁶⁵ As such, the EPA and other federal agencies, such as

⁶² Am. Compl., *Tenn. Riverkeeper, Inc. v. 3M Co.*, No. 5:16-cv-01029 (N.D. Ala. 2017), ECF No. 62.

⁶³ Compl., *Ambrose v. The Kroger Co.*, No. 3:20-cv-04009 (N.D. Cal. June 16, 2020), ECF No. 1.

⁶⁴ Am. Compl., *Kanan v. Thinx Inc.*, No. 2:20-cv-10341 (C.D. Cal. March 16, 2021), ECF No. 29.

⁶⁵ Biden for President, *The Biden Plan to Secure Environmental Justice and Equitable Economic Opportunity*, available at <https://joebiden.com/environmental-justice-plan/> (last visited March 30, 2022).

the Agency for Toxic Substances and Disease Registry (ATSDR) and the Department of Defense, have ramped up efforts to investigate PFAS. The CDC and ATSDR have undertaken a quest to discover any and all potential links between PFAS and health effects. Governmental endeavors such as these show no signs of slowing down.⁶⁶

A. Chronology of Recent Regulatory Actions Involving PFAS:

2016: The EPA issued an advisory for PFOA and PFOS contamination in drinking water.

June 2018: The ATSDR released a draft report that proposed Minimum Risk Levels for drinking water for children that equate to 21 parts per trillion for PFOA, 14 parts per trillion for PFOS, 140 parts per trillion for perfluorohexanesulfonic acid (PFHxS) and 21 parts per trillion for perfluorononanoic acid (PFNA).

2019: The EPA released a PFAS Action Plan that detailed how the agency plans to address the contamination issue.⁶⁷

February 2021: The EPA pre-proposed and began developing the final Fifth Unregulated Contaminant

Monitoring Rule (UCMR5) to provide new data on twenty-nine PFAS that are critically needed to improve EPA's understanding of PFAS impacts on community drinking water.

April 2021: The EPA published an updated and externally peer reviewed toxicity assessment for perfluorobutanesulfonic acid (PFBS) authored by expert career scientists.

April 27, 2021: Administrator Regan called for the creation of a new "EPA Council on PFAS" charged with building on the agency's ongoing work to better understand and ultimately reduce the potential risks caused by these chemicals.

June 2021: They EPA restarted the process to designate PFOA and PFOS as hazardous substances, one of the most important steps the Agency can take to increase understanding of the number and location of PFOA and PFOS releases.

June 2021: The EPA proposed a rule to require all manufacturers (including importers) of PFAS in any year since 2011 to provide EPA a wide range of data, including on how they are using certain PFAS.

⁶⁶ See ATSDR, *Toxicological Profile for Perfluoroalkyls*, *supra* note 39; Centers for Disease Control and Prevention, Press Release, *CDC and ATSDR Award \$7 Million to Begin Multi-Site PFAS Study* (Sept. 23, 2019), available at <https://www.cdc.gov/media/releases/2019/p0923-cdc-atsdr->

[award-pfas-study.html](#) (last visited March 30, 2022).

⁶⁷ EPA, EPA'S PER- AND POLYFLUOROALKYL SUBSTANCES (PFAS) ACTION PLAN, 1-2 (2019), available at https://www.epa.gov/sites/default/files/2019-02/documents/pfas_action_plan_021319_508compliant_1.pdf (last visited March 30, 2022).

July 2021: The EPA released the first set of preliminary data for PFAS ever collected under the Toxics Release Inventory (TRI). The Agency collected data for more than 170 PFAS and is working to further enhance the quality and quantity of reporting under the TRI by removing certain exemptions and exclusions.

August 2021: The EPA released a draft assessment of the human health hazards of PFBA (Perfluorobutanoic Acid) for public comment and external peer review.

October 2021: The EPA released its *PFAS Strategic Roadmap: EPA's Commitments to Action 2021-2024*, a major step in the efforts to regulate PFAS. Using a whole agency approach to implement a national PFAS testing strategy, the EPA will use its Toxic Substances Control Act (TSCA) authority to require PFAS manufacturers to provide information on PFAS. The Agency announced additional steps toward evaluating the existing data for four PFAS under the Resource Conservation and Recovery Act (RCRA) and strengthening the ability to clean up PFAS contamination across the country through the RCRA corrective action process. The stated objectives of the PFAS Roadmap are three-fold: research, restrict, and remediate. Highlights of the plan include:⁶⁸

- “Aggressive” timelines to set enforceable drinking water limits under the Safe Drinking Water Act “to ensure water is safe to drink in every community;”
- Timelines for actions involved in the establishment of “effluent guideline limitations” for nine industrial categories;
- Establishment of a hazardous substance designation under the federal Superfund law that enhances the government’s ability to hold PFAS polluters financially accountable;
- A review of past actions on PFAS taken under the Toxic Substances Control Act (TSCA) to address those that are insufficient;
- Increased monitoring, data collection, and research so that the Agency can identify what actions are needed and when to take them;
- A final toxicity assessment for a type of PFAS called GenX used in manufacturing nonstick coatings that has been found in drinking water, rainwater and air samples; and

⁶⁸ Carey Gillam, *PFAS: Health Concerns and Efforts to Regulate “Forever Chemicals”*, US RTK (November 22, 2021)

<https://usrtk.org/chemicals/pfas-health-concerns-and-efforts-to-regulate-forever-chemicals/> (last visited March 30, 2022).

- Continued efforts to address PFAS emissions into the air.

October 2021: The EPA published a final human health toxicity assessment for GenX chemicals that was authored by expert career scientists and underwent rigorous external peer review and public comment.

November 2021: The EPA asked its Science Advisory Board to review four draft scientific documents, recent scientific data and new analyses that indicate that negative health effects may occur at much lower levels of exposure to PFOA and PFOS than previously understood and that PFOA is a likely carcinogen.

December 17, 2021: The EPA finalized the fifth *Unregulated Contaminant Monitoring Rule (UCMR5)*. Every five years, the Safe Drinking Water Act requires EPA to release a new list of unregulated contaminants to be monitored in public water systems. UCMR5 will monitor all public water systems serving 3,300 people or more and a representative set of systems serving fewer individuals. From 2022 to 2026, UCMR5 monitoring will include each of 29 PFAS which has a validated drinking water method and is not subject to a national primary drinking water

regulation, with sampling beginning in 2023. UCMR monitoring provides the occurrence and exposure data necessary to protect public health in future regulatory actions.

December 27, 2021: The EPA published the final UCMR5, which will require sample collection for twenty-nine PFAS between 2023 and 2025. Consistent with EPA's PFAS Strategic Roadmap, UCMR5 will provide new data that are critically needed to improve EPA's understanding of the frequency that the twenty-nine identified PFAS (and lithium) are found in the nation's drinking water systems and at what levels.

The EPA has provided some of the most important guidance to understanding the potential effects PFAS have on human health. They are educating the public and increasing our understanding of the environmental risks involved. Despite this leadership role, they are the first to admit that there is much that regulators do not fully understand yet. They state that they remain committed to working with researchers to more fully understand.⁶⁹

- How to better and more efficiently detect and measure PFAS in our air,

⁶⁹ EPA, *PFAS Explained*, available at <https://www.epa.gov/pfas/pfas-explained> (last visited March 31, 2022).

water, soil, and fish and wildlife?

- How much people are exposed to PFAS?
- How harmful PFAS are to people and the environment?
- How to remove PFAS from drinking water?
- How to manage and dispose of PFAS?

B. State of Illinois Actions

Like many other states, lawmakers and regulators in Illinois are aggressively working to establish standards that exceed those enacted by the federal government. The Illinois EPA has reported the following actions:⁷⁰

1. Community Water Supply Sampling

Illinois Environmental Protection Agency is conducting a statewide investigation into the prevalence and occurrence of PFAS in finished drinking water at all 1,749 community water supplies in Illinois. When PFAS chemicals are detected, Illinois EPA will work with community water supplies to inform

⁷⁰ Illinois Environmental Protection Agency, *PFAS Statewide Investigation Network: Community Water Supply Sampling*, available at <https://www2.illinois.gov/epa/topics/water-quality/pfas/Pages/pfas->

residents and determine next steps to reduce exposure.

2. Groundwater Standard Development

35 Illinois Administrative Code Part 620 establishes various aspects of groundwater quality, including method of classification of groundwater, non-degradation provisions, standards for quality of groundwater, and various procedures and protocols for the management and protection of groundwater. On December 8, 2021, Illinois EPA proposed amendments to the Part 620 regulations. The proposed amendments update toxicity data for various listed chemicals, update exposure factors and introduce groundwater quality standards for six PFAS: PFOA, PFOS, PFNA, PFHxS,

PFBS, and GenX; and update other portions of the regulations.⁷¹

3. Maximum Contaminant Level Development

The Illinois EPA intends to perform sampling for PFAS at community water supplies across Illinois. Along with monitoring regulatory developments on the federal level, the sampling will

statewide-investigation-network.aspx (last visited March 31, 2022).

⁷¹ Information on the proposed amendments may be found on the 620 Groundwater Quality page.

provide Illinois EPA with data to determine future state actions needed to protect community water supplies.

4. Class B Firefighting Foam

Public Act 102-0290, effective January 1, 2022, regulates the use of Class B firefighting foam to minimize PFAS exposure to humans and reduce PFAS releases to the environment. Illinois EPA and the Office of the State Fire Marshal jointly developed a fact sheet providing information about Firefighting Foam and PFAS which provides information to fire departments about firefighting foam, PFAS, and the new law. As of January 1, 2022, any person, unit of local government, fire department, or State agency that discharges or releases Class B firefighting foam that contains intentionally added PFAS chemicals must notify the Illinois Emergency Management Agency (IEMA) within 48 hours of AFFF discharge or release, including use at an emergency incident.

C. Other State Actions

The nonprofit investigative research group U.S. Right to Know⁷² published a report which details recent State by State PFAS related regulatory actions. These include:

Alabama – 3M agreed to pay local government agencies in Alabama \$98.4 million in October 2021 in a deal reached through court-ordered mediation over claims that one of the company’s chemical plants polluted the Tennessee River in northern Alabama. The money is to be used to fund cleanup efforts and reimburse water agencies’ prior efforts to remediate PFAS from the drinking water. 3M also agreed to pay \$12 million to settle a potential class action lawsuit by Alabama drinking water customers.

California – In October 2021, California enacted new laws that prohibit the use of PFAS in children’s products; ban the sale or distribution of any food packaging that contains PFAS after Jan. 1, 2023; and by Jan.1, 2024, labels on cookware must list any PFAS in the product and provide a link or QR code to a webpage that contains more details.

Maine – Environmental regulators announced in October 2021 a statewide investigation to identify PFAS contamination sites related to the state’s municipal sludge and paper mills. State lawmakers earmarked \$30 million to test for PFAS and to install filtration systems on contaminated water systems. The state will assist farmers whose land or water is found to have unsafe levels of PFAS.

⁷² Gillam, *supra* note 68.

Michigan – In October 2021, Governor Gretchen Whitmer signed an executive directive ordering the state to “use its purchasing power—an estimated \$2.5 billion annually” to limit purchasing of products containing PFAS chemicals.

New Hampshire – The Department of Natural Resources announced in November 2021 that PFAS contamination was so high in five of its lakes that people (and particularly children) should limit fish consumption.

North Carolina – In November 2021, North Carolina’s Attorney General filed lawsuits against 14 manufacturers of a fire suppressant made with PFAS, asking the court to require the manufacturers to pay for investigations to determine the extent of the pollution damage and to clean up the damage, replace water treatment systems and wells, restore damaged natural resources, and monitor water quality going forward. The lawsuits focus on PFAS contamination at Charlotte-Douglas International Airport and at an Air National Guard Base.

Oregon – Oregon announced in October 2021 it would test about 150 drinking water systems across the state to determine levels of PFAS contamination.

Pennsylvania – Regulators announced in November 2021 they would set enforceable limits on toxic “forever chemicals” in drinking water. Pennsylvania officials said they plan to set drinking water limits on the two best-studied of the chemicals (PFOA and PFOS).

IV. Insight and Planning for the Future

A. Minimizing Risk

Companies whose products contain PFAS or who use PFAS in their manufacturing processes should begin to: (1) develop risk management plans, including considering PFAS alternatives; (2) conduct full compliance audits; and (3) review whether any supplier materials could expose them to liability.

Companies responsible for Superfund cleanups should determine whether PFAS contaminants are now, or have the potential to become, a risk factor when preparing remediation plans. They should examine their corporate histories with PFAS and immediately start testing potential sites for chemicals.

With many consumer groups pressing for retail regulation, now is

the time for fast food companies to take a hard look at their corporate policies and seek opportunities to phase out PFAS from food packaging.

Companies in the waste management industry, especially those who send their industrial waste to landfills, should conduct full compliance checks. This is especially important now as many environmental regulatory agencies are looking to hold the owners of waste sites and landfills responsible for PFAS contamination in waterways.

Companies facing long-tail environmental liabilities for PFAS exposure should consult their historic general liability policies for insurance coverage, as these policies may provide coverage for property damage costs and ground water remediation. There also may be pollution liability insurance policies under certain circumstances. It is important to determine which State's law will apply when considering insurance, as coverage law differs from state to state. Some states hold that the controlling law is the State where the hazardous waste is located, while others hold that controlling law is determined where the policy holder's principal place of business

is located or in which state they purchased the policy.⁷³ As a first step, companies at risk for PFAS exposure should determine whether the potential contamination occurred prior to 1986 (year the absolute pollution exclusion went into effect). If so, companies should immediately notify their insurer, because depending on the controlling state law, coverage may be precluded as a matter of law.⁷⁴

Companies should monitor both the MDL as well as the many state and federal regulations to fully comprehend and develop strategies to minimize the risk associated with PFAS.⁷⁵

Consumers might want to consider investing in a certified PFAS filtration system, as boiling water is not effective in eliminating PFAS chemicals from tap water. It may be prudent to replace any nonstick cookware with cast iron or stainless steel. Make a conscious effort to read labels to avoid purchasing water repellent fabrics and making inquiries of restaurants concerning the types of carry out containers prior to carrying out.

B. Crystal Ball Predictions

Newly funded research on the potential toxicity (or lack thereof) of

⁷³ Robert D. Chesler and Robert M. Horkovich, *Insurance Coverage for Forever Chemicals*, RISK MANAGEMENT (May 3, 2021).

⁷⁴ *Id.*

⁷⁵ Robert W. Petti and Samuel D. Habeeb, *Will Forever Chemicals, PFAS, Lead to Never-Ending Lawsuits?* CARRIER MANAGEMENT (Nov. 18, 2021) <https://www.carriermanagement.com/features/2021/11/18/229077.htm> (last visited March 30, 2022).

PFAS will, when complete, bring a heightened level of awareness to the general public. This increased awareness will lead inevitably to an increase in litigation targeting chemical manufacturers and suppliers. Even if plaintiffs don't emerge without help, given the size of the settlements seen to date, activist Plaintiff firms will aggressively seek out plaintiffs to file lawsuits against PFAS manufacturers and suppliers.

Plaintiff firms will also pursue downstream companies and peripheral products in far-fetched industries under familiar and adapted legal theories currently employed in mass toxic tort litigation. Waste management, landfill site owners and the construction industry will be affected on a massive scale, whether through direct enforcement action, re-opener remediation actions, or lawsuits for contribution.⁷⁶

Newly-enacted Federal regulations may create additional legal liability for current and former owners and operators of facilities where PFAS have been handled. The EPA will designate at least two types

of PFAS (PFOA and PFOS) as "hazardous substances" under the Comprehensive Environmental Response, Compensation & Liability Act (CERCLA, also known as the Superfund law) leading to costly clean up and remediation actions involving considerable reporting requirements.⁷⁷ Companies may be required to disclose any PFAS made, imported, used, and disposed since Jan. 1, 2011 if the EPA's planned final rule is issued in 2022.⁷⁸ Depending on the language ultimately used in the Final Rule, companies dealing in imported goods, such as automobiles and computers, or any products with components or parts consisting of these chemicals may be effected by this rule. States will also be looking closely at PFAS levels in local air, soil and water and will introduce and pass regulations and laws stricter than those passed by the federal government. As more government regulation goes into effect and more litigation is filed in courts, insurance companies can expect to see a

⁷⁶ John Gardella, *PFAS Risks and Construction Industry: Yes, EPA Actions Will Impact You!*, *CMBG₃ LAW* (Jan. 18, 2022), available at <https://www.cmbg3.com/pfas-risks-and-construction-industry-yes-epa-actions-will-impact-you> (last visited March 30, 2022).

⁷⁷ *Id.*

⁷⁸ Pat Rizzuto, *'Buckle Up' for PFAS Regulation, Litigation in 2022, Lawyers Say*, *BLOOMBERG LAW* (Dec. 29, 2021), available at <https://news.bloomberglaw.com/environment-and-energy/buckle-up-for-pfas-regulation-litigation-in-2022-lawyers-say> (last visited March 30, 2022).

corresponding rise in the number of PFAS-related claims filed.⁷⁹

In addition to legal and regulatory pressures, companies should expect business pressures, too. Environmental and consumer groups may begin to target retailers, pressuring them to refrain from selling cosmetics, textiles, and some other products made with PFAS.

V. Conclusion

There is still much to be learned about PFAS both from a legal and scientific standpoint. To date, despite increasing regulatory scrutiny, research has not shown a conclusive link between PFAS exposure and any specific injury or disease. But given the regulatory climate, even in the absence of such a link it remains prudent to protect consumers by taking reasonable steps to minimize PFAS exposure. Companies should also determine if they have any potential PFAS liability and, if so, proactively design and implement a plan to minimize or eliminate any such liability. Although much more research is needed to fully analyze and evaluate PFAS, one thing is certain. More lawsuits will continue to be filed.

⁷⁹ Jencap Group, *PFAS: How “The New Asbestos” Will Affect the Insurance Industry*, available at <https://jencapgroup.com/pfas->

[how-the-new-asbestos-will-affect-the-insurance-industry/](https://jencapgroup.com/pfas-how-the-new-asbestos-will-affect-the-insurance-industry/) (last visited March 30, 2022).