

REGULATING PFAS AND "FOREVER CHEMICALS": LIABILITY UNDER ENVIRONMENTAL REMEDIATION LAWS

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ABSTRACT

*Per- and polyfluoroalkyl substances (PFAS) are a class of more than ten thousand synthetic compounds whose carbon-fluorine bonds resist environmental degradation, earning them the epithet forever chemicals. Their near-universal presence in drinking water, soil and human blood has forced remediation law to confront a contaminant that does not fit the paradigm on which strict, joint and several liability was built, namely a single, identifiable, geographically bounded release. This paper undertakes a doctrinal and critical examination of liability for PFAS contamination under the American Comprehensive Environmental Response, Compensation and Liability Act, 1980 (CERCLA), tracing the 2024 hazardous-substance designation of PFOA and PFOS, the jurisprudence on owner, operator, parent-corporation and arranger liability, and the unresolved tension between CERCLA's textual strict liability and the Environmental Protection Agency's enforcement-discretion carve-outs for passive receivers such as water utilities and fire departments. It situates this analysis against the multi-billion-dollar settlements reached in the Aqueous Film-Forming Foams multidistrict litigation and the earlier Leach and Bartlett litigation against E.I. du Pont de Nemours & Co. The paper then turns comparatively to the European Union's proposed universal REACH restriction and to India, where no PFAS-specific statute exists but where the doctrine of absolute liability and the polluter-pays principle, developed in *M.C. Mehta v. Union of India* and *Indian Council for Enviro-Legal Action v. Union of India*, offer a jurisprudential foundation for future remediation claims. The paper argues that ubiquity, not culpability, is now the central obstacle to environmental liability regimes, and proposes a calibrated framework combining source-directed strict liability with proportionate, exposure-based cost allocation.*

KEYWORDS: PFAS; Forever Chemicals; CERCLA; Environmental Remediation; Polluter Pays; Strict Liability.

1. INTRODUCTION

Environmental law has always organised liability around an assumption that contamination can be traced backward from an injured resource to a discrete, identifiable actor whose conduct caused it. The polluter, in this imagination, is a factory with a pipe, a landfill with a fence, a tank with a leak. Per- and polyfluoroalkyl substances break this assumption at its root. PFAS are a family of more than ten thousand synthetic compound built around chains of carbon and fluorine atom bonded so strongly that they do not hydrolyse, photolyse, or biodegrade under any environmentally relevant condition.¹ Manufactured since the late 1940s for use in non-stick cookware, water-repellent textile, food packaging, cosmetics, and, most consequentially, aqueous film-forming foam (AFFF) used to extinguish petroleum fire at military base, airport and refinery, PFAS have entered soil, groundwater, surface water, and the bloodstream of

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¹ European Chemicals Agency, ECHA Publishes Updated PFAS Restriction Proposal (Aug. 20, 2025).

nearly every tested human being on the planet.² Because these compound persist indefinitely, disperse across administrative and national boundary through water and atmospheric transport, and were, for decade, actively concealed from regulator by their principal manufacturer, they present the starkest possible test of whether remediation statute drafted for a world of point-source pollution can discipline a contaminant that is, quite literally, everywhere.

This paper interrogates that test through the lens of liability. Section 2 briefly explains why the chemistry of PFAS is inseparable from the legal difficulty of assigning responsibility for it. Section 3 maps the fragmented American regulatory architecture, the Toxic Substances Control Act, the Safe Drinking Water Act, and, centrally, the 2024 designation of two legacy PFAS compound as hazardous substances under CERCLA. Section 4 undertakes a close doctrinal reading of CERCLA liability as elaborated by the United States Supreme Court in *New York v. Shore Realty Corp.*³, *United States v. Bestfoods*⁴, and *Burlington Northern & Santa Fe Railway Co. v. United States*⁵, and asks whether these precedent, developed for solvent spill and pesticide dump, translate coherently to a mobile, ubiquitous contaminant. Section 5 examines how this doctrine has actually operated in the Aqueous Film-Forming Foams multidistrict litigation and the earlier Leach and Bartlett case against DuPont, where settlement now exceed twenty-seven billion dollars. Section 6 turns comparatively to the European Union's proposed universal restriction under REACH and, at greater length, to India, where the absence of PFAS-specific legislation throws into relief the possibility and limit of the judicially developed polluter-pays and absolute liability doctrine. Section 7 offers a critical assessment of the doctrinal strain ubiquity places on strict liability, and Section 8 proposes reform and concludes.

The central argument is that the difficulty PFAS poses for remediation law is not primarily one of insufficient stringency but of a mismatched causal architecture: liability regime built to answer who spilled this drum are being asked to answer who is responsible for a molecule found in every reservoir on earth, and until legislature and court explicitly re-engineer causation and apportionment rule for such contaminant, remediation will continue to proceed through improvised settlement rather than principled adjudication.

² FAQs: What Are 'Forever Chemicals'? How They Pollute India's Rivers, Groundwater, and Drinking Water, India Water Portal (last visited Sept. 2026).

³ *New York v. Shore Realty Corp.*, 759 F.2d 1032 (2d Cir. 1985).

⁴ *United States v. Bestfoods*, 524 U.S. 51 (1998).

⁵ *Burlington N. & Santa Fe Ry. Co. v. United States*, 556 U.S. 599 (2009).

2. THE CHEMISTRY AND UBIQUITY OF PFAS: WHY REMEDIATION LAW STRUGGLES

The regulatory difficulty of PFAS begins in chemistry. The carbon-fluorine bond is among the strongest in organic chemistry, and PFAS molecule are engineered precisely so that this bond resists heat, water, and microbial attack, the same property that makes the compound commercially indispensable also makes them environmentally indestructible.⁶ Unlike the chlorinated solvent and petroleum hydrocarbon that dominated the first generation of Superfund litigation, PFAS do not remain conveniently near their point of release. Several member of the class, including PFOA and PFOS, are highly water-soluble and migrate rapidly through groundwater plume over distances of many kilometre; others volatilise, are transported atmospherically, and are redeposited far from any industrial source, so that region with no PFAS-manufacturing or AFFF-use history are nonetheless found to carry a detectable contamination burden.⁷ The United States Environmental Protection Agency's own toxicological review concluded that PFOA and PFOS are likely human carcinogen and that no safe threshold of exposure to either compound can presently be identified, a finding reflected in a Maximum Contaminant Level Goal of zero for both substance under the 2024 drinking-water rule.⁸

This combination of persistence, mobility, and near-zero safe threshold has three consequence for liability doctrine that recur throughout this paper. First, the class of potential defendant for any given plume is far larger and more diffuse than for a conventional contaminant, because multiple manufacturer supplied chemically similar formulation to multiple downstream user over a period spanning seven decade, and because AFFF was used not merely by manufacturer but by thousands of airport, military installation, and municipal fire department who neither made nor profited from the chemical.⁹ Second, because PFAS is already present at measurable, if low, concentration in essentially the entire human population and in most surface water, causation, the demonstration that a particular defendant's release, rather than the ambient background, produced the contamination at a particular site, becomes a matter of statistical apportionment rather than binary attribution. Third, because so much scientific and regulatory understanding of PFAS toxicity has crystallised only in the last decade, remediation law is now being asked to apply liability

⁶ Universal PFAS Restriction, ChemTrust (last visited Sept. 2026).

⁷ FAQs: What Are 'Forever Chemicals'?, *supra* note 2 (noting that states without significant industry are not necessarily free of PFAS, since atmospheric deposition and river transport carry contamination far from source points).

⁸ Designation of Perfluorooctanoic Acid (PFOA) and Perfluorooctanesulfonic Acid (PFOS) as CERCLA Hazardous Substances, 89 Fed. Reg. 39,124, 39,145-46 (May 8, 2024); PFAS National Primary Drinking Water Regulation, 89 Fed. Reg. 32,532 (Apr. 26, 2024).

⁹ EPA Releases Final Rule on CERCLA Designation of PFOA and PFOS, Int'l Ass'n of Fire Chiefs (Apr. 23, 2024).

standard retrospectively to conduct, the sale, use, and disposal of AFFF and PFAS-containing product between the 1950s and the 2000s, undertaken at a time when the specific hazard was, for most actor other than the manufacturer themselves, either unknown or actively concealed.¹⁰ It is against this factual backdrop that the doctrinal analysis in Sections 3 through 5 must be read.

3. THE UNITED STATES REGULATORY ARCHITECTURE

3.1 The Toxic Substances Control Act and the Limits of Pre-Market Control

The Toxic Substances Control Act (TSCA), as amended by the Frank R. Lautenberg Chemical Safety for the 21st Century Act of 2016, empowers the Environmental Protection Agency to require testing of new and existing chemical and to restrict those found to present an unreasonable risk.¹¹ TSCA's principal weakness with respect to PFAS is temporal: the statute's pre-1976 grandfathering of chemical already in commerce meant legacy compound such as PFOA and PFOS never underwent the risk evaluation applied to genuinely new substance, and even after the 2016 amendment strengthened EPA's authority, the sheer number of PFAS congener, variously estimated between four thousand and twelve thousand, has made individualised risk assessment administratively impossible within any realistic timeframe.¹² EPA has instead relied on a 2020 TSCA reporting rule requiring manufacturer to disclose historical PFAS production and use, a measure that generates data for future regulation but imposes no liability of its own.

3.2 The Safe Drinking Water Act and the 2024 National Primary Drinking Water Regulation

On 10 April 2024, EPA finalised, under the Safe Drinking Water Act, the first legally enforceable national drinking-water standard for six PFAS compound.¹³ The rule sets Maximum Contaminant Level of four parts per trillion for PFOA and PFOS, the MCL Goal for both being zero, in recognition of EPA's carcinogenicity finding, and ten parts per trillion for PFHxS, PFNA and HFPO-DA (commonly GenX), together with a unitless Hazard Index of one for any mixture of these latter three compound and PFBS.¹⁴

Public water systems were originally given until 2027 to complete monitoring and until 2029 to achieve compliance; a change in federal

¹⁰ Tavr Blog, DuPont PFOA Lawsuit: \$670.7M Settlement Breakdown, Tavr (2026).

¹¹ 15 U.S.C. § 2601 et seq.; Frank R. Lautenberg Chemical Safety for the 21st Century Act, Pub. L. No. 114-182, 130 Stat. 448 (2016).

¹² Cally Edgren, Overview of PFAS and Related EPA Regulations; EPA's New Chemical Program Under Amended TSCA, in The ESG Report (last visited Sept. 2026).

¹³ PFAS National Primary Drinking Water Regulation, 89 Fed. Reg. 32,532 (Apr. 26, 2024).

¹⁴ Id. at 32,533; U.S. Gov't Accountability Off., B-336287.

administration has since produced proposed rule, announced in May 2026, to extend the PFOA/PFOS compliance deadline to 2031 and to rescind the standard for the four other compound altogether, illustrating the political fragility of standard set through notice-and-comment rulemaking rather than statute.¹⁵ The Safe Drinking Water Act standard does not itself create a private cause of action for remediation cost; its significance for liability lies instead in its evidentiary function, since a documented exceedance of the MCL is powerful proof both of contamination and of the absence of any safe threshold, a point water utility have deployed heavily in the cost-recovery litigation discussed in Section 5.

3.3 CERCLA Hazardous Substance Designation and the Emerging 102(a) Framework

The most consequential American regulatory action to date is EPA's designation, effective 8 July 2024, of PFOA and PFOS, together with their salt and structural isomer, as hazardous substance under Section 102(a) of CERCLA.¹⁶ This was the first time EPA had exercised its free-standing Section 102(a) authority to designate a substance not already listed as hazardous under some other environmental statute, a fact that generated separate litigation over EPA's statutory authority to do so, presently held in abeyance before the D.C. Circuit.¹⁷ The rule sets the reportable quantity for release of PFOA or PFOS at one pound within any twenty-four-hour period, the lowest reportable quantity EPA has ever promulgated under CERCLA, triggering notification obligation to the National Response Center under CERCLA Section 103 and to state and local emergency planning authority under the Emergency Planning and Community Right-to-Know Act.

The designation's deeper significance, however, is that it activates CERCLA's liability provision, discussed in detail in Section 4, with respect to any site where PFOA or PFOS has been released. Recognising the breadth of party this would sweep in, not merely fluorochemical manufacturer but every airport, municipal fire department, wastewater treatment plant, and landfill that ever received or used AFFF or PFAS-containing waste, EPA simultaneously issued a PFAS Enforcement Discretion and Settlement Policy stating the Agency would not pursue cost recovery against passive receivers: community water system, publicly owned treatment work, municipal separate storm sewer system, publicly owned landfill, airport, and local fire department that neither

¹⁵ EPA Proposes Major Changes to PFAS Drinking Water Rule, Pillsbury Winthrop Shaw Pittman LLP (May 2026).

¹⁶ Designation of PFOA and PFOS as CERCLA Hazardous Substances, 89 Fed. Reg. 39,124 (May 8, 2024).

¹⁷ California Cmty. Against Toxics v. EPA, No. 24-1193 (D.C. Cir. filed 2024) (held in abeyance).

manufactured PFAS nor used it as part of an industrial process.¹⁸ This is a policy of prosecutorial discretion, not a statutory defence, and it therefore binds neither private cost-recovery plaintiff nor future administration, a distinction of considerable practical importance examined critically in Section 7. In September 2025, the successor administration confirmed it would retain the PFOA/PFOS designation while developing a general Section 102(a) Framework Rule intended to govern the criteria, including cost consideration, for any future hazardous-substance designation, a signal that further PFAS congener are unlikely to be added to the CERCLA list without a more elaborate cost-benefit process than accompanied the 2024 rule.¹⁹

4. CERCLA LIABILITY: DOCTRINAL FOUNDATIONS AND JUDICIAL INTERPRETATION

4.1 The Statutory Scheme: Strict, Joint and Several, and Retroactive

CERCLA Section 107(a) identifies four category of potentially responsible party (PRPs): current owner and operator of a facility; owner and operator at the time hazardous substance were disposed of; any person who arranged for disposal or treatment of hazardous substance; and transporter who selected the disposal site.²⁰ Liability under Section 107(a) is strict, it does not depend on negligence, fault, or even knowledge that the substance was hazardous, and, in the near-universal judicial construction of the statute, joint and several as among PRPs unless a defendant can demonstrate that the harm is divisible and capable of reasonable apportionment.²¹ CERCLA further applies retroactively to disposal conduct that occurred before the statute's enactment in 1980 and, by extension under the 2024 designation, to the sale and use of AFFF and PFAS-containing product decade before PFOA and PFOS were listed as hazardous substance at all.²² Courts, including the Fourth Circuit in *United States v. Monsanto Co.*, have rejected due process and takings challenge to this retroactive application, reasoning that Congress possesses broad authority to impose remedial, non-punitive liability for conduct whose environmental consequence continue into the present, and that a defendant's reliance interest in the legality of past disposal practice does not outweigh the public interest in cost internalisation.²³

¹⁸ PFAS Enforcement Discretion and Settlement Policy Under CERCLA, U.S. EPA (Apr. 19, 2024).

¹⁹ EPA Will Retain CERCLA Hazardous Substance Designation for PFOA, PFOS, Will Develop CERCLA Section 102(a) Framework Rule, Bergeson & Campbell, P.C. (Sept. 18, 2025).

²⁰ 42 U.S.C. § 9607(a)(1)-(4).

²¹ *United States v. Monsanto Co.*, 858 F.2d 160, 167 n.11 (4th Cir. 1988); *New York v. Shore Realty Corp.*, 759 F.2d 1032, 1042 (2d Cir. 1985).

²² *United States v. Monsanto Co.*, 858 F.2d 160, 173-74 (4th Cir. 1988).

²³ *Id.* at 174-75.

This retroactivity is precisely what allows EPA and private plaintiff to reach conduct, AFFF discharge at military base in the 1960s, industrial PFOA emission from the 1950s onward, that long predates any regulatory or even scientific recognition of PFAS toxicity, and it is the feature of CERCLA liability most frequently attacked, and most consistently upheld, in PFAS-adjacent litigation.

4.2 Owner and Operator Liability: The Shore Realty Line

The Second Circuit's decision in *New York v. Shore Realty Corp.* remains the foundational statement of owner liability under CERCLA. The court held that Section 107(a)(1) imposes liability on the current owner of a contaminated facility without regard to causation, rejecting the argument that only an owner in possession at the time of disposal could be liable, and holding further that even a purchaser who acquired contaminated property with full knowledge of prior contamination could not escape liability by pointing to the earlier owner's conduct.²⁴ *Shore Realty's* uncompromising strict-liability reading, and a court in the same line of authority observed that CERCLA's affirmative defence under Section 107(b) are exceedingly narrow, available only where the release was caused solely by an act of God, an act of war, or the act of an unrelated third party, is what makes present owner of contaminated groundwater plume liable for PFOA and PFOS release that occurred, in some AFFF case, before the current owner's very corporate existence.²⁵ For airport authority and municipal utility that acquired their facility decade after AFFF use began, *Shore Realty's* rule is the single greatest legal exposure the 2024 designation creates, and it is precisely the population EPA's enforcement-discretion policy was designed to shield, a policy that, as noted, cannot bind private plaintiff applying *Shore Realty* in a cost-recovery action.

4.3 Parent Corporation Liability: United States v. Bestfoods

Where a facility is operated by a subsidiary, CERCLA liability for the parent corporation is governed by *United States v. Bestfoods*, in which the Supreme Court held a parent may be held liable only where the corporate veil can be pierced under ordinary state-law principle, or where the parent, independently of its ownership, actively participated in, and exercised control over, the operation of the facility itself in a manner specifically related to decision about disposal or environmental compliance.²⁶ Justice Souter's opinion for a unanimous Court rejected the Sixth Circuit's suggestion that a parent's mere majority ownership, overlapping director, or general oversight could establish operator liability, insisting on a functional inquiry into whether the parent's own

²⁴ *New York v. Shore Realty Corp.*, 759 F.2d 1032, 1044-45 (2d Cir. 1985).

²⁵ 42 U.S.C. § 9607(b); Kenneth A. Hodson & Charles H. Oldham, *Defenses to Liability Under CERCLA*, 46 *Ariz. St. L.J.* (2014).

²⁶ *United States v. Bestfoods*, 524 U.S. 51, 55-56 (1998).

agent managed environmental matter at the facility.²⁷ This precedent bears directly on the corporate-restructuring history central to the DuPont-Chemours-Corteva litigation discussed below: DuPont spun off Chemours in 2015 and later separated Corteva, and much of the contested litigation over who pays for legacy PFOA contamination at Parkersburg, West Virginia has turned on precisely the *Bestfoods* question of which corporate entity, across a chain of spin-off, exercised operational control over PFOA disposal decision at the relevant time.²⁸

4.4 Arranger Liability, Apportionment, and Burlington Northern

The Supreme Court's most significant modern refinement of CERCLA liability is *Burlington Northern & Santa Fe Railway Co. v. United States*. The case addressed two distinct question arising from contamination at an agricultural chemical distribution site in Arvin, California: whether Shell Oil, which sold and delivered a pesticide to the site operator in the ordinary course of business, could be liable as having arranged for disposal of hazardous substance, given that some of the product was spilled during delivery; and whether the railroad company that owned adjoining land could limit their liability through apportionment rather than bear the full joint and several burden.²⁹ On the first question, the Court held that arranger liability requires the defendant to have taken intentional step to dispose of a hazardous substance, and that the mere sale of a commercially useful, if hazardous, product, with knowledge some spillage was likely to occur in the ordinary course of delivery, does not by itself establish the requisite intent.³⁰ On the second question, the Court upheld the District Court's apportionment of only nine percent of the cleanup cost to the railroad, based on the proportion of the site they owned, the duration of the contaminating activity, and a rough estimate of the volume of hazardous substance attributable to their portion of the land, holding that a defendant seeking apportionment need not show mathematical precision, only a reasonable basis for divisibility grounded in the record.³¹

Burlington Northern is doubly significant for PFAS liability. Its narrowing of arranger liability protects, in principle, chemical distributor and downstream product seller, a category that includes the very AFFF manufacturer being pursued as PRPs, from liability premised solely on having sold a product later disposed of by others, meaning PFAS plaintiff have generally had to frame their

²⁷ Id. at 71-72.

²⁸ Cf. *United States v. Bestfoods*, 524 U.S. 51 (1998); Tavr Blog, *supra* note 10.

²⁹ *Burlington N. & Santa Fe Ry. Co. v. United States*, 556 U.S. 599, 602-04 (2009).

³⁰ Id. at 610-11.

³¹ Id. at 613, 616-17.

claim around direct manufacture, direct disposal, and direct operational control rather than mere distribution.³²

Its apportionment holding, on the other hand, is a double-edged sword: while it permits defendant at long-contaminated, multi-party site to limit exposure to their proportionate contribution, the very feature of PFAS that makes it so difficult to regulate, its ubiquity, mobility, and presence from multiple contemporaneous and historical source, makes the kind of volumetric, site-specific apportionment approved in *Burlington Northern* extraordinarily difficult to construct for a PFAS groundwater plume fed by a fire-training area, an adjacent manufacturing plant, atmospheric deposition, and biosolid land application, all superimposed over decade. Divisibility doctrine was built for solvent in defined lagoon; it strains considerably when applied to a contaminant plume with no clear edge and multiple concurrent contributing source of comparable but unquantifiable magnitude.

5. PFAS LITIGATION IN PRACTICE: SETTLEMENTS AND THE ENFORCEMENT-DISCRETION PROBLEM

5.1 The Leach and Bartlett Litigation: Establishing Causation

The modern PFAS liability story begins not with CERCLA but with tort litigation arising from DuPont's Washington Works facility near Parkersburg, West Virginia. In 2001, attorney Robert Bilott filed *Leach v. E.I. du Pont de Nemours & Co.*³³ in West Virginia state court on behalf of some eighty thousand resident whose drinking water had been contaminated with PFOA, known internally at DuPont as C8. The 2004 class settlement was unusual in structure: rather than awarding immediate personal-injury damage, it funded an independent C8 Science Panel to conduct epidemiological study determining whether a probable link existed between PFOA exposure and any of six disease category, with class member permitted to pursue individual personal-injury claim only for disease the Panel found to be probably linked.³⁴

The Science Panel's 2011-2012 finding, establishing probable link to kidney cancer, testicular cancer, thyroid disease, ulcerative colitis, pregnancy-induced hypertension, and hypercholesterolemia, triggered more than three thousand five hundred individual lawsuit, consolidated in multidistrict litigation in the Southern District of Ohio.³⁵ The first bellwether trial, *Bartlett v. E.I. du Pont de Nemours & Co.*, produced a jury verdict of 1.6 million US dollars in October 2015 after internal DuPont document demonstrated the company had known

³² *Burlington N. & Santa Fe Ry. Co.*, 556 U.S. at 610.

³³ *Leach v. E.I. du Pont de Nemours & Co.*, No. 01-C-608 (W. Va. Cir. Ct. filed 2001).

³⁴ Chemours Co., Form 10-Q, at 27 (Sept. 30, 2020).

³⁵ *Leach v. E.I. du Pont de Nemours & Co. & Related Cases: Case Timeline*, Bus. & Hum. Rts. Res. Ctr. (last visited Sept. 2026).

since at least 1961 that C8 was toxic and had nonetheless suppressed epidemiological finding linking it to elevated cancer rate among exposed worker.³⁶ DuPont and Chemours ultimately settled the entire MDL inventory for a sum between 670.7 million and 921 million US dollars in 2017.³⁷ The *Leach* litigation is legally significant less for any single doctrinal holding than for what it demonstrates about the interaction of scientific uncertainty and liability: by outsourcing causation to an independent scientific panel rather than leaving epidemiological dispute to competing expert in each individual trial, the settlement solved, at least for this one litigation, the very apportionment and causation problem Section 4 identified as CERCLA's principal doctrinal weakness for a ubiquitous contaminant.

5.2 The AFFF Multidistrict Litigation and the New Scale of Settlement

The scale of PFAS liability shifted by an order of magnitude with the consolidation, before Judge Richard M. Gergel in the District of South Carolina, of thousands of claim brought principally by public water system against 3M, DuPont, Chemours, Corteva, and other AFFF manufacturer, styled *In re: Aqueous Film-Forming Foams Products Liability Litigation*³⁸ (MDL No. 2873). In June 2023, DuPont, Chemours and Corteva jointly agreed to contribute 1.185 billion US dollars to a fund compensating public water system with detected or anticipated PFAS contamination.³⁹ Days later, 3M, the original inventor and, until 2002, the dominant manufacturer of PFOS, agreed to pay a minimum of 10.5 billion and a maximum of 12.5 billion US dollars over thirteen year to resolve equivalent claim, a settlement approved by the District Court in February 2024 and covering essentially every active public water system in the United States that had detected PFAS or was required to monitor for it under EPA's fifth Unregulated Contaminant Monitoring Rule.⁴⁰ DuPont and its corporate successor separately settled natural-resource-damage claim with the State of New Jersey for 875 million US dollars in March 2024.⁴¹

Collectively, these settlement, resolved substantially before trial, under the shadow rather than the direct application of CERCLA's post-2024 hazardous-substance designation, total more than twenty-five billion US dollars, a figure that dwarfs the recovery obtained in any prior Superfund cost-recovery litigation and illustrates that, for PFAS, negotiated multidistrict settlement,

³⁶ Tavr Blog, *supra* note 10.

³⁷ Chemours Co., Form 10-Q, at 27-28 (Sept. 30, 2018).

³⁸ *In re Aqueous Film-Forming Foams Prods. Liab. Litig.*, MDL No. 2873 (D.S.C.).

³⁹ Chemours, DuPont, and Corteva Reach Comprehensive PFAS Settlement with U.S. Water Systems (June 2, 2023).

⁴⁰ 3M Resolves Claims by Public Water Suppliers, Supports Drinking Water Solutions for Vast Majority of Americans, 3M Co. (June 22, 2023).

⁴¹ Judge Approves Settlement Requiring DuPont, Chemours, and Corteva to Pay \$1.1 Billion in PFAS Contamination Suit, Ass'n of State Drinking Water Adm'rs (Feb. 16, 2024).

rather than adjudicated CERCLA liability, has become the operative remediation-financing mechanism.

5.3 The Passive-Receiver Problem: Policy Against Statute

The AFFF settlement were driven overwhelmingly by manufacturer defendant; they leave largely untouched the harder question, squarely raised by the 2024 CERCLA designation, of liability for the airport, military installation, and fire department that used AFFF as directed, often under federal mandate, and the water utility and landfill that unwittingly received PFAS-laden waste. EPA's 2024 Enforcement Discretion and Settlement Policy expressly commits the Agency not to pursue these passive receivers for cost recovery, reasoning that entity providing essential public service, fire suppression, drinking water, waste disposal, should not bear Superfund liability for contamination they did not create and had no practical means of avoiding.⁴²

This is sound policy, but it rests on an unstable legal foundation. Enforcement discretion binds only the Agency exercising it; it creates no defence enforceable against a state government, a private landowner, or a downstream water utility bringing its own CERCLA Section 107 cost-recovery action or state common-law nuisance claim against a municipal fire department or airport authority, nor does it survive a change of administration as a matter of law, however durable it may prove as a matter of practice.⁴³ The result is a liability landscape in which the entity actually bearing the economic risk of a PFAS designation, a small municipal water authority, say, depends less on any principled allocation of fault than on which category of plaintiff happens to sue and under which theory. This is not a minor technical gap; it is the central unresolved question left by the 2024 rulemaking, and it is discussed further, and critically, in Section 7.

6. COMPARATIVE PERSPECTIVES: THE EUROPEAN UNION AND INDIA

6.1 The European Union's Proposed Universal Restriction

The European Union has approached PFAS through a chemicals-authorisation rather than a contaminated-site framework. In January 2023, the competent authority of Denmark, Germany, the Netherlands, Norway and Sweden submitted to the European Chemicals Agency (ECHA) a proposal to restrict, as a single group defined by the presence of at least one fully fluorinated carbon atom, more than ten thousand PFAS substance under the Registration, Evaluation, Authorisation and Restriction of Chemicals Regulation (REACH), an approach that would function, in substance, as a class-wide ban subject to

⁴² EPA Releases Final Rule on CERCLA Designation of PFOA and PFOS, *supra* note 9.

⁴³ Cf. *United States v. Bestfoods*, 524 U.S. 51 (1998).

time-limited, sector-specific derogation.⁴⁴ After a public consultation generating more than five thousand six hundred comment, the five authority published a substantially revised proposal in August 2025, expanding the number of use-sector evaluated and introducing a wider set of derogation, including for certain fluoropolymer application, while ECHA's scientific committee continue an evaluation not expected to conclude before the end of 2026.⁴⁵

The European approach is instructive by contrast: rather than relying, as the United States does, on a liability regime that operates after contamination has occurred and must then reconstruct historical causation and apportionment, the EU strategy is preventive, addressing the class of substance at the point of manufacture and use. It sidesteps the retroactivity and divisibility problem examined in Section 4 entirely, at the cost of a much longer and more contested rulemaking process and continuing uncertainty about which existing use will ultimately be exempted.

6.2 India: Legislative Vacuum and Judicial Doctrine

India presently has no legislation, standard, or regulatory limit addressing PFAS in any environmental medium.⁴⁶ The Bureau of Indian Standards' drinking-water specification, IS 10500, prescribes limit for a narrow set of legacy pesticide and heavy metal but is silent on PFAS altogether, and academic survey have detected PFAS in the Ganges river basin and, more recently, an Indian Institute of Technology Madras study commissioned by the Ministry of Environment, Forest and Climate Change found PFAS in Chennai's lake and treated drinking water at concentration that, the study noted, conventional sand-filtration and chlorination treatment does not remove and may even concentrate.⁴⁷

That finding is presently the subject of an original application before the National Green Tribunal, in which the Central Pollution Control Board has confirmed the absence of any national PFAS standard and pointed to an ongoing Council of Scientific and Industrial Research inventory of PFAS manufacture and use as the government's principal, and still preliminary, response.⁴⁸ The Food Safety and Standards Authority of India has, since

⁴⁴ Universal PFAS Restriction, ChemTrust, *supra* note 6; ECHA Publishes Updated PFAS Restriction Proposal, Eur. Chemicals Agency (Aug. 20, 2025).

⁴⁵ ECHA Publishes Updated REACH Restriction Proposal for PFAS, Bergeson & Campbell, P.C. (Aug. 29, 2025).

⁴⁶ India Produce What Europe Bans: PFAS Enters India Without Regulations?, ChemAnalyst (last visited Sept. 2026).

⁴⁷ FAQs: What Are 'Forever Chemicals'?, *supra* note 2; Reply on Behalf of Respondent No. 1, Central Pollution Control Board, Original Application No. 548/2024, Nat'l Green Tribunal, Principal Bench, New Delhi.

⁴⁸ Reply on Behalf of Respondent No. 1, Central Pollution Control Board, Original Application No. 548/2024, Nat'l Green Tribunal, Principal Bench, New Delhi.

October 2025, proposed prohibiting PFAS in food-contact packaging, and a draft Indian Chemicals (Management and Safety) Rules would require registration of industrial chemical generally, but neither instrument yet addresses contaminated-site remediation or liability.⁴⁹

This legislative vacuum does not, however, leave Indian environmental jurisprudence without resource. The doctrine of absolute liability, first articulated by the Supreme Court in *M.C. Mehta v. Union of India*⁵⁰ in response to an oleum gas leak from a Delhi fertiliser plant, holds that an enterprise engaged in a hazardous or inherently dangerous activity owes an absolute and non-delegable duty to the community, is strictly liable for any harm resulting from that activity, and, critically for present purpose, may not invoke any of the exception recognised under the English rule in *Rylands v. Fletcher*. The Court extended this doctrine, and married it explicitly to the polluter-pays principle, in *Indian Council for Enviro-Legal Action v. Union of India*⁵¹, where chemical unit in Bicchhri, Rajasthan, had discharged untreated acidic effluent and toxic sludge, contaminating groundwater and agricultural land across the surrounding village. The Court held that the cost both of compensating affected villager and of restoring environmental quality, the latter estimated by the Ministry of Environment and Forests at approximately 37.385 crore rupees, needed to be borne by the management of the industry in keeping with the Polluter Pays principle and the doctrine of Strict and Absolute liability, and it grounded the Central Government's power to make such a determination in Sections 3 and 5 of the Environment (Protection) Act, 1986.⁵²

The judgment's enforcement history is itself instructive: despite the finality of the 1996 order, the respondent industry filed repeated interlocutory application resisting payment for over fifteen year, prompting a further Supreme Court intervention in 2011 that emphasised no litigant can derive benefit from the mere pendency of a case and that delay cannot be permitted to erode a settled remediation liability, an observation of obvious relevance to any future PFAS remediation order in India, where the diffuse and long-latency character of the contaminant would make protracted resistance even more attractive to a liable industry than it was in Bicchhri.⁵³

The Court reinforced the polluter-pays and precautionary principle as essential feature of sustainable development in *Vellore Citizens' Welfare Forum v. Union of India*⁵⁴, holding that environmental measure must anticipate and

⁴⁹ India Produce What Europe Bans, *supra* note 50.

⁵⁰ *M.C. Mehta v. Union of India*, (1987) 1 S.C.C. 395 (India).

⁵¹ *Indian Council for Enviro-Legal Action v. Union of India*, (1996) 3 S.C.C. 212 (India).

⁵² *Id.*; see also *Indian Council for Enviro-Legal Action v. Union of India*, Judgment (Feb. 13, 1996).

⁵³ *Indian Council for Enviro-Legal Action v. Union of India*, (2011) 8 S.C.C. 161 (India).

⁵⁴ *Vellore Citizens' Welfare Forum v. Union of India*, (1996) 5 S.C.C. 647 (India).

prevent degradation even in the absence of complete scientific certainty about the causal mechanism of harm, a formulation that maps with unusual precision onto the PFAS problem, where the scientific case for the absence of any safe exposure threshold is well established even though site-specific causal proof of a given plume's origin may remain contested.

Read together, *Oleum Gas Leak*, *Enviro-Legal Action*, and *Vellore Citizens* supply, without any PFAS-specific statute, a doctrinal architecture strikingly similar in substance to CERCLA's strict, non-fault-based liability: an enterprise engaged in hazardous activity is liable regardless of care taken, is liable for both individual compensation and ecological restoration, and cannot defeat that liability by pointing to scientific uncertainty about mechanism. What Indian doctrine presently lacks, and what CERCLA supplies through Sections 107 and 113, is a codified framework for identifying the universe of potentially responsible party at a multi-source site, apportioning liability among them, and structuring judicially supervised remediation trust fund of the kind that financed the American AFFF settlement, precisely the institutional infrastructure a future Indian PFAS statute, or a sufficiently ambitious National Green Tribunal order in the pending Chennai proceeding, would need to build.

7. CRITICAL ANALYSIS: THE STRAIN OF UBIQUITY ON STRICT LIABILITY DOCTRINE

Four tension recur across the doctrine surveyed in Sections 4 through 6, and each deserves to be named plainly rather than left implicit.

First, retroactivity, though repeatedly upheld against constitutional challenge, sits uneasily with elementary notion of fair notice when applied to PFAS. The Fourth Circuit's reasoning in *Monsanto*, that CERCLA imposes remedial rather than punitive liability, and that a polluter's reliance on the legality of past disposal does not outweigh the public interest in cost internalisation, is defensible where the defendant knew, or with reasonable diligence should have known, that its disposal practice were hazardous.⁵⁵ It is considerably harder to defend as applied to a municipal fire department that used AFFF exactly as the Federal Aviation Administration required, decade before any regulator suspected the foam was toxic. EPA's enforcement-discretion policy recognises this distinction as a matter of prosecutorial grace; principled doctrine would recognise it as a matter of law, through either a statutory good-faith-user defence or a codified passive-receiver exemption of the kind that presently exists only as revocable Agency policy.

Second, the apportionment doctrine approved in *Burlington Northern*, however sound for a site with two or three identifiable contributor and a

⁵⁵ *United States v. Monsanto Co.*, 858 F.2d 160, 174-75 (4th Cir. 1988).

bounded contamination footprint, does not scale to a PFAS plume fed simultaneously by a fire-training area, an upgradient manufacturing plant, atmospheric deposition from a regional source, and land-applied biosolid, each contributing comparable and largely unquantifiable volume over an overlapping multi-decade period. Courts applying *Burlington Northern's* reasonable basis standard to such a site will face a genuine evidentiary vacuum, and the risk is that this vacuum will be resolved, as it typically is under existing doctrine, by falling back on joint and several liability against whichever solvent defendant remains in the case, a result administratively convenient but analytically arbitrary, since it makes liability turn on litigation stamina rather than causal contribution.

Third, the passive-receiver problem identified in Section 5.3 is not merely an American policy gap; it is a structural feature of any liability regime, including the Indian absolute-liability doctrine discussed in Section 6.2, that defines liability by reference to engagement in hazardous activity without a corresponding, codified exception for entity that neither manufactured nor profited from the hazardous substance but were merely compelled, by regulation or operational necessity, to handle it. A coherent PFAS liability framework, whether built on CERCLA, on India's absolute-liability doctrine, or on a future statute in either jurisdiction, requires that this distinction be drawn by the legislature or the highest court, not left to the unreviewable discretion of an environmental agency whose policy can be reversed by the next administration, as EPA's own September 2025 announcement of a forthcoming Framework Rule implicitly concedes.

Fourth, and finally, the very success of the AFFF settlement in delivering more than twenty-five billion US dollars to public water system should not be mistaken for proof that the underlying liability doctrine is functioning well. Settlement at this scale was possible principally because 3M and DuPont, as the dominant historical manufacturer, were financially identifiable, well-capitalised, and possessed of the kind of internal corporate document, the 1961 toxicity finding suppressed for decade, cited in *Bartlett*, that made summary judgment on liability, and therefore a strong negotiating position for plaintiff, likely. Where no comparably resourced, comparably documented manufacturer defendant exists, as will often be the case for PFAS contamination traced to diffuse consumer-product use, to legacy AFFF training area with no surviving corporate defendant, or, most acutely, in a jurisdiction such as India where no manufacturer has yet been identified with anything like DuPont's documentary record, the settlement model that has so far substituted for adjudicated CERCLA liability offers no template at all, and the underlying doctrinal gap identified above will have to be confronted directly.

8. TOWARDS A COHERENT FRAMEWORK: RECOMMENDATIONS AND CONCLUSION

Four reforms follow from the analysis above.

- Congress, and any future Indian legislature acting on the National Green Tribunal's Chennai proceeding, should codify a narrow, statutory passive-receiver defence, covering public water system, publicly owned treatment work, and fire-suppression entity that used a PFAS-containing product in compliance with then-applicable government specification and without independent knowledge of its hazard, rather than leaving this protection to revocable executive policy.
- Apportionment doctrine should be supplemented, for multi-source, ubiquitous contaminant specifically, with a presumptive market-share or manufacturing-volume allocation mechanism analogous to that developed in American pharmaceutical toxic-tort litigation, displacing the site-specific volumetric apportionment of Burlington Northern where the evidentiary record cannot support it.
- EPA's forthcoming Section 102(a) Framework Rule should be paired with a parallel framework for remediation-trust financing, of the kind improvised ad hoc in the AFFF MDL, so that future hazardous-substance designations are accompanied from the outset by a funding mechanism rather than leaving injured water utilities to litigate for years before recovering compliance cost.
- For India specifically, the Ministry of Environment, Forest and Climate Change should translate the existing CSIR-NEERI PFAS inventory into binding drinking-water and effluent standards under the Environment (Protection) Act, 1986, so that the polluter-pays and absolute-liability doctrines developed in Oleum Gas Leak and Enviro-Legal Action have a codified numerical standard against which future PFAS remediation claims, whether before the National Green Tribunal or the ordinary courts, can be measured, rather than requiring each case to establish contamination and causation from first principles.

PFAS liability law is presently caught between two inadequate posture: an American regime that has extended textually strict, retroactive, joint and several CERCLA liability to a contaminant for which the doctrinal tool of apportionment and causation were never designed, and an Indian regime that possesses a judicially robust absolute-liability doctrine but no codified standard, inventory, or remediation-financing mechanism through which that doctrine could actually be applied to a PFAS site. The multi-billion-dollar AFFF

settlement demonstrate that enormous sum of remediation funding can be extracted from well-documented, well-capitalised historical manufacturer, but they also demonstrate, by their very structure as negotiated settlement rather than adjudicated judgment, that courts and legislature have not yet worked out a principled answer to the harder question this paper has traced throughout: how liability should be apportioned once the polluter is not one identifiable actor but an entire industrial century, and the victim is not one contaminated well but a planetary contaminant found in the blood of every person alive.

Until that question is answered by statute rather than by settlement, remediation for the next generation of forever chemical will remain exactly as improvised, and exactly as dependent on the historical accident of a well-preserved corporate document trail, as it has been for this one.