Submission No 50

INQUIRY INTO INQUIRY INTO PFAS CONTAMINATION IN WATERWAYS AND DRINKING WATER SUPPLIES THROUGHOUT NEW SOUTH WALES

Organisation: 3M Company

Date Received: 19 December 2024

3M Company Submission

This submission is made by 3M Company to the Senate Select Committee on PFAS (per- and polyfluoroalkyl substances) (Committee).

1 Introduction

1.1 3M Company appreciates the opportunity to make this submission to assist the Committee.[1]

1.2 Over the years, the water, oil, grease, and heat-resistant qualities of per- and polyfluoroalkyl substances (PFAS) have helped enable important technological advances, lifesaving innovations and interventions, and popular consumer products in Australia and around the world. One of the earliest uses of PFAS products was to extinguish deadly fuel fires, especially in naval and aviation contexts. Since then, they have become components in a wide variety of essential products used by people across the globe. And they have remained in use as a tool for extinguishing extremely dangerous liquid-fuel fires—like those on naval ships—that cannot be doused with water and conventional fire suppressant products alone.

1.3 Against this backdrop, 3M Company has led industry by taking important steps to recognize both accelerating regulatory trends focused on reducing the presence of PFAS in the environment as well as changing stakeholder expectations.

1.4 Twice—first in 2000, and again in 2022—3M Company has led the industry in exiting from the manufacture of PFAS. In 2000, 3M Company announced that it would phase out the manufacture of long chain PFAS such as perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS) (the types of PFAS that have generated the most attention). As a result, 3M Company has not manufactured aqueous film-forming foam (AFFF) for about 20 years. And two years ago, 3M Company once again led the industry by announcing its exit from the manufacture of all PFAS. The company announced that it will stop manufacture by the end of 2025 and is on schedule to do so. The company also announced that it would work to discontinue the use of PFAS across its product portfolio. In contrast to 3M Company's industry-leading decisions, other PFAS manufacturers instead elected not to exit from the market for PFOA and PFOS in 2000 and have continued their production of other types of PFAS to fill market demand for those products, including in Australia.

2 PFAS—A Family of Chemistries with Essential Societal Uses

2.1 The term "PFAS" refers to a broad category of thousands of compounds with distinct and widely varying properties and characteristics. PFAS compounds have been used in many essential consumer and industrial products because of their chemical and physical properties, including properties that make them resistant to oil, grease, stains, and heat, among other things.

2.2 AFFF, or aqueous film-forming foam, ranks among the most significant PFAS applications. AFFF's history dates back many decades. It was developed by the United States Navy in collaboration with industry in the early 1960s. In 1967, a highly publicized fuel fire on the U.S. Navy's aircraft carrier *USS Forrestal* resulted in 134 deaths and injuries to 161 other servicemembers. The destruction was devastating because the fire, which started when a rocket misfired and ruptured an airplane's fuel tank, triggered a conflagration that burned for hours. In response, the U.S. Navy promoted the deployment of AFFF, which was and is the most effective product available for suppressing fires caused by jet fuel. The U.S. Department of Defense eventually put AFFF to work in more than 8,000 facilities and mobile assets in the United States and across the globe. Fluorocarbon surfactants had been a key part of the U.S. military specifications for firefighting foam

[1] 3M Company does not itself have any operations in Australia. However, 3M Company's subsidiary, 3M Australia Pty Ltd ("3M Australia"), has operated in Australia since 1951. Please see 3M Australia's separate submission to the Committee.

for decades.

2.3 According to the U.S. Fire Administration, which is part of the U.S. Department of Homeland Security's Federal Emergency Management Agency (FEMA), AFFF forms a stable, durable film and foam "blanket" over liquid fuel that prevents flammable vapors from escaping, which in turn helps both to extinguish the fire by choking off its source of oxygen and prevent additional ignition of vapors. The intense heat generated by fuel fires makes them incapable of being extinguished by water. These same chemical and physical properties render PFAS uniquely capable in countless other products.

2.4 Today, consumers, industries, and governments worldwide depend on products made by many companies using PFAS, including:

- *Automobiles*, including electric and conventional vehicles, to help protect fuel lines, seals, and batteries;
- *Aerospace*, to help allow for interference-free communication from the cockpit to the wings, tail, and other equipment;
- *Advanced communications networks*, including WiFi and cellular data networks;
- *Consumer goods*, including non-stick cookware, food packaging, cosmetics, and clothing;
- *Electronics*, such as semiconductors and batteries, which are vital for everything from smartphones and wearable fitness trackers to national-security technologies;
- *Medical technologies and devices*, like catheters, stents, and needles, as well as transdermal patches that are used for medicine delivery;
- *Medicines and pharmaceuticals*, including life-saving chemotherapy and prescription medicines that treat conditions like anxiety or depression;
- *Military and national-security technologies*, including aircraft control systems and safety equipment; and
- *Sustainable and renewable energy*, including solar panels, windmills, and fuel cells.

2.5 Alternatives are not currently available for many of these critical societal uses.

3. Decisions Regarding the Manufacture of PFAS

3.1 In 2000, 3M Company announced that it would phase out long chain PFAS such as PFOS and PFOA production globally (the types of PFAS that have generated the most attention). The company has long since phased both materials out of its operations and also permanently discontinued production of AFFF.

3.2 When 3M Company announced its phaseout of these chemistries, several other manufacturers of PFOS and PFOA existed in the market. These manufacturers continued to produce PFOS, PFOA, or both for years after 3M Company announced its phaseout. When 3M Company exited the manufacture and sale of AFFF, the market demand and technical need for AFFF—the most effective technology available for extinguishing certain types of fires—did not disappear. Other companies continued to manufacture and supply AFFF around the world, including in Australia. AFFF made and purchased over the last two decades has not come from 3M Company.

3.3 After 3M Company's phaseout of PFOA and PFOS, the company announced in December 2022,

that it would exit all PFAS manufacturing by the end of 2025 and is on schedule to do so. Today, many companies other than 3M manufacture PFAS, and all of the PFAS made after 3M's manufacturing exit will derive from other sources. 3M Company also announced in December 2022 that it would work to discontinue PFAS use across its product portfolio. The company has made substantial progress in this regard in a variety of applications and, even beyond the announced manufacturing exit, has significantly reduced PFAS use across its portfolio.

4. Remediation and Treatment of PFAS

4.1 3M Company has extensive experience in remediating and treating PFAS in connection with its operations. Several effective processes already exist and others are expected to come online in the years ahead, due in part to 3M Company's efforts. 3M Company is committed to science-based site remediation and advancing water-treatment technologies at sites where it has historically manufactured PFAS. 3M Company is doing this work in partnership with government authorities, outside scientists and community advisors. The company also continues to investigate and support the development of new technologies that may provide additional, cost-effective methods for addressing PFAS in the environment.

4.2 Choosing the right approach to treat or remediate PFAS depends on a variety of site-specific factors, the resources affected, the composition and concentration of PFAS and other present substances, as well as the applicable regulatory and industry standards.

4.3 A number of well-established methods exist to remove PFAS from liquids, including from sources of drinking water. The most commonly used technology for removing PFAS from water is granular activated carbon, or GAC. GAC is effective in removing a wide range of PFAS and is particularly effective in removing longer-chain PFAS such as PFOS and PFOA. PFAS filtered from water is typically destroyed by incineration—the destruction technology that has been consistently endorsed by regulators.

4.4 Another technology, anion exchange resin, known as AIX, uses electrostatic interactions between the fluorinated carbon chains and the resin. AIX is particularly effective for short-chain PFAS. Selected resins in an AIX system can be regenerated, and efforts are underway to enhance that capability.

4.5 Two other technologies—reverse osmosis (RO) and nanofiltration (NF)—push water through a membrane that can remove both long- and short-chain PFAS. However, this separation produces a concentrated waste stream requiring additional management, as well as high capital and operation-and-maintenance costs. RO and NF therefore are currently less practicable for most PFAS-treatment scenarios.

4.6 Finally, a fifth process, sometimes referred to as foam fractionation, uses air and turbulence to generate bubbles that separate substances such as PFAS from bulk liquid. PFAS cling to these bubbles and accumulate as a concentrated foam that can then be removed for further treatment or disposal. This process is dependent on site-specific factors such as treatment volume and has been implemented at field-scale worldwide and may effectively reduce long-chain PFAS.

4.7 Other current technologies focus on PFAS in soil, sludge, or other solids, rather than in water or bulk liquids. Choosing the right approach from among these technologies again depends on site-specific factors, including the composition and concentration of PFAS.

4.8 Notwithstanding the effectiveness of current remediation and treatment technologies, efforts to research, develop, and deploy additional technologies are actively underway today. Globally, substantial resources are being devoted to innovating and improving technologies to address PFAS. These efforts show promise for both making existing treatment options more effective and affordable and introducing entirely new technologies. 3M Company has explored the use of

multiple PFAS-concentration technologies and multiple PFAS-destruction technologies. It has contributed to the development of some of the most promising new methods. In addition, 3M Company supports other scientists, researchers, and developers in the field. For example, 3M Company scientists co-authored a recently published study examining the effectiveness of a new destruction method to treat mixtures of ultra-short-, short-, and long-chain PFAS in liquids with high total dissolved solids—a method that yielded promising results, particularly with respect to high-volume industrial wastewater treatment.

4.9 Both today and increasingly in the future, technologies will be available to provide a wide range of options for addressing PFAS in the environment.

5. Conclusion

5.1 3M Company has been a leader in inventing advanced materials and products that serve important societal needs. The company is also committed to being a leader in applying science in response to concerns about PFAS, and it supports collaborative, science-based approaches to address them. 3M Company supports regulation and governmental action that is science-based

5.2 3M Company appreciates the opportunity to make this submission in support of the Committee's work.