

THE STATE OF SOUTH CAROLINA
IN THE SUPREME COURT

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APPEAL FROM YORK COUNTY
Court of Common Pleas

S.C. SUPREME COURT

Jean H. Toal, Circuit Court Judge

Appellate Case No. 2022-0001574

Stephen R. Edwards, Individually and as Personal
Representative of the Estate of Steven Redfearn Stewart, ...

Appellee,

v.

Scapa Waycross, Inc.,

Appellant

**AMICI CURIAE BRIEF OF AMERICAN TORT REFORM ASSOCIATION,
NATIONAL ASSOCIATION OF MANUFACTURERS, NATIONAL FEDERATION OF
INDEPENDENT BUSINESS SMALL BUSINESS LEGAL CENTER, INC., NATIONAL
ASSOCIATION OF MUTUAL INSURANCE COMPANIES, AMERICAN PROPERTY
CASUALTY INSURANCE ASSOCIATION, AND AMERICAN COATINGS
ASSOCIATION IN SUPPORT OF APPELLANT**

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QUESTION PRESENTED FOR REVIEW

I. Whether the Court of Appeals erred in affirming the trial court's ruling denying Petitioner's motion for judgment n.o.v. because Respondent did not introduce any legally sufficient evidence of causation.¹

INTEREST OF AMICI CURIAE

The American Tort Reform Association (ATRA),² National Association of Manufacturers (NAM),³ National Federation of Independent Business Small Business Legal Center, Inc. (NFIB Legal Center),⁴ National Association of Mutual Insurance Companies (NAMIC),⁵ American Property Casualty Insurance Association (APCIA),⁶ and American

¹ *Amici* also support Appellant's position that the Court of Appeals erred in affirming the trial court's additur and setoff rulings. Those issues were briefed by *amicus* American Tort Reform Association (ATRA) in *Jolly v. General Elec. Co.*, Appellate Case No. 2022-000272, and in ATRA's *amicus* brief in support of the petition for review in this case. We incorporate those arguments here rather than repeat them.

² Founded in 1986, ATRA is a broad-based coalition of businesses, corporations, municipalities, associations, and professional firms that have pooled their resources to promote reform of the civil justice system with the goal of ensuring fairness, balance, and predictability in civil litigation. For over three decades, ATRA has filed *amicus curiae* briefs in cases that address important liability issues. ATRA members include defendants in South Carolina asbestos cases.

³ NAM is the largest manufacturing association in the United States, representing small and large manufacturers in all 50 states and in every industrial sector. Manufacturing employs nearly 13 million men and women, contributes \$2.9 trillion to the U.S. economy annually, has the largest economic impact of any major sector, and accounts for over half of all private-sector research and development in the nation. The NAM is the voice of the manufacturing community and the leading advocate for a policy agenda that helps manufacturers compete in the global economy and create jobs across the United States.

⁴ The NFIB Legal Center is a nonprofit, public-interest law firm established to provide legal resources and be the voice for small businesses in the nation's courts through representation on issues of public interest affecting small businesses. The NFIB Legal Center is an affiliate of the National Federation of Independent Business, Inc., which is the nation's leading small business association. NFIB's mission is to promote and protect the right of its members to own, operate, and grow their businesses. NFIB represents, in Washington, D.C., and all 50 state capitals, the interests of its members.

⁵ NAMIC consists of more than 1,500 member companies, including seven of the top 10 property/casualty insurers in the United States. The association supports local and regional mutual insurance companies on main streets across America as well as many of the country's (Footnote continued on next page)

Coatings Association (ACA)⁷ are organizations that address asbestos causation issues in appellate courts around the country to ensure that such lawsuits remain within the ambit of mainstream and well-accepted science. *Amici*'s members include South Carolina asbestos defendants or their insurers. *Amici* have a substantial interest in ensuring that South Carolina follows sound science and applies fair liability rules in asbestos cases.

INTRODUCTION AND SUMMARY OF THE ARGUMENT

The Court of Appeals erred in admitting unscientific *cumulative exposure* expert testimony because the theory does not conform to the “regularity, frequency, and proximity” test set forth in *Lohrmann v. Pittsburgh Corning Corp.*, 782 F.2d 1156 (4th Cir.1986), and adopted by this Court in *Henderson v. Allied Signal, Inc.*, 373 S.C. 179, 644 S.E.2d 724 (2017).

The decedent's exposures were far too low to cause mesothelioma. He was a supervisor—he never cleaned, cut, or handled an asbestos-containing dryer felt. Less than 4% of the felts used during his career were asbestos-containing. These facts strain *Henderson*'s regular, frequent, and proximate exposure test to the breaking point. This Court should reverse the decision of the Court of Appeals.

largest national insurers. NAMIC member companies write \$357 billion in annual premiums and represent 69% of homeowners, 56% of automobile, and 31% of the business insurance markets. Through its advocacy programs NAMIC promotes public policy solutions that benefit member companies and the policyholders they serve and fosters greater understanding and recognition of the unique alignment of interests between management and policyholders of mutual companies.

⁶ APCA is the primary national trade association for home, auto, and business insurers. APCA promotes and protects the viability of private competition for the benefit of consumers and insurers, with a legacy dating back 150 years. APCA's member companies represent 63% of the total U.S. property-casualty insurance market and 73% of the commercial lines market, including more than 75% of the commercial lines premiums in South Carolina.

⁷ ACA advances the needs of the paint and coatings industry through advocacy and programs that support environmental protection, product stewardship, health, safety, and the advancement of science and technology.

Further, while this case does not satisfy the *Henderson* standard, the Court should use this opportunity to provide instruction for trial courts with respect to cases involving exposures that are very low but could be construed, in an expansive sense, as regular, frequent, and proximate. Asbestos litigation today is often characterized by such exposures, which do not cause mesothelioma or the other alleged diseases. Meaningful application of *Henderson* must include a dose quantification and epidemiological proof to prevent speculative jury verdicts that lump trivial (even if repeated) exposures into one “cumulative” bucket.

ARGUMENT

I. CUMULATIVE EXPOSURE TESTIMONY IS INCONSISTENT WITH THE SCIENTIFIC DOSE PRINCIPLE AND SUBSTANTIAL FACTOR CAUSATION

The Court of Appeals erred in distinguishing the widely-rejected *every exposure* approach from the *cumulative exposure* testimony propounded by Plaintiff’s experts. The theories are identical in foundation and application—neither one excludes minor workplace or bystander exposures. By lumping various exposures, regardless of substantiality, under the heading of “cumulative,” plaintiff’s experts attempt to transform even the most limited exposure into a legally “substantial” one.

“Every exposure” and “cumulative exposure” theories are inconsistent with the substantial factor causation standard in South Carolina and many other jurisdictions. The Court should join the many other courts that have rejected attempts by plaintiff experts to repackage the rejected *every exposure* approach as “cumulative exposure.”

A. Cumulative Exposure Testimony Contradicts the Established Toxicology Principle that the Dose Makes the Poison

The appellate court’s acceptance of *cumulative exposure* testimony fails to recognize the differences among a wide array of potential exposures in any case: some that are sufficient to

cause disease and some that are not. The most important step in any toxic tort case is to distinguish between inconsequential exposures and exposures that are sufficient to cause disease. “[W]here a plaintiff relies on proof of exposure to establish that a product was a substantial factor in causing injury, the plaintiff must show a high enough level of exposure that an inference that the asbestos was a substantial factor in the injury is more than conjectural.” *Moeller v. Garlock Sealing Techs., Inc.*, 660 F.3d 950, 955 (6th Cir. 2011); *see also Connor v. Covil Corp.*, 996 F.3d 143, 156 (4th Cir. 2021) (citing *Moeller* and finding that plaintiff’s exposures to defendant’s product were insufficient in relation to other exposures to be causative).

Dr. Frank and other experts who utilize the cumulative exposure approach ignore the most important principle of toxicology: “the dose makes the poison.” The dose requirement is set forth in the Bernard Goldstein & Mary Sue Henifin, *Reference Guide on Toxicology, in Federal Judicial Center, Reference Manual on Scientific Evidence* 633, 636 (3d ed. 2011) (a central tenet of toxicology is that the dose of exposure is the factor that makes a substance toxic), and discussed in one of the best medical descriptions of the application of toxicology to litigation, by Dr. David Eaton of the University of Washington. As Professor Eaton explains: “*Dose is the single most important factor* to consider in evaluating whether an alleged exposure caused a specific adverse effect.” David L. Eaton, *Scientific Judgment and Toxic Torts – A Primer In Toxicology for Judges and Lawyers*, 12 J.L. & Pol’y 5, 11 (2003) (emphasis added).⁸

⁸ Courts have looked to the Eaton article to apply the dose principle and reject forms of the any exposure theory. *See, e.g., Watkins v. Affinia Group*, 54 N.E.3d 174, 179 (Ohio Ct. App. 2016); *McClain v. Metabolife Int’l, Inc.*, 401 F.3d 1233, 1242-43 (11th Cir. 2005); *Borg-Warner Corp. v. Flores*, 232 S.W.3d 765, 770 (Tex. 2007); *Adams v. Cooper Indus., Inc.*, 2012 WL 2339741, at *1 (E.D. Ky. June 19, 2012); *Henrickson v. ConocoPhillips Co.*, 605 F. Supp. 2d 1142, 1156 (E.D. Wash. 2009).

As Professor Eaton notes, this dose principle holds true for carcinogens like asbestos to the same extent as it does for any other toxin:

Most chemicals that have been identified to have “cancer-causing” potential (carcinogens) do so only *following long-term, repeated exposure for many years. Single exposures or even repeated exposures for relatively short periods of time (e.g., weeks or months) generally have little effect* on the risk of cancer, unless the exposure was remarkably high and associated with other toxic effects.⁹

Id. at 9 (emphasis added). This finding is true even when a substance is carcinogenic at high doses.¹⁰ Incidental exposures to asbestos do not produce disease, cumulatively or otherwise.¹¹

Humans are regularly exposed to low levels of asbestos and other cancer-causing materials, either naturally-occurring or from limited home or workplace exposures, without incurring disease. To say that those exposures “cumulate” to cause disease is “akin to saying that one who pours a bucket of water into the ocean has substantially contributed to the ocean’s volume,” *Moeller*, 660 F.3d at 955, or that a match thrown into a forest fire substantially contributes to the fire.

⁹ This quote from Dr. Eaton demonstrates that exposures to carcinogens can be minimally regular, frequent, and proximate without ever causing cancer. Later, this brief discusses that *Henderson*, properly applied, should consider the dose incurred to support a verdict.

¹⁰ Epidemiology is universally recognized as the “most desirable evidence” for assessing causation in the science of toxicology. Michael Green, *Expert Witnesses and Sufficiency of Evidence in Toxic Substances Litigation: The Legacy of the Agent Orange and Bendectin Litigation*, 86 Nw. U. L. Rev. 643, 646 (1992).

¹¹ See, e.g., *Martin v. Cincinnati Gas & Elec. Co.*, 561 F.3d 439, 443 (6th Cir. 2009) (“Plaintiff also argues that, because mesothelioma is a progressive disease, any exposure is a substantial cause. This argument would make every incidental exposure to asbestos a substantial factor.”); *Stallings v. Georgia-Pacific Corp.*, 675 F. App’x 548, 551 (6th Cir. 2017) (“Our precedents foreclose the theory . . . that *any* further exposure to asbestos [beyond some four years of Navy exposure] would have been a substantial factor in bringing about an asbestos-related disease like mesothelioma.”); *Matter of New York City Asbestos Litig. (Juni v. A.O. Smith Water Prods. Co.)*, 148 A.D.3d 233, 237 (1st Dept. 2017), *aff’d*, 116 N.E.3d 75 (N.Y. 2018) (rejecting cumulative exposure theory as irreconcilable with required quantification of exposure).

Plaintiffs' experts such as Dr. Frank themselves illustrate this point by *excluding* from causation any background exposure to asbestos, while including minimal workplace exposures to the same fiber types, often in lower total doses. The exclusion of background exposures from "cumulative exposures" illustrates that this testimony is merely a litigation tactic designed to include suable sources of asbestos while excluding background sources that cannot be sued.

At bottom, Plaintiff's experts have failed to perform a proper causation analysis. A scientific causation analysis starts with epidemiology studies documenting disease in populations with known or estimated exposure levels to a particular substance. The experts must then perform some scientific assessment or estimation of a plaintiff's dose to show that it reached the levels documented in the relevant studies. This approach is consistent with sound science and with South Carolina's substantial factor and *Henderson* standards.

B. Many Courts Have Rejected the "Cumulative Exposure" Approach As a Mere Relabeling of Unscientific "Every Exposure" Testimony

1. Plaintiff Experts Have Simply Relabeled Their Causation Testimony to Avoid Exclusion

Decades of asbestos litigation have long since driven into bankruptcy most of the early, high-exposure litigation defendants, such as insulation manufacturers. The litigation has since expanded to be dominated by remote defendants associated with minor or trivial exposures.

Dryer felt, as one example, produces at most only limited exposures to the least hazardous form of asbestos (chrysotile). The dryer felt work environment has not produced an excess of mesothelioma in accepted and published epidemiology studies.¹²

¹² See, e.g., Kjell Toren et al., *Health Effects of Working in Pulp and Paper Mills: Malignant Diseases*, 29 Am. J. Indus. Med. 123 (1996) (surveying eight studies, only two found increased mesothelioma, and 20 out of 21 such cases were in maintenance workers exposed to amphibole insulation asbestos; none were attributed to dryer felt).

Likewise, many lawsuits in the last two decades have targeted bonded products (primarily brakes and gaskets) that produce little asbestos exposure.¹³ A strong series of published epidemiology studies has consistently shown that exposure to brakes and gaskets, even over a lifetime, does not increase one's risk of mesothelioma.¹⁴

To support litigation against increasingly remote defendants for increasingly remote exposures, plaintiffs' experts initially testified that exposure to even a single workplace fiber of asbestos could cause disease.¹⁵ When courts began to reject this approach, Dr. Frank and other experts recast their testimony in hopes of avoiding rejection by courts.

¹³ See *In re Garlock Sealing Techs.*, 504 B.R. 71, 73 (W.D.N.C. 2014) ("It is clear that Garlock's products resulted in a relatively low exposure to asbestos to a limited population and that its legal responsibility for causing mesothelioma is relatively de minimus."). The *Garlock* opinion contains a succinct review of the early litigation and bankruptcies that ensued, exposing entities such as Garlock with minimal exposure profiles to the bulk of the litigation and deceptive litigation practices. The court excoriated plaintiffs and their lawyers for "withholding of exposure evidence" that had the effect of inflating recoveries against Garlock. *Id.* at 86.

¹⁴ See *Juni*, 148 A.D.3d at 237 (faulting plaintiff expert for ignoring that "21 of 22 epidemiological studies that addressed asbestos exposure to mechanics working on friction products found no increased risk of mesothelioma."); *Yates*, 113 F. Supp. 3d at 859 (referencing 30 epidemiology studies finding "no association between brake work and mesothelioma"). The definitive study is David H. Garabrant et al., *Mesothelioma Among Motor Vehicle Mechanics: An Updated Review and Meta-Analysis*, 60 *Annals of Occupational Hygiene* 8 (2016).

¹⁵ See, e.g., *Basile v. Am. Honda Motor Co.*, 2007 WL 712049, at *4 (Pa. Ct. Com. Pl. Indiana Cnty. Feb. 22, 2007) ("The record in this case offers no methodology to support a 'single fiber' opinion, much less general acceptance of any such methodology."); *Betz v. Pneumo Abex, LLC*, 44 A.3d 27, 56 (Pa. 2012) ("Dr. Maddox's any-exposure opinion is in irreconcilable conflict with itself. Simply put, one cannot simultaneously maintain that a single fiber among millions is substantially causative, while also conceding that a disease is dose responsive..."); *Hostetler v. Johnson Controls, Inc.*, 2020 WL 5543081, at *7 (N.D. Ind. Sept. 16, 2020) ("Since those opinions offer nothing more than that the Plaintiffs were each exposed to at least one asbestos fiber from the site, the only basis to opine that the Plaintiffs are at increased risk is to assert that every exposure to any single asbestos fiber increases a person's risk. [T]hat no-safe-dose opinion is not reliable and helpful in evaluating the extent to which these Plaintiffs' exposures put them at an increased risk.").

Dr. Frank and others stopped saying “single fiber” and changed their approach to testify that every workplace exposure to asbestos is a contributing or causal factor in mesothelioma.¹⁶ The switch was intended to achieve the same litigation goal as the rejected single fiber approach.

Under both approaches, the experts were able to target virtually any solvent defendant. They advised juries, as Dr. Frank did here, that exposures from various defendants’ products or worksites contributed to the overall dose and were thus part of the cause of the disease. The dose did not matter, nor did the toxicity of the fiber type. The experts often use illustrations such as “one drop contributes to the water in a glass” to support their testimony.¹⁷

Plaintiff experts’ switch from “single fiber” to “every exposure” started unravelling nearly 20 years ago when courts began to exclude that testimony as unscientific and no different in kind from the rejected “single fiber” testimony.¹⁸ Between 2008 and 2010, the Sixth Circuit Court of Appeals rejected *every exposure* testimony, joined by a Pennsylvania trial court, a Washington state court, and a Texas appellate court.¹⁹ By the end of 2013, over twenty courts had issued opinions criticizing and rejecting *every exposure* and other dose-less causation theories in asbestos litigation. Those courts included the Supreme Court of Virginia, a Georgia

¹⁶ For a summary of the early cases addressing “single fiber” and the initial “every exposure” approach, see Mark A. Behrens & William L. Anderson, *The “Any Exposure” Theory: An Unsound Basis for Asbestos Causation and Expert Testimony*, 37 Sw. U. L. Rev. 479 (2008).

¹⁷ See *Betz v. Pneumo Abex, LLC*, 44 A.3d 27, 35 (Pa. 2012) (plaintiff expert analogy contending that each marble added to a glass of water causes the water eventually to overflow).

¹⁸ See *Bartel v. John Crane, Inc.*, 316 F. Supp. 2d 603 (N.D. Ohio 2004), *aff’d sub nom. Lindstrom v. A-C Prod. Liab. Trust*, 424 F.3d 488 (6th Cir. 2005); *In re Toxic Substances Cases*, 2006 WL 2404008 (Pa. Com. Pl. Allegheny Cnty. Aug. 17, 2006), *aff’d sub nom. Betz v. Pneumo Abex, LLC*, 44 A.3d 27 (Pa. 2012); *Flores*, 232 S.W.3d at 770.

¹⁹ See *Martin v. Cincinnati Gas & Elec. Co.*, 561 F.3d 439 (6th Cir. 2009); *Free v. Ametek*, 2008 WL 728387 (Wash. Super. Ct. King Cnty. Feb. 28, 2008); *In re Asbestos Litig. (Certain Asbestos Friction Cases Involving Chrysler LLC)*, 2008 WL 4600385 (Pa. Com. Pl. Phila. Cnty. Sept. 24, 2008); *Smith v. Kelly-Moore Paint Co., Inc.*, 307 S.W.3d 829 (Tex. Ct. App. 2010).

appellate court, a District of Columbia federal court, the Sixth Circuit again, and federal judges in Utah.²⁰ Between 2013 and 2017 another sixteen courts rejected *every exposure* and similar forms of testimony, including the Georgia Supreme Court, the Seventh and Ninth Circuits, the Texas Supreme Court (for a second time), an Ohio appellate court, and various federal courts.²¹

Faced with widespread rejection of their unscientific *every exposure* approach, it would have been reasonable to assume that plaintiff experts would have modified their testimony to account for the dose involved. They did not. Instead, plaintiffs' experts began relying on the "cumulative exposure" theory, which is in all relevant aspects the same as *every exposure* testimony. In fact, the experts previously used "cumulate" to sometimes describe how each exposure allegedly contributes.²²

²⁰ *Ford Motor Co. v. Boomer*, 736 S.E.2d 724 (Va. 2013); *Butler v. Union Carbide Corp.*, 712 S.E.2d 537 (Ga. App. 2011); *Wannall v. Honeywell Int'l, Inc.*, 292 F.R.D. 26 (D.D.C. 2013), *aff'd*, 775 F.3d 425 (D.C. Cir. 2014); *Betz v. Pneumo Abex LLC*, 44 A.3d 27 (Pa. 2012); *Moeller v. Garlock Sealing Techs., Inc.*, 660 F.3d 950 (6th Cir. 2011); *Smith v. Ford Motor Co.*, 2013 WL 214378 (D. Utah Jan. 18, 2013); *Anderson v. Ford Motor Co.*, 2013 WL 3179497 (D. Utah June 24, 2013).

²¹ *See Scapa Dryer Fabrics, Inc. v. Knight*, 788 S.E.2d 421 (Ga. 2016); *Krik v. Exxon Mobil Corp.*, 870 F.3d 669 (7th Cir. 2017); *McIndoe v. Huntington Ingalls Inc.*, 817 F.3d 1170 (9th Cir. 2016); *Estate of Barabin v. AstenJohnson, Inc.*, 740 F.3d 457 (9th Cir. 2014); *Stallings v. Georgia-Pacific Corp.*, 675 F. App'x 548 (6th Cir. 2017); *Georgia-Pacific Corp. v. Bostic*, 439 S.W.3d 332 (Tex. 2014); *Watkins v. Affinia Group*, 54 N.E.3d 174 (Ohio Ct. App. 2016); *Haskins v. 3M Co.*, 2017 WL 3118017 (D.S.C. July 21, 2017); *Comardelle v. Pennsylvania Gen. Ins. Co.*, 76 F. Supp. 3d 628 (E.D. La. 2015); *Sclafani v. Air & Liquid Sys. Corp.*, 2013 WL 2477077 (C.D. Cal. May 9, 2013); *Yates v. Ford Motor Co.*, 113 F. Supp. 3d 841 (E.D.N.C. 2015); *Vedros v. Northrup Grumman Shipbuilding, Inc.*, 119 F. Supp. 3d 556 (E.D. La. 2015); *Davidson v. Georgia Pacific LLC*, 2014 WL 3510268 (W.D. La. July 14, 2014), *vacated on other grounds*, 819 F.3d 758 (5th Cir. 2016); *Suoja v. Owens-Illinois, Inc.*, 211 F. Supp. 3d 1196 (W.D. Wis. 2016).

²² Before Dr. Frank and similar experts switched to "cumulative exposure," they were testifying that each and every exposure "cumulates," demonstrating that the theories are the same. *See, e.g., Basile*, 2007 WL 712049, at *1 ("Each of these experts, by methodologies of case study and downward dose-effect extrapolation, opines that because asbestos exposure and consequent mesothelioma are cumulative processes, any asbestos exposure from any Defendant's product, whatever its nature and regardless of quantity or quality of exposure, is a legal cause of Decedent's mesothelioma."); *Georgia-Pacific Corp. v. Stephens*, 239 S.W.3d 304, 315 (Tex. (Footnote continued on next page)

For instance, in 2017 in Maryland federal court, Dr. Frank and other plaintiff experts “espoused the theory that ‘each and every’ exposure to asbestos ‘cumulates’ and should therefore be considered a cause of injury, regardless of the type of mesothelioma, the exposure ‘dose,’ the type of asbestos, or the passage of time.” *Rockman v. Union Carbide Corp.*, 266 F. Supp. 3d 839, 848-49 (D. Md. 2017). The court excluded the testimony. *See id.* at 850.

In *Krik v. Exxon Mobil Corp.*, 870 F.3d 669 (7th Cir. 2017), Dr. Frank changed his testimony midstream from *every exposure* to *cumulative exposure* after the initial trial judge rejected *every exposure* testimony as inadmissible. *See id.* at 675. The Seventh Circuit held: “[The district judge] readily and correctly concluded that the cumulative exposure theory was no different from the ‘each and every exposure’ theory....” *Id.*²³

App. 2007) (Dr. Hammar “express[ed] an opinion that each and every exposure that an individual has in a bystander occupational setting causes their mesothelioma.”); *Watkins*, 54 N.E.3d at 179 (Dr. Frank testified that the each and every exposure theory is based on a “cumulative, dose-response process.”).

²³ *See also Johnson v. Edward Orton, Jr. Ceramic Foundation, Inc.*, 2021 WL 5493231, at *3 (N.D. Ill. Nov. 23, 2021) (granting defendant’s “motion to exclude Dr. Frank and any argument, testimony, or reference to the cumulative exposure theory.”); *Rockman*, 266 F. Supp. 3d at 842-43 (Dr. Frank and others testifying to cumulative exposure); *Watkins*, 54 N.E.3d at 183 (excluding Drs. Frank and Strauchen); *Juni*, 148 A.D.3d at 239 (“The trial court also correctly declined to adopt plaintiffs’ theory of cumulative exposure to support the verdict.”); *Suoja*, 211 F. Supp. 3d at 1207 (“Defendant contends that Dr. Frank’s opinion, couched in terms of a person’s ‘cumulative exposure,’ is no different from the ‘any exposure’ theory that plaintiff agreed he would not proffer at trial and therefore should be stricken. I agree.”); *Carpenter v 3M Co.*, 2022 WL 17885688, at *13 (N.D. Cal. Dec. 13, 2022) (“Plaintiffs offer two expert opinions –but both rely on the prohibited ‘every exposure’ and/or ‘cumulative exposure’ theories to support their conclusions on causation.”); *Clarke v. Air & Liquid Sys. Corp.*, 2021 WL 1534975, at *8 (C.D. Cal. Mar. 18, 2021) (courts have rejected both every exposure and cumulative exposure theories); *Doolin v. Ford Motor Co.*, 2018 WL 4599712, at *12 (M.D. Fla. Sept. 25, 2018) (cumulative exposure theory is a “recent variation” of the every exposure theory); *Jack v. Borg-Warner Morse TEC, LLC*, 2018 WL 3819027, at *10 (W.D. Wash. Aug. 10, 2018) (rejecting cumulative exposure as a “further outgrowth” of every exposure).

Most courts have recognized the lack of any meaningful distinction between “every” and “cumulative” exposure testimony.²⁴ The courts have rejected *cumulative exposure* testimony, much as other courts previously rejected the *every exposure* approach.

For example, federal district courts in North and South Carolina have rejected *cumulative exposure* testimony on the same grounds as they previously rejected *every exposure* testimony. *See Yates v. Ford Motor Co.*, 113 F. Supp. 3d 841 (E.D.N.C. 2015) (rejecting every exposure testimony based on the “accumulation” of fibers); *Haskins v. 3M Co.*, 2017 WL 3118017 (D.S.C. July 21, 2017) (cumulative exposure testimony violates substantial factor causation standard).

In the last five years, at least thirteen courts have rejected “cumulative exposure” testimony, including the District Court of South Carolina, the Sixth and Seventh Circuits, the New York Court of Appeals (twice), the Supreme Court of Ohio, and federal district courts in North Carolina, California, Illinois, Florida, Washington, and Maryland.²⁵ This is a substantial record of rejection for Plaintiff to overcome.

Today, based on these rulings, *every* or *cumulative exposure* asbestos causation theories are insufficient or inadmissible in several federal circuits and state supreme courts, as well as in

²⁴ *See, e.g., Yates*, 113 F. Supp. 3d at 846 (“Also referred to as ‘any exposure’ theory, or ‘single fiber’ theory, it represents the viewpoint that, because science has failed to establish that any specific dosage of asbestos causes injury, every exposure to asbestos should be considered a cause of injury. Numerous courts have excluded expert testimony or evidence grounded in this theory, reasoning that it lacks sufficient support in facts and data.”).

²⁵ *See Haskins*, 2017 WL 3118017, at *6; *Stallings*, 675 F. App’x at 551; *Krik*, 870 F.3d at 677; *Matter of New York City Asbestos Litig. (Juni v. A.O. Smith Water Prods. Co.)*, 116 N.E.3d 75, 75 (N.Y. 2018); *Nemeth v. Brenntag N. Am.*, 38 N.Y.3d 336, 346 (N.Y. 2022); *Schwartz v. Honeywell Int’l, Inc.*, 102 N.E.3d 477, 480 (Ohio 2018); *Yates*, 113 F. Supp. 3d at 856; *Carpenter*, 2022 WL 17885688, at *12; *Clarke*, 2021 WL 1534975, at*5; *Johnson*, 2021 WL 5493231, at *3; *Doolin*, 2018 WL 4599712, at *12, 17; *Jack*, 2018 WL 3819027, at *11; *Rockman*, 266 F. Supp. 3d at 843.

multiple federal and state lower courts.²⁶ Florida courts are also rejecting such testimony.²⁷ South Carolina should follow the majority approach and reject unscientific expert testimony.

2. The Pennsylvania *Rost* Case Is an Inappropriate Precedent for the Courts of South Carolina

The Court of Appeals relied heavily on a controversial 4-2 Pennsylvania Supreme Court opinion, *Rost v. Ford Motor Co.*, 151 A.3d 1032 (Pa. 2016), to support its adoption of *cumulative exposure* testimony. *Rost* is an outlier opinion.

²⁶ The cases are discussed in Bryce Friedman, *New York Contributes to the Demise of Every Exposure Testimony in Asbestos and Talc Litigation*, 38 Mealey's Litig. Rep.: Asbestos (Feb. 7, 2023); Mark A. Behrens & William L. Anderson, *The "Any Exposure" Theory: An Unsound Basis for Asbestos Causation and Expert Testimony*, 37 Sw. U. L. Rev. 479 (2008); William Anderson et al., *The "Any Exposure" Theory Round II – Court Review of Minimal Exposure Expert Testimony in Asbestos and Toxic Tort Litigation Since 2008*, 22 Kan J. L. & Pub. Policy 1 (2012); William L. Anderson & Kieran Tuckley, *The Any Exposure Theory Round III: An Update on the State of the Case Law 2012-2016*, Def. Counsel J. 264 (July 2016); Joseph Sanders, *The 'Every Exposure' Cases and the Beginning of the Asbestos Endgame*, 88 Tul. L. Rev. 1153 (2014); William L. Anderson & Kieran Tuckley, *How Much Is Enough? A Judicial Roadmap to Low Dose Causation Testimony in Asbestos and Tort Litigation*, 42 Am. J. Trial Advoc. 39 (2018). The Second, Fifth, Eighth, and Eleventh Circuits have not addressed an asbestos case, but all have rejected expert testimony that did not account for the dose in other contexts. *Wills v. Amerada Hess Corp.*, 379 F.3d 32 (2d Cir. 2004) (benzene); *McMunn v. Babcock & Wilcox Power Generation, Inc.*, 869 F.3d 246 (3d Cir. 2017) (excessive radiation from uranium effluent); *Burleson v. Texas Dep't of Criminal Justice*, 393 F.3d 577 (5th Cir. 2004) (welding rods); *Nat'l Bank of Commerce v. Assoc. Milk Producers, Inc.*, 191 F.3d 858 (8th Cir. 1999) (aerosolized milk containing aflatoxin M-1); *McClain v. Metabolife Int'l, Inc.*, 401 F.3d 1233 (11th Cir. 2005) (ephedrine).

²⁷ After the Florida legislature adopted the federal expert evidence standard in 2013, an appellate court applied it to reject "every exposure" asbestos testimony. The Florida Supreme Court subsequently rejected legislative adoption of the rule. See, e.g., *Crane Co. v. DeLisle*, 206 So. 3d 94, 105 (Fla. 4th DCA 2016), *quashed*, 258 So. 3d 1219 (Fla. 2018). The following year, the Florida Supreme Court reversed itself and adopted the federal standard by court rule. *In re Amendments to the Florida Evidence Code*, 278 So. 3d 551 (Fla. 2019). Since that ruling, trial courts have applied the *DeLisle* appellate court opinion to reject *every* or *cumulative* exposure testimony. See, e.g., *Fauteux v. The Country Club at Woodfield, Inc.*, 2020 WL 7714186, at *4 (Fla. Cir. Ct. Palm Beach Cnty. Oct. 29, 2020) (citing *DeLisle* and other decisions to reject cumulative exposure testimony in mineral spirits case); *Howell v. Palmdale Oil Co.*, 2020 WL 7714192, at *3 (Fla. Cir. Ct. Palm Beach Cnty. Jan. 16, 2020) (rejecting cumulative exposure theory in benzene case).

The Pennsylvania Supreme Court initially issued some of the strongest and earliest opinions rejecting the *every exposure* approach to asbestos causation. Defense counsel discusses two of these cases in its brief. Among those decisions was *Betz v. Pneumo Abex, LLC*, 44 A.3d 27 (Pa. 2012), a compelling and well-articulated rejection of expert testimony that does not include a causative dose.

In 2012, *Betz* became the law of Pennsylvania, and was soon joined by decisions from the Supreme Courts of Texas, Georgia, Ohio, Virginia, New York, and other jurisdictions. After changes to the composition of the Pennsylvania Supreme Court following a judicial election in 2015,²⁸ the court departed from *Betz* (without actually overturning it), in the process allowing *every exposure* testimony to suffice in *Rost*. The court set itself at odds with its own prior decisions and well as its sister states of Ohio and New York and other federal and state courts. The Court of Appeals should not have followed *Rost* because the decision does not acknowledge the role of dose or comport with South Carolina law.

II. AS PROPERLY INTERPRETED AND APPLIED, HENDERSON DOES NOT SUPPORT THE VERDICT

As stated, in *Henderson*, this Court adopted the “regularity, frequency, and proximity” test set forth in *Lohrmann* as the basis for testing the sufficiency of asbestos exposure evidence. *Lohrmann*, however, has its genesis in the context of the old “dusty trades” asbestos litigation that is different from the minimal exposure, chrysotile cases dominating today’s docket. *Henderson* can still suffice to separate legitimate cases from those that are not scientifically supported, but it should be applied with dose and substantial factor causation in mind.

²⁸ See Stephen Caruso, *How Pa’s Supreme Court Moved Left, and What It Means for the GOP*, Pa. Capital Star (Aug. 2, 2019).

A. Plaintiff Has Not Satisfied *Henderson's* Frequent, Regular and Proximate Exposure Requirements

Under *Henderson*, the Court of Appeals should have reversed the *Edwards* verdict. According to Petitioner's brief, Mr. Stewart could not have worked around Scapa dryer felts until 1969 at the earliest, which was the first year Scapa supplied asbestos-containing felts to the Bowater Paper Mill where Mr. Stewart spent his entire career. Petitioner's Brief at 7. But the year before the first Scapa dryer felt arrived at the plant (1968), Mr. Stewart had advanced to a supervisor position, covering an area 150 yards long, according to the appellate court's decision. *He never cut, cleaned or otherwise handled a Scapa asbestos-containing felt.* Even after this time, the felts involved were only rarely asbestos containing.

Decedent was not "proximate" to the felts after he became a supervisor. In addition, the use of only 3.8% asbestos-containing felts over the course of almost forty years of work does not approach any common-sense notion of "regular" or "frequent." In fact, encountering only some 11 out of 288 felts with asbestos qualifies as infrequent and irregular. Mr. Stewart's actual dose from these events, given the wetness of the felts, his distance from them, and his lack of any hands-on activity, was not frequent, regular, or proximate. The less toxic nature of chrysotile is relevant as well.²⁹ Chrysotile asbestos fibers are non-rigid, easily broken-down and disappear

²⁹ See *Bartel*, 316 F. Supp. 2d at 605 ("While there is debate in the medical community over whether chrysotile asbestos is carcinogenic, it is generally accepted that it takes a far greater exposure to chrysotile fibers than to amphibole fibers to cause mesothelioma."); *In re Asbestos Litig.*, 911 A.2d 1176, 1181 (Del. Super. May 9, 2006) ("[I]t is generally accepted in the scientific community and among government regulators that amphibole fibers are more carcinogenic than serpentine (chrysotile) fibers.").

from the body in weeks to months. They do not reside in the body in any significant amount for years as amphibole fibers do.³⁰

Thus, on the facts of this case, Plaintiff has not satisfied the *Henderson* standard. None of the Plaintiff experts testified that the exposures of decedent were sufficiently regular, frequent, or proximate to achieve a dose sufficient to cause disease. They merely assumed, and testified, that any amount of exposure by Mr. Stewart would be “cumulative” of his overall lifetime dose and thus a cause of his disease. The experts simply threw the issue of “how much is enough” to a jury with no expertise to make that determination.

This approach undercuts *Henderson*. If plaintiff experts do not advise the jury how frequent, regular, and proximate the exposures must be to result in mesothelioma, then they have not established the scientific basis for a verdict under *Henderson*.

B. Expert Testimony Under *Henderson* Must Clearly Articulate the Dose Generated by Frequent, Regular, and Proximate Exposures

Even though the Court of Appeals should have reversed based on *Henderson*, this Court should provide instruction for future cases involving extended periods of minimal exposure.

³⁰ Medical articles and texts have widely reported on the body’s capacity to remove chrysotile, explaining why that fiber substance is far less toxic than rigid amphiboles. *See, e.g.*, Elizabeth N. Pavlisko & Thomas A. Sporn, *Mesothelioma*, in *Pathology of Asbestos-Associated Diseases* 106 (Victor Roggli et al. eds., 3d ed. 2014); Clare Gilham et al., *Pleural Mesothelioma and Lung Cancer Risks in Relation to Occupational History and Asbestos Lung Burden*, 73 *Occupational & Env’tl. Med.* 290, 294-96 (2016) (“It is well known that chrysotile fibers are cleared more rapidly than crocidolite fibers. The half-life of crocidolite in the lungs has been estimated as about 6-10 years. By contrast chrysotile fibers disappear from the lung with a half-life of a few days to a few months.”). Courts have also recognized the significantly less toxic nature of chrysotile. *See In re Garlock Sealing Techs.*, 504 B.R. at 75 (“[I]t is clear under any scenario that chrysotile is far less toxic than other forms of asbestos.”); *Yates*, 113 F. Supp. at 853 (the parties agree that amphibole asbestos is more potent than chrysotile asbestos, and that higher levels of exposure to chrysotile asbestos than amphibole asbestos are necessary to cause mesothelioma”); *Rockman*, 266 F. Supp. 3d at 846 (“[C]hrysotile asbestos is classified in an entirely separate mineralogical family from *amphibole* asbestos and is widely considered less potent.”).

Meaningful application of *Henderson* must include a competent dose quantification and epidemiological proof to prevent speculative jury verdicts in low dose cases.

The *Henderson* standard served a purpose when it was created years ago—to distinguish heavy, direct, daily exposures sufficient to cause disease, from a non-asbestos worker’s presence in the same building or other minimal exposure. The point of *Henderson* is that infrequent, irregular, or not proximate exposures do not achieve the dose necessary to cause disease, even if some exposure occurs.

Unlike the shipyard scenario in *Lohrmann*, in today’s asbestos litigation, most alleged exposures are low-dose. Thus, the *Henderson* standard, if misapplied, could cause confusion for judges and juries in cases where the exposures are very low but still exist on an arguably frequent, regular, and proximate basis. Background exposures are one such example—typical lifetime exposures to asbestos in ambient air are quintessentially regular, frequent, and proximate but do not cause mesothelioma. Likewise, other low-dose or trivial workplace exposures that might occur over months or years, especially to chrysotile, typically do not produce mesothelioma.

Henderson, properly applied, requires a scientifically meaningful dose exposure that is regular, frequent, and proximate. Requiring a dose assessment as part of the *Henderson* test puts plaintiffs in South Carolina on the same footing as plaintiffs in many other states and federal courts where dose is the fundamental requirement. This proof requirement is hardly burdensome—exposure and toxicology experts are fully capable of estimating a range of exposure from a particular job activity and developing estimates of the lifetime dose in quantified terms of “fibers per cc year.” The process is well-established in the medical and exposure literature.

The Court should reject *cumulative exposure* testimony as insufficient to prove substantial factor causation. Merely claiming the exposures were “substantial” or “repeated” or “above background” or “cumulative (as plaintiff’s experts did here) allows for speculative testimony divorced from actual science. An asbestos case—like any other toxic tort case—should be based upon proof that the plaintiff had a reasonably quantified exposure, attributable to an individual defendant, consistent with epidemiology studies showing disease at those levels.

CONCLUSION

This Court should reverse the decision of the Court of Appeals.

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