IN THE UNITED STATES DISTRICT COURT FOR THE DISTRICT OF SOUTH CAROLINA

IN RE: AQUEOUS FILM-FORMING FOAMS PRODUCTS LIABILITY LITIGATION)	Master Docket No.: 2:18-mn-2873-RMG
CITY OF CAMDEN, et al., Plaintiffs,)	Civil Action No.: 2:23-cv-03230-RMG
- <i>vs</i> -)	
E.I. DUPONT DE NEMOURS AND COMPANY (n/k/a EIDP, Inc.), et al.,)	
Defendants.)	

CLASS COUNSEL'S MOTION FOR ATTORNEYS' FEES AND COSTS

Class Counsel, on behalf of all Plaintiffs' counsel, the Preliminarily Approved Settlement Class and the Preliminarily Approved Class Representatives, City of Camden, City of Brockton, City of Sioux Falls, California Water Service Company, City of Del Ray Beach, Coraopolis Water & Sewer Authority, Township of Verona, Dutchess County Water & Wastewater Authority and Dalton Farms Water System, City of South Shore, City of Freeport, Martinsburg Municipal Authority, Seaman Cottages, Village of Bridgeport, City of Benwood, Niagara County, City of Pineville, and City of Iuka, respectfully submit this Motion for Attorneys' Fees and Costs.

For the reasons set forth in the accompanying memorandum of law, Class Counsel's request that the following award be approved should be granted:

• 8% in fees of the DuPont PWS Settlement in the amount of \$94,800,000.00;

- 5% of that amount, or \$4,740,000.00, to be held back for legal fees to administer the DuPont PWS Settlement through 2030; and
- Reimbursement of costs in the amount of \$2,136,213.21;

Additionally, Class Counsel's request that the 8% attorneys' fee award should be credited against any individual counsel's retainer fee, such that any private contract will be reduced by 8%, should be granted for the reasons set forth in the accompanying memorandum of law.

Dated: October 15, 2023

Respectfully submitted,

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Class Counsel

CERTIFICATE OF SERVICE

I hereby certify that a true and correct copy of the foregoing was electronically filed with this Court's CM/ECF on this 15th day of October, 2023 and was thus served electronically upon counsel of record.

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Defendants.)	

 $\frac{\text{CLASS COUNSEL'S MEMORANDUM IN SUPPORT OF THEIR MOTION FOR}}{\text{ATTORNEYS' FEES AND COSTS}}$

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Torrisi v. Tucson Elec. Power Co., 83 F.3d 1370 (9th Cir.1993)
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I. INTRODUCTION

Never before has litigation protected American drinking water on this scale. Plaintiffs' counsel secured historic settlement funds for Public Water Suppliers ("PWS") - \$1.185 billion from DuPont¹ and between \$10.5 and \$12.5 billion from the 3M Company ("3M") – to aid PWS in their efforts to supply PFAS-free water both for their current constituents and for future generations. After years of intensely adversarial litigation, Class Counsel on behalf of all Plaintiffs' counsel now petition the Court for an award of attorneys' fees commensurate to the exceptional achievement they labored tirelessly for years to obtain. Class Counsel request an award of 8% of the DuPont settlement of \$1,185,000,000 ("Settlement Amount")² or \$94,800,000 ("Class Fee"), plus costs. Class Counsel's fee request represents an amount well below the approximate 25% benchmark permissible under Fourth Circuit precedent and is modest in contrast to the enormity of the work performed to obtain this result.³

Over the last four and a half years, Plaintiffs' counsel, including Lead Counsel, Class Counsel and the Plaintiffs' Executive Committee ("PEC"), spent 414,900.9 hours⁴ working on herculean tasks that synergistically yielded the largest drinking water settlements in United States' history. This colossal achievement was the result of a sustained and concerted effort directed against all Defendants whose liability is undeniably intertwined and interrelated. Under the Court's watchful oversight and various scheduling orders, Plaintiffs conducted common discovery against all Defendants simultaneously, defeated common defenses (*e.g.*, government contractor defense),

¹ The Settling Defendants include: The Chemours Company, The Chemours Company FC, LLC, DuPont de Nemours, Inc., Corteva, Inc., and E. I. DuPont de Nemours and Company n/k/a EIDP, Inc. ("DuPont").

² With the exception of the terms "Class Fee" and "Class Costs," which are defined herein, all other capitalized terms have the same definition as in the Class Action Settlement Agreement (as amended) [ECF Nos. 3393-1, 3603 and 3684].

³ See Diagram, infra.

⁴ Declaration of John W. Perry, Jr. ("Perry Decl."), at ¶ 20, attached as Ex. A.

traced the exchange of research and knowledge as between and amongst the Defendants, and discovered the interplay among the various Defendants and the United States. These efforts were nothing short of exceptional. Every hour devoted to this litigation advanced the case against all Defendants, and the cumulative time expended by Plaintiffs' counsel was necessarily common to the cause and is indivisible as to the DuPont and 3M settlements. Class Counsel thus respectfully request that this Court view the DuPont and 3M settlements in the aggregate when analyzing the Class Fee – just as the Court approached the overall management of this case with all Defendants in concert, beginning with Science Day, through the government contractor defense briefing and argument, the bellwether process and right up until the eve of the first bellwether trial.

In super mega-fund cases like this one, courts regularly award percentage fees from a common fund in amounts greater than 8%, and a larger percentage would be appropriate with respect to the DuPont settlement if treated alone. Given this Court's intimate familiarity with how cohesively this litigation was conducted, Class Counsel ask the Court to review the current 8% fee request in the DuPont settlement, and the 8% fee request forthcoming in the 3M settlement, together. This is justified given that the hours and work were equally important to achieving both settlements.

As discussed below, a thorough analysis of the *Barber* factors⁶ illustrates that the requested Class Fee is reasonable given the daunting governmental contractor defense that loomed over this

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⁵ It is important to note that while Class Counsel believe an 8% Class Fee request is appropriate in both the 3M and DuPont settlements, and is consistent with legal precedent, any future settlements will need to be analyzed separately, if and when they occur.

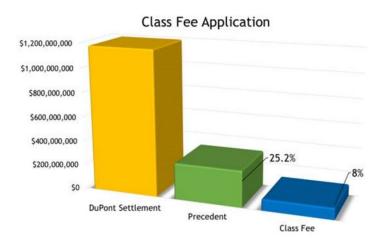
⁶ These factors include: "(1) the time and labor expended; (2) the novelty and difficulty of the questions raised; (3) the skill required to properly perform the legal services rendered; (4) the attorney's opportunity costs in pressing the instant litigation; (5) the customary fee for legal work; (6) the attorney's expectations at the outset of litigation; (7) the time limitations imposed by the client or circumstances; (8) the amount in controversy and the results obtained; (9) the experience, reputation[,] and ability of the attorney; (10) the undesirability of the case within the legal community in which the suit arose; (11) the nature and length of the professional relationship

litigation like the sword of Damocles. Thanks to this Court's oversight, Plaintiffs' counsel skillfully faced and surmounted well-heeled defense counsel who relentlessly pressed their novel and difficult governmental immunity arguments, and more – recall, a jury trial was imminent. With the situation piled high with adversity, Plaintiffs' counsel were obliged to rise to each occasion, sweating through thousands of hours over more than 4 ½ years of tedious tasks, contentious discovery, complex research, and evidentiary presentations, that may have appeared seamless to the unknowing, but happened only because of sleepless nights and exacting preparation by seasoned counsel whose ability matched their well-deserved reputations and judicial appointments. The result achieved for the Settlement Class Members -- considering all the significant litigation risks that were ever-present and only overcome on the eve of trial after grueling pre-trial toil by Plaintiffs' counsel who went uncompensated for years as they labored on a contingent basis -- is nothing short of remarkable. Where such extraordinary results are achieved courts in similar cases do not hesitate to justly compensate counsel for their contributions.

As the diagram below depicts, the 8% fee request represents a small portion of the total anticipated DuPont settlement payments and is likewise a much lower percentage-method award than is supported by Fourth Circuit precedent.⁷

between attorney and client; and (12) attorneys' fees awards in similar cases. *Barber v. Kimbrell's Inc.*, 577 F.2d 216, 226 n.28 (4th Cir. 1978)

⁷ Declaration of Brian T. Fitzpatrick ("Fitzpatrick Decl."), at attached as Ex. B (opining that 8% is lower than the norm both overall and with respect to billion-dollar cases).



In addition to the request for 8% in attorneys' fees, Class Counsel likewise seek reimbursement of \$2,136,213.21 in ("Class Costs"), or 10% of their total out-of-pocket costs, expended to fund the prosecution of this litigation. No incentive awards are being sought for the class representative Plaintiffs.

A comprehensive description of the massive scope and nature of the work performed by PEC firms and other common benefit attorneys that led to what will be, if approved, a historic settlement by any measure, is provided below along with the supporting declarations of individuals with personal knowledge of that work, including the Declaration of Michael A. London ("London Decl."), which addresses the overall administration of this complex and multitrack MDL; the Declaration of Scott Summy ("Summy Decl."), which describes the settlement process, its complex details, and history of negotiations; the Declaration of Gary J. Douglas ("Douglas Decl."), which details the substantive litigation efforts undertaken from the inception of the MDL up though and including preparation for the first bellwether trial; and the Declaration of Paul J. Napoli ("Napoli Decl."), which describes the totality of discovery efforts undertaken as against the United

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⁸ Perry Decl., at ¶ 21 (reporting total costs submitted to date of \$21,362,132.10, of which Class Counsel requests 10% – DuPont's approximate contribution to the combined settlement amount when totaled with the 3M PWS Settlement); *see also*, Fitzpatrick Decl., at ¶¶ 8, 27 (noting that Plaintiffs' \$2.1 million reimbursement request is modest).

States, each of which is being filed concurrently herewith, and attached as Exs. C, D, E, and F, respectively.

To support this motion, additional evidence is being provided through declarations regarding: (1) document review management and electronically stored information;⁹ (2) the development of experts;¹⁰ and (3) the law and briefing efforts. These declarations are likewise being filed concurrently herewith in further support of Class Counsel's fee request.¹¹ All of the efforts described in the declarations combined to achieve these remarkable settlements that, if finally approved, will greatly benefit the Settlement Class.

Finally, Class Counsel provide input from leading professionals to assist the Court in evaluating the reasonableness of Class Counsel's fee request under the *Barber* standards, including the Fitzpatrick Decl., the Perry Decl. attesting to the number of hours of work performed and expenses submitted by PEC firms and other common benefit attorneys, and the Declaration of Steven J. Herman ("Herman Decl.") regarding an appropriate hourly rate for attorney time in this MDL (for the purpose of a Lodestar cross-check, in the event the Court choses to perform one), attached as Exs. B, A, and G, respectively.

The DuPont settlement was the result of a years-long, multitrack effort by Plaintiffs' counsel who expended hundreds of thousands of combined hours on multiple fronts, including settlement efforts, litigation efforts and MDL case administration, without any guarantee of a recovery. This three-pronged approach was necessary given the highly complex nature of this

⁹ Declaration of Staci J. Olsen in Support of Class Counsel's Motion for Attorneys' Fees and Costs, ("Olsen Decl."), attached as Ex. H.

¹⁰ Declaration of Wesley Bowden in Support of Class Counsel's Motion for Attorneys' Fees and Costs ("Bowden Decl."), attached as Ex. I.

¹¹ Declaration of Rebecca G. Newman In Support of Class Counsel's Motion for Attorneys' Fees and Costs ("Newman Decl."), attached as Ex. J.

MDL involving so many Defendants, and in order to meet the challenges and obstacles presented by this MDL, including, of course, litigating in the midst of a global pandemic.

All attorneys, working together towards the same goal, enhanced the efforts of the others, and their combined efforts, as described more fully below and in the supporting declarations, along with existing legal precedent, demonstrate that the requested 8% Class Fee (\$94,800,000) and \$2,136,213.21 in Class Costs is reasonable.

II. THE DUPONT SETTLEMENT

A. PROCEDURAL BACKGROUND

On June 1, 2023 a Memorandum of Understanding was executed¹² and thereafter a settlement with DuPont was announced. Four weeks later, on June 30, 2023, the Class Action Settlement Agreement was executed.¹³ On August 22, 2023, the \$1.185 billion proposed class settlement with DuPont was preliminarily approved.¹⁴ The preliminarily approved settlement is for the Settlement Class consisting of:

- (a) All Public Water Systems in the United States of America that draw or otherwise collect from any Water Source that, on or before the Settlement Date, was tested or otherwise analyzed for PFAS and found to contain any PFAS at any level; and
- (b) All Public Water Systems in the United States of America that, as of the Settlement Date, are (i) subject to the monitoring rules set forth in UCMR 5 (*i.e.*, "large" systems serving more than 10,000 people and "small" systems serving between 3,300 and 10,000 people), or (ii) required under applicable state or federal law to test or otherwise analyze any of their Water Sources or the water they provide for PFAS before the UCMR 5 Deadline.¹⁵

In its Preliminary Approval Order, the Court noted "that it will likely be able to approve, under Rule 23(e)(2) of the Federal Rules of Civil Procedure, the proposed Settlement

¹² Summy Decl., at ¶ 30.

¹³ ECF No. 3393-2

¹⁴ Order regarding Motion of proposed Class Counsel for Preliminary Approval of Settlement Agreement ("Preliminary Approval Order") [ECF No. 3603].

¹⁵ *Id.* at 3.

Agreement,"¹⁶ which would necessarily include a finding that the proposed settlement is fair, reasonable and adequate. FED. R. CIV. P. 23(e). Moreover, pursuant to the Preliminary Approval Order, the Court likewise instructed Class Counsel to file a motion for attorneys' fees and costs,¹⁷ which now occasions this request for a reasonable Class Fee and Class Costs in accordance with the methodology set forth below.¹⁸

B. MECHANISM OF PAYMENT

1. Class Fee and Class Costs

Class Counsel respectfully request Class Fees and Class Costs, broken down as follows:

- <u>Class Fee</u>: 8% to be awarded for attorney fees (e.g., for the legal work performed for the common benefit of all litigants, all of which helped achieve this historic result); and
- <u>Class Costs</u>: \$2,136,213.21 to be awarded for reimbursement of costs (e.g., for the DuPont PWS Settlement's share of costs and expenses incurred by the PEC and Class Counsel for the common benefit of all litigants).

A percentage award and reimbursement of expenses of this dimension are regularly allowed in litigation like this.¹⁹

As explained in detail by Mr. Summy, Co-Lead Counsel analyzed and determined that resolution of this matter on a class-wide basis was the superior way to ensure that all PWS had the opportunity to benefit from any proposed resolution.²⁰ Pursuant to Rule 23 and the principles of common benefit, counsel are entitled to seek a reasonable fee and out-of-pocket costs from the

¹⁷ *Id.* at 12.

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¹⁶ *Id*. at 7.

¹⁸ While this fee request is being made by Class Counsel, it is for the work performed over the course of the litigation by Lead Counsel, Class Counsel, PEC firms and other common benefit attorneys (collectively referred to as "Plaintiffs' counsel" or "counsel"), as set forth in II.B, *infra*. ¹⁹ *See e.g.*, Fitzpatrick Decl., at Table 1 identifying percent fee method cases and exemplar expenses.

²⁰ Summy Decl., *supra*.

Settlement Amount. Of note, Class Counsel seek an 8% Class Fee here and will seek an 8% Class Fee from the pending 3M Settlement Amount, both of which were preliminarily approved during the same time period as a result of the indivisible work and efforts by Plaintiffs' counsel.

The present request is based on the cumulative number of reported hours worked by Plaintiffs' counsel from October 1, 2018²¹ through August 22, 2023, the date of preliminary approval of the DuPont settlement,²² for the work performed to achieve both the DuPont PWS Settlement and the 3M PWS Settlement. Class Counsel, supported by the PEC, will be filing a motion in the 3M PWS Settlement seeking the *same* percentage for Class Fees as in the DuPont PWS Settlement, and seeking Class Costs on the same proportionate basis as in the DuPont PWS Settlement. The PEC and Class Counsel are therefore optimistic that their cumulative lodestar and litigation costs will also be compensated from the 3M PWS Settlement funds. Thereafter, additional fees or costs would be compensated from future judgments or settlements.²³

2. Class Fees and Costs are Appropriate for a Class Action Settlement

CMO 3, which issued on April 26, 2019, contemplated a common benefit holdback for settlements in individual cases in the amount of 9% (6% for common benefit attorneys' fees and 3% for common benefit costs and expenses). Notably, CMO 3 contemplated that its application would be "subject to modification depending on the future course of litigation." Due to the class action mechanism under which this resolution was reached, CMO 3's holdback should not apply

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²¹ Co-Lead Counsel recommended and agreed to waive all time submitted prior to this date with the exception of one firm that did not agree to waive a small amount of time that predates this date.

²² The sole exception to this is with respect to the 5% holdback discussed below that is limited to fees associated with the administration of the DuPont PWS Settlement only through August 2030.

²³ Regarding private attorney-client agreements as to fees and costs, Class Counsel submits that

those be paid in accordance with their private contract terms and will be deducted from the attorneys' portion of any settlement funds.

 $^{^{24}}$ CMO 3 at ¶ 21.

to this settlement. Instead, CMO 3 should continue to apply in the context for which it was originally designed – namely, for individual or private case settlements²⁵ – while here, Class Counsel's reasonable request for a Class Fee and Class Costs should be granted due to certain additional distinguishing factors which must be considered.

Rather than employ the MDL assessment applicable to individual case settlements under CMO 3, which is designed to prevent "free riders," the Class Fee and Class Costs requests spread the fee amongst *all* class members, *i.e.*, absent class members (some of whom are not represented by counsel) as well as the Class Representative Plaintiffs, as is appropriate in class action settlement under FED. R. CIV. P. 23. In addition, the current motion requests *less than* CMO 3's 9% holdback, since the Class Fee request is only 8% and Class Counsel only seek reimbursement of proportional costs of \$2,136,213.21, which costs were calculated as the approximate percent share of the total common (shared and held) costs incurred through August 22, 2023 that resulted in the total recovery achieved in the DuPont and the 3M PWS Settlements. Stated differently, of the \$21,362,132.10 in total costs certified by Special Master John Perry's office, only one-tenth (1/10th) of the costs to date are ascribed to the DuPont PWS Settlement since that approximates its proportionate share when compared to the 3M settlement.

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²⁵ Plaintiffs recognize that CMO 3 will likely apply in future individual or private case settlements. For example, if a cluster of personal injury or property damage cases were to settle with one lawyer (or small group of lawyers), as occurred in *Campbell v. Tyco Fire Prods.*, et al., 19-cv-00422 or *City of Stuart v. 3M*, et al., 18-cv-3487, then the requirements of CMO 3 would likely apply.

²⁶ See Sprague v. Ticonic National Bank, 307 U.S. 161 (1939); Mills v. Electric Auto-Lite Co., 396 U.S. 375 (1970); In re Air Crash Disaster at Florida Everglades on December 29, 1972, 549 F.2d 1006, 1019-21 (5th Cir. 1977).

²⁷ Plaintiffs' Motion for Preliminary Approval of Class Settlement, for Certification of Settlement Class and for Permission to Disseminate Class Notice (hereinafter, "Plaintiffs' Motion for Preliminary Approval") [ECF 4].

²⁸ Given that expenses are also inextricably interwoven, the PEC in consultation with class fairness experts, determined that rather than seek reimbursement of all expenses at the present time, which would amount to less than 2.5% of the settlement (still under the 3% approved under CMO 3), they are seeking to have the expenses reimbursed based upon a pro-rata share of the 3M and the

Class Counsel intend to allocate the Class Fee just as if the funds were received pursuant to CMO 3. Thus, for present purposes, the concept of "common benefit attorneys' fees" is synonymous with the concept of the requested "Class Fee." The Class Fee here will be allocated to those whose work was performed for the common benefit of all litigants from October 1, 2018 up through to August 22, 2023.²⁹ Similarly, as used herein the concepts of "common benefit expenses and costs" and "Class Costs" are synonymous. The Class Costs here will be allocated to reimburse counsel whose expenses and costs were incurred for the common benefit of the litigation through to August 22, 2023.

At present, the PEC has spent \$21,362,132.10 for all litigation expenses from October 1, 2018 through August 22, 2023. Time and expense reports were required to be submitted to the Court-appointed CPA, Mr. Jeremy Betsill.³⁰ Special Master John Perry and his office, with his partner Mr. Dan Balhoff, review the submissions to ensure they comply with CMO 3. These professionals categorize the expenses as either Held Expenses or Shared Expenses.³¹ Mr. Perry

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DuPont PWS Settlements combined. To this end, the combined base settlements equal \$11,685,000,000.00 (\$10,500,000,000.00 + \$1,185,000,000.00). DuPont's percent of \$11,685,000,000.00 is 10.14%. Class Counsel seek \$2,136,213.21, or approximately 10.14% of the total common costs, to be reimbursed from the DuPont PWS Settlement. Notably, if the three 3% assessment for costs under CMO 3 was applied, it would have amounted to \$35,550,000.00 – more than tenfold the present request. Class Counsel's request for costs from the DuPont PWS in the amount of \$2,136,213.21 represents a significant and appropriate savings to the Class.

²⁹ Just before the *Stuart* bellwether trial was to begin, the Kidde Defendants filed for bankruptcy. The effect of the automatic stay in bankruptcy had profound effects on the *Stuart* trial. Principally, it resulted in the severance of all telomer Defendants from the trial, including DuPont. But the pressures of the trial still were integral to the DuPont settlement just before jury selection. Until that moment, Plaintiffs were prosecuting Stuart's claims under the impression that all the Defendants were jointly and severally liable, and thus Plaintiffs' litigation efforts were focused on all Defendants collectively. This collective focus explains why it is simply impossible to disaggregate time Defendant-by-Defendant. The case was never prosecuted in that manner – and indeed, neither CMO 3 nor any other governing guidance contemplated such disaggregation, instead implicitly recognizing the interconnectedness of work performed as against all Defendants.

³⁰ CMO 3 at ¶ 12.d.

³¹ CMO 3 at ¶ 14; see also, Perry Decl. at ¶ 21.

confirmed that Plaintiffs' expenses have been properly received in accordance with CMO 3.³² Because the PEC is treating the DuPont and 3M PWS Settlements as presenting a virtually unified common fund due to how the cases were jointly prosecuted against all Defendants and how the work was inextricably intertwined, Class Counsel seek reimbursement of costs from the DuPont Settlement in the amount of \$2,136,213.21, which represents DuPont's approximate proportionate contribution of one-tenth (1/10th) to the combined settlement proceeds.³³ In addition to litigation costs, certain costs of providing notice to the class, and the currently invoiced costs of the Notice Administrator, Escrow Agent and Special Master are to be taken from the QSF even before the Effective Date in accordance with the Settlement Agreement.³⁴ Should final approval be granted, future costs of the Notice Administrator, Escrow Agent and Special Master shall be paid directly from the QSF in accordance with the Settlement Agreement.³⁵ The following chart denotes the calculations discussed above, incorporating the 3M PWS Settlement for the purpose of illustrating

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 $^{^{32}}$ Perry Decl., at ¶ 9.

³³ Courts are authorized to award payment of out-of-pocket costs expended to achieve a common benefit recovery or to advance the common goals of plaintiffs in MDL litigation. See Sprague, 307 U.S. at 166-67 (recognizing a federal court's equity power to award costs from a common fund); Savani v. URS Pro. Sols. LLC, 121 F. Supp. 3d 564, 576 (D.S.C. 2015) ("Reimbursement of reasonable costs and expenses to counsel who create a common fund is both necessary and routine"). "The prevailing view is that expenses are awarded in addition to the fee percentage." Berry v. Wells Fargo & Co., No. 3:17-CV-00304-JFA, 2020 WL 9311859, at *15 (D.S.C. July 29, 2020) (citations omitted). Notably, CMO 3's holdback assessment serves the underlying purpose of the common fund doctrine: "avoid[ing] the unjust enrichment of those who would otherwise benefit from the fund without paying the litigation costs necessary to produce the fund." Fickinger v. C.I. Planning Corp., 646 F. Supp. 622, 632 (E.D. Pa. 1986); see also In re Diet Drugs, 582 F.3d 524, 550 n.52 (3rd Cir. 2009) (noting that fee awards in common fund cases include "[b]asic concerns for fairness and due process"). Coinciding with this principle, the equitable considerations addressing reimbursement of costs from a common fund created by virtue of a class action apply to ensure that all class members, whether or not represented by counsel, contribute to pay for the recovery.

³⁴ DuPont Settlement Agreement ¶ 6.2.

³⁵ DuPont Settlement Agreement ¶¶ 6.3 & 11.2.

the basis for Class Counsel's request – namely, that the costs incurred to achieve both the DuPont and the 3M PWS Settlements were wholly intertwined:

	BASIS FOR CALCULATION	AMOUNT
A	DuPont PWS Settlement Amount	\$1,185,000,000.00
В	3M PWS Settlement Amount minimum	\$10,500,000,000.00
C	Aggregate minimum of PWS Settlement	\$11,685,000,000.00
	Amounts $(A + B)$	
D	Total costs to date across both PWS Settlements	\$21,362,132.10
E	DuPont share of aggregate costs $(A \div C)$	$10.14\%^{36}$
F	DuPont approximate share of total costs (D * E)	\$2,136,213.21
G	DuPont Class Fee request (8% of A)	\$94,800,000.00
Н	Total DuPont Class Fee and Class Costs request	\$96,936,213.21
	(F+G)	
I	Remaining DuPont funds after deduction of	\$1,088,063,786.79*
	requested Class Fee and Class Costs (A – H)	

^{*}Not inclusive of any interest earned.

Based on their experience, consultation with experts, and analysis of legal precedent, Class Counsel request a Class Fee of 8% percent or \$94,800,000.00.³⁷ In addition, also in consultation with Plaintiffs' expert, Class Counsel request that the Class Fee be treated like a common benefit assessment, such that for represented Plaintiffs, it shall be deducted from the total amount of counsel fees payable under individual Plaintiffs' counsel's retainer agreements.³⁸ Previously, there was unanimous support amongst the PEC when the 9% assessment in CMO 3 was proffered to the Court and approved. Notably, when the MDL assessment under CMO 3 was agreed to, all counsel understood that the fee portion of that assessment would be deducted from counsel's retainer fee. Given the circumstances presented by this class settlement (and motion related to 3M in the near future), it is proposed that this procedure should apply. In other words, for class

³⁶ For purposes of the calculations herein, the 10.14% has been rounded down to 10%.

³⁷ Fitzpatrick Decl. at ¶ 3 (noting that the 8% fee request is below the norm and reasonable).

³⁸ Fitzpatrick Decl., at ¶ 8, n.2.

settlements, the 8% Class Fee will be credited against any individual counsel's retainer fee such that any private contract will be reduced by 8%. For example, a class member who has hired a private lawyer at a 25% contingency agreement, will have its contingency agreement reduced to 18% because the Class Fee will have already come off the top.

3. Class Fee and Class Costs Allocation and Administration

Pursuant to CMO 3 and in accordance with the Settlement Agreement, common benefit awards are to be deducted from any settlement monies paid by Defendants.³⁹ As noted above, the proposed Class Fee and Class Costs would be deducted the same way; namely, taken from the settlement fund itself. *See Boeing Co. v. Van Gemert*, 444 U.S. 472, 478 (1980). *See also* FED. R. CIV. P. 23(h).

The following chart delineates the calculation and transfer destinations of the funds to be paid from the Settlement Amount for the Class Fee Award:

	BASIS FOR CALCULATION	AMOUNT	TRANSFERRED TO
A	Settlement Amount	\$1,185,000,000.00	DuPont Qualified Settlement
			Fund
В	Class Fee (8% of Settlement	\$94,800,000.00	Class Counsel fee account
	Amount)		
C	Class Costs requested (10% of	\$2,136,213.21	Class expense account
	total costs to date,		-
	\$21,362,132.10)		

Pursuant to the Settlement Agreement with DuPont, upon Preliminary Approval, the DuPont Defendants were required to tender the entirety of the Settlement Amount, \$1,185,000,000.00, within 10 business days. ⁴⁰ Further, in accordance with the settlement and Plaintiffs' Motion for Preliminary Approval, Co-Lead Counsel moved for the establishment of a

⁴⁰ Settlement Agreement at 6.1; *see also*, Order Granting Motion for Preliminary Approval [ECF 33].

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³⁹ CMO 3; see also, DuPont Settlement Agreement at Sections 6.2 and 6.3.

Qualified Settlement Fund ("QSF") as defined in the DuPont MSA.⁴¹ Such Motion was granted by the Court and the QSF was established.⁴² In accordance with the Preliminary Approval Order, DuPont tendered the Settlement Amount into the QSF, titled the DuPont PFAS Water Provider Settlement Trust Fund (hereinafter, "DuPont QSF"). These funds are being maintained in the DuPont QSF.⁴³ In accordance with the DuPont MSA, future costs incurred by the Court-approved Claims Administrator, Notice Administrator and Settlement Special Master are to be taken or billed directly to the QSF and paid throughout the course of the litigation.

Class Counsel propose to administer the Class Fee and Class Costs as follows. First, upon entry of the Court's Order Granting Final Approval of the DuPont PWS Settlement (including the Class Fee as respectfully requested herein), and thereafter following the Effective Date, 8% (\$94,800,000.00) of the Settlement Amount would be taken from the DuPont QSF for the Class Fee, and another \$2,136,213.21 would be taken from the DuPont QSF for Class Costs, totaling \$96,963,213.21. As illustrated in the chart above, this \$96,963,213.21 would be allocated and transferred as follows:

- <u>Class Fee</u>: \$94,800,000.00 (8% of the gross settlement amount of \$1.185 billion) would be wired to the Class Fee account/common benefit fee account: MDL 2873 COMMON BENEFIT FEE FEE FUND Huntington Bank (Acc#: ...9885)).
- <u>Class Costs</u>: \$2,136,213.21 (10% of the total reimbursable MDL costs incurred to date) would be wired to the Class Expense account/common benefit expense account: MDL 2783 COMMON BENEFIT FEE EXPENSE FUND (Huntington Bank (Acc#: ...9872)).

⁴¹ Settlement Agreement at 2.41, 6.2, 7.

⁴² Order Granting Motion for Preliminary Approval [ECF 33].

⁴³ See Huntington Private Bank Account State, attached as Ex. K.

The remaining money, which would be in excess of \$1,088,063,786.79 (because interest is already and will continue accruing), shall remain in the DuPont QSF until its allocation and distribution in accordance with the Settlement Agreement.

However, because the settlement will require ongoing administration, and in order to ensure that Class Counsel remain fully committed to this administration, 5% percent of the Class Fee award should be held back from immediate distribution so that fees incurred in the post-settlement administration are compensated.⁴⁴ Class Counsel has consulted with their expert, Steven J. Herman, who opines that a 5% holdback is appropriate.⁴⁵ Mr. Perry concurs and is prepared to administer fee applications related to these funds over the course of the next six years.⁴⁶

Allocation of any award of Class Fees that are available now would be the subject of a recommendation by a Fee Committee, a report and recommendation by Special Master John Perry (to include documentation of the work that he and Mr. Balhoff have engaged in), and ultimately the review and approval of this Court. This Class Fee would be paid from the \$94,800,000.00 requested, less a 5% holdback for legal fees that will be incurred in the course of future settlement administration. As such, \$90,060,000.00 would be immediately available for attorneys' fees, while \$4,740,000.00 would be held back and available for legal fees incurred by Class Counsel or their designees for the remainder of the DuPont settlement's administration. ⁴⁷ It is contemplated that claims for legal fees incurred by Class Counsel in the ongoing administration of the settlement would be made by Class Counsel one time per year with the first request due November 7, 2024

⁴⁴ See, e.g., In re: NFL Players' Concussion Inj. Litig., MDL No. 2323, Explanation and Order [ECF 10019] at 4, n. 2 (approving a 5% holdback for additional "implementation fees" to class counsel to be paid at a later date).

⁴⁵ Herman Decl., at ¶ 90-93; see also, Perry Decl., at ¶ 24.

⁴⁶ Perry Decl., at ¶¶ 22-24.

⁴⁷ Herman Decl., at ¶ 93; see also, Perry Decl., at ¶ 24.

and then all future requests for attorney fees (for settlement administration) due on the first Thursday of November for each year thereafter through 2030.

Similarly, any award of Class Costs would be subject to the same process: a Fee Committee recommendation, a report and recommendation by Special Master John Perry, and ultimately, the review and approval of this Court.

III. BACKGROUND AND OVERVIEW OF COMMON BENEFIT EFFORTS.

A. A BRIEF HISTORY OF PRE-MDL LITIGATION AND EFFICIENCY OF THE MDL AND COUNSEL.

Plaintiffs' counsel's work in this MDL should be commended and compensated for their extraordinary skill and efficiency made possible by both counsel's institutional knowledge with respect to PFAS litigation specifically and their vast decades of experience in water contamination cases generally, as well as their ability to adapt to the challenging circumstances presented by a global pandemic, including carrying out discovery of a complex subject matter despite a nationwide lockdown. As the history below recounts, all of the Barber factors support Class Counsel's fee request. Counsel's expertise and commitment to the litigation allowed them to overcome a myriad of complex and novel questions of law and difficulties in proving factual culpability. The government contractor defense, which loomed as an existential threat at the inception of the litigation, tampered counsel's expectations, and made the case undesirable to many, was defeated through hard work and careful attention to details by insightful, high-caliber lawyers who had the gumption and know-how to accomplish their mission. Plaintiffs' counsel's work was never made easy given the incredibly talented and resourced opposition who regularly presented strong defenses and challenged virtually all of Plaintiffs' efforts given the magnitude of liability their clients had at stake. All these factors justify the award sought.

1. This Court Appointed Skilled Counsel with Institutional Knowledge of the Subject Matter that were Fully Capable of Performing their Legal Services Efficiently.

Litigation involving per- and polyfluoroalkyl substances ("PFAS") has been ongoing for nearly 25 years. This extensive history is part of what makes PFAS litigation unique. Early litigations acted as the catalyst⁴⁸ that led to the 2009 provisional Health Advisory Levels for PFOA and PFOS, ⁴⁹ the 2016 Lifetime Health Advisory Level for PFOA and PFOS of 70 ppt (parts per trillion) combined, ⁵⁰ the 2022 Interim Health Advisories, ⁵¹ and, finally, the enforceable National Primary Drinking Water Regulations (NPDWRs) that were proposed by EPA in March 2023 of 4 ppt for each PFOA and PFOS. ⁵² The EPA has concluded that these regulatory actions, "will prevent thousands of deaths and reduce tens of thousands of serious PFAS-attributable illnesses." ⁵³

Driven by a growing public awareness of PFAS contamination, brought to light, in part, as a result of high profile PFAS verdicts⁵⁴ and settlements,⁵⁵ public water systems and other entities

⁵⁴ See e.g., Vigneron v. E. I. DuPont de Nemours & Co., 13-cv-136 (S.D.O.H.)(plaintiff's verdict in 2017 of \$2 million in compensatory damages and \$10.5 million in punitive damages).

⁴⁸ Letter from Robert A. Bilott, Esq. to the United States Environmental Protection Agency, dated March 6, 2001, EPA01-00171880-172830 (informing government officials including EPA that DuPont was emitting PFOA which "may pose an imminent and substantial threat to health or the environment"), attached as Ex. L.

⁴⁹ EPA's website, Health Advisories for Perfluorooctanoic Acid (PFOA) and Perfluorooctane Sulfonate (PFOS), *available at*: https://www.epa.gov/sites/default/files/2015-09/documents/pfoa-pfos-provisional.pdf.

⁵⁰ EPA's website, FACT SHEET, PFOA & PFOS Drinking Water Health Advisories, *available at:* https://www.epa.gov/sites/default/files/2016-05/documents/drinkingwaterhealthadvisories pfoa pfos 5 19 16.final .1.pdf.

⁵¹ EPA's website, Drinking Water Health Advisories for PFOA and PFOS, 2022 Interim Updated PFOS and PFOS Health Advisories, *available at*: https://www.epa.gov/sdwa/drinking-water-health-advisories-pfoa-and-pfos.

⁵² EPA's website, Per- and Polyfluoroalkyl Substances (PFAS), Proposed PFAS National Primary Drinking Water Regulation, *available at*: https://www.epa.gov/sdwa/and-polyfluoroalkyl-substances-pfas.

⁵³ *Id*.

⁵⁵ See e.g., approximately \$671 million dollar settlement with DuPont in 2017 in the *In re E. I. DuPont de Nemours and Co. C8 Personal Injury Litig.*, (S.D.O.H.)("C8 MDL")(global resolution

began filing cases against a variety of PFAS and AFFF manufacturers. ⁵⁶ As the number of AFFFspecific PFAS cases piled up in federal courts, a growing chorus for consolidating these disparate cases before the Judicial Panel on Multidistrict Litigation ("JPML") ensued.⁵⁷ Consolidation served the best interests of individual clients, but also established a pathway to advance the prosecution of PFAS-related claims nationwide.

Discovery and expert efforts in this MDL benefitted from work conducted in PFAS litigation prior to the formation of the MDL.⁵⁸ Rather than duplicate existing discovery efforts that had previously been undertaken in PFAS cases outside of the AFFF MDL, Plaintiffs' counsel devised novel ways to accommodate this discovery in this AFFF MDL. For example, deposition transcripts of DuPont witnesses taken in the C8 MDL were reproduced and made available for use in this MDL. Access to these deposition transcripts allowed for a more efficient and streamlined approach to deposing the DuPont witnesses in this MDL, because counsel knew what testimony already existed, and thus could focus on eliciting testimony related to undiscovered areas of inquiry only, such as, DuPont's role in the AFFF market specifically rather than PFAS more broadly.

Similarly, legacy expert discovery from the C8 MDL benefitted this MDL. This is because many of the experts who provided testimony in that litigation likewise proffered expert opinions in this MDL and brought their prior PFAS knowledge to bear in this MDL.⁵⁹ Of course, the same is true for counsel in the C8 MDL who are also counsel in this case. Not surprisingly, much of that prior litigation was conducted by counsel who attained leadership positions in this MDL as well

of approximately 3500 cases alleging harm from PFOA exposure emitted from DuPont's Washington Works plant).

⁵⁶ London Decl., at ¶ 14.

⁵⁷ London Decl., at ¶ 15.

⁵⁸ London Decl., at ¶¶ 8-9, 15-16, 36, 39.

⁵⁹ The following disclosed Plaintiffs' experts likewise served as experts in the C8 MDL: Dr. Michael Siegel, Dr. Barry Levy, Dr. David MacIntosh, Mr. Robert Johnson and Mr. Stephen Petty.

as lead critical committee and other litigation roles. The cumulative effect of this prior PFAS litigation, and the institutional knowledge garnered from it, was to make the prosecution of this case more efficient than otherwise could have been, which undoubtedly saved thousands of hours of additional attorney time that would have been necessary had these prior efforts not been undertaken.

Other counsel also brought invaluable depth of experience in environmental litigation. For almost three decades, some of these counsel have represented public water providers in cases against the manufacturers of chemical products whose release contaminated water supplies. These lawyers' fluency in the language of water system operation, contaminant treatment, and complex products liability litigation efficiently gave the PEC an appreciation of the claims and context that would otherwise take years to acquire. They also shared established relationships with leading environmental experts, who are well-versed in designing treatment systems for public water providers. And, critically, they contributed to the PEC an advanced understanding of water provider Plaintiffs, their damages, and how to structure a settlement that reflects these Plaintiffs' needs.

In sum, having knowledgeable and experienced counsel appointed by the Court to leadership roles clearly benefited the overall conduct of this litigation and accelerated its successful resolution.

2. Plaintiffs' Counsel Conducted Discovery on a Massive Scale Efficiently Despite a Global Pandemic.

Surprisingly, the global COVID-19 pandemic, horrific and life-altering in so many ways, created an opportunity for efficiency in time spent conducting common benefit work, and resulted in significant cost savings for the PEC and all Plaintiffs. Specifically, shortly after the pandemic and ensuing lockdown began, this Court issued one of the nation's first protocols for remote

depositions without which this litigation might have to come to a complete halt.⁶⁰ Although navigating largely uncharted waters in this regard, and as is described more fully below and in supporting declarations, pursuant to CMO 11, the PEC demonstrated an exceptional ability to effectively and efficiently conduct dozens of complex depositions, which required the review of millions of pages of documents. CMO 11 provided a protocol that largely avoided any undue delays and enabled the PEC to prosecute the case expeditiously on behalf of the entire MDL despite the pandemic. It is indisputable that the remote format saved countless of hours of attorney time and extraordinary expense.⁶¹

B. THE COMMON BENEFIT WORK PERFORMED FROM THE ESTABLISHMENT OF THE AFFF MDL THROUGH AUGUST 22, 2023 SURMOUNTED A MYRIAD OF NOVEL AND DIFFICULT LEGAL QUESTIONS.

On December 7, 2018, the JPML transferred the AFFF MDL to the District of South Carolina. 62 The first Status Conference in the AFFF MDL was held on February 25, 2019, 63 after which this Court entered two Orders appointing Plaintiffs' Co-Lead Counsel, Liaison Counsel, the first slate of Plaintiffs' Executive Committee members and Advisory Counsel to the PEC ("Leadership Counsel"). 64, 65

 60 CMO 11, as amended by CMOs 11A-B, ("Remote Deposition Protocol")[ECF Nos. 680, 1173 and 1778]; *see also*, London Decl., at \P 45-48.

.. ...

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⁶¹ London Decl., at ¶ 47.

⁶² MDL Transfer Order No. 2873 [ECF No. 1].

⁶³ Case Management Order ("CMO") No. 1 [ECF No. 3].

⁶⁴ CMO Nos. 2 and 3 [ECF Nos. 28 & 72]. CMO 3 added four (4) additional firms to the initial slate of PEC firms.

⁶⁵ London Decl., at $\P\P$ 3, 9, 13, 24-33.

Plaintiffs' Leadership Counsel initially included twenty-five (25) Leadership firms. ⁶⁶ As the MDL went on, while some lawyers resigned, the total number of PEC firms for the 2022-2023 Term expanded to include twenty-eight (28) firms. ⁶⁷

Leadership Counsel were collectively charged with prosecuting the litigation for the common benefit by conducting all pretrial discovery on behalf of Plaintiffs in the MDL, organizing regular meetings of Plaintiffs' counsel and representing their interests as spokespersons at all pretrial proceedings, and finally, engaging in a multitude of actions, such as the submission of motions, stipulations, development of settlements and every other task necessary and proper to accomplish these responsibilities.⁶⁸

To carry out these duties and responsibilities, Leadership Counsel enlisted various PEC firms and other common benefit attorneys to assist.⁶⁹ To effectively manage this massive workload

⁶⁶ *Id*.

⁶⁷ CMO 24 [ECF No 2259].

⁶⁸ CMO 2 [ECF No. 48], 6-8 (setting forth the specific responsibilities assigned by the Court); *see also*, London Decl. at ¶¶ 29-33, 107-113, 117.

⁶⁹ London Decl. at ¶ 30.

of prosecuting this sprawling litigation, the PEC and other common benefit attorneys were subdivided into committees with discrete responsibilities:^{70, 71}

⁷⁰ These Committees included:

- (1) Law & Briefing Committee
- (2) Science Committee
- (3) Public Water Provider Committee
- (4) Private Water Provider Committee
- (5) Medical Monitoring Committee
- (6) Property Damage Committee
- (7) State/Sovereign Claims Committee
- (8) Personal Injury Committee
- (9) Discovery Committee
- (10) Privilege Challenge Committee
- (11) Redactions/De-Designations Committee
- (12) Fact Sheet Committee
- (13) Third-Party Discovery Committee
- (14) Defendant Identification/Dossier Committee
- (15) Government Contractor Committee
- (16) Document Review Management Committee ("DRMT")
- (17) DuPont Fraudulent Conveyance Committee, and
- (18) Legislative Committee.

Over the course of the MDL, these original committees were supplemented with the following additional committees:

- (19) Market Share
- (20) Personal Injury Bellwether Trial Team Committee (*Leach* injuries)
- (21) Turn Out Gear Plaintiff Injury Committee
- (22) DOJ Immunity Motions Committee
- (23) Communications Committee
- (24) Kidde Bankruptcy Committee
- (25) Water Provider Bellwether Selection Committee
- (26) Tier One Water Provider Bellwether Team
- (27) Tier Two Water Provider Bellwether Team
- (28) City of Stuart Trial Team
- (29) Telomer Water Provider Trial Team
- (30) Telomer Water Provider Bellwether Team
- (31) Settlement Team

⁷¹ London Decl., at ¶¶ 20-33.

Each committee was either chaired co-chaired by multiple common benefit attorneys whose responsibilities include coordinating the committee's internal efforts as well as liaising with Co-Lead Counsel regarding the status of tasks assigned to the respective committees. Throughout the course of the MDL, these committees' collective efforts constituted essential common benefit work without which the litigation would not have been successfully prosecuted with such alacrity. Perhaps no committee was more important than an *ad hoc* committee comprised of key members selected from the various committees. Established prior to the Court's Science Day, the "Strike Force," its colloquial moniker, was established for the purpose of coordinating the efforts of all committees, with a singularity of purpose, to allow for the nimble prosecution of the litigation, efficient coordination and effective communication as across all aspects of the MDL. 73

Given the tremendous work performed by these committees over the course of this MDL through August 22, 2023, it would be impossible to delineate every item of common benefit work. Below, however, Class Counsel have sought to identify highlights of these collective efforts.

For proper context, it is imperative to underscore that the liability efforts with respect to each Defendant helped make the liability case as against *the other* Defendants. There is such inextricable interplay between each Defendants' liability that it would be impossible to parse specific efforts that relate only to one Defendant and played no role in the larger overall liability picture. In fact, documents and other evidence produced by one Defendant often helped buttress the liability case as against another Defendant.

For example, in one email correspondence between DuPont witness, Dr. Stephen Korzeniowski and his DuPont colleague, Charles K. Taylor, they discussed their perspective that

⁷² *Id.* at ¶¶ 34, 52, 90-93.

⁷³ Douglas Decl., at ¶¶ 6-7.

3M's market withdrawal from C8-chemistries was not voluntary, but rather, "staged."⁷⁴ This correspondence between Dr. Korzeniowski and Mr. Taylor provided a liability theme that the PEC fully discovered and prosecuted, that is, that 3M's withdrawal from the C8-chemsitry market was not as voluntary as 3M suggested. This allowed Plaintiffs to undercut 3M's argument that it had acted as an exemplary environmental steward in phasing out of C8 chemistries. Similarly, congressional testimony from DuPont witness, Daryl Roberts, solidified the PEC's general understanding that "PFAS chemicals used in firefighting foams... particularly PFOS-based firefighting foams, are the main cause of drinking water contamination with PFAS..."

Testimony from 3M's long-time chief toxicologist, John Butenhoff, Ph.D., helped shore up the liability case against DuPont by making clear that 3M always shared its historic toxicology data regarding PFOS and PFOA with DuPont. ⁷⁶

Similarly, Anne Regina testifying on behalf of Defendants Kidde-Fenwal, Inc. ("Kidde") and National Foam, Inc. ("National Foam"), acknowledged that, as of the year 2000, she had access to 3M's toxicology data as well.⁷⁷ This arguably put Kidde on notice of the totality of toxicology data concerning the potential harms of both PFOA and its precursor products, including C8-based fluorosurfactants, which were often incorporated into both Kidde and National Foam's AFFFs.

Liability with respect to AFFF concentrate manufacturers, like Kidde, National Foam, Tyco/Chemguard and Buckeye, was also clearly intertwined with the liability of fluorosurfactant suppliers, such as DuPont, Dynax, Chemguard, and BASF as successor-in-interest to Ciba-Geigy, among others, who manufactured the C8-based fluorosurfactants that were incorporated into these

⁷⁴ Deposition of Stephen Korzeniowski, at 341:18-348:10, (discussing exhibit DL262 and how 3M played the EPA so that their C8 market withdrawal would look voluntary), relevant pages attached as Ex. M.

⁷⁵ Congressional Testimony of Daryl Roberts, attached as Ex. N

⁷⁶ Deposition of John Butenhoff, at 155:2-156:2 [ECF No. 2597-6].

⁷⁷ Deposition of Anne Regina, at 191:11-193:9 [ECF No. 2597-17].

companies' respective AFFFs. Adding even more layers to this complicated amalgam, the liability of every AFFF fluorosurfactant manufacturer who purchased PFOA precursor intermediates from companies such as Daikin, Clariant Corporation, AGC Chemicals and Archroma was likewise inextricably interlinked. In fact, even toll manufacturers' liability was s similarly immersed with the Defendants at every other level of the AFFF market channels.

Finally, the AFFF-industry group, the Fire Fighting Foam Coalition ("FFFC"), acted as a collaborative mouthpiece and combined knowledge center for all Telomer-Defendants, which further intertwined the Telomer-Defendants' liability with one another, illustrating how these Defendants' liabilities were not separate and distinct but rather had to be considered collectively. In short, the development of both the science and liability evidence as it pertains to each of the various Defendants cannot reasonably be separated.⁷⁸

Exemplar Case Management/Leadership-Related Efforts That Helped Resolve this Massive Case and the Difficult and Novel Questions Presented Therein.

Throughout the pendency of this MDL, Co-Lead Counsel organized, coordinated, and oversaw the various committees, advocated on behalf of the PEC at each CMC, liaised with defense counsel to negotiate CMOs, advised all PEC and other counsel of litigation developments, and worked to establish the administrative protocols and foundational frameworks for the litigation.⁷⁹

As part of these efforts, Co-Lead Counsel oversaw the entry of sixty-six (66) CMOs, many of which were heavily negotiated with opposing counsel over months-long periods of time. ⁸⁰ Take for example CMO 5, which governs the procedure, form and schedule for the completion of Fact

⁷⁸ Douglas Decl., at ¶¶ 11-15.

⁷⁹ London Decl., at ¶¶ 107-112.

⁸⁰ *Id.* at ¶¶ 3, 34-37, 56-63, 111.

Sheets.⁸¹ The draft of this CMO was so contested the Parties had to submit to the Court lengthy memoranda to justify their interpretation of the proper fact sheets, a crucial foundational discovery device needed for individual case-specific facts.⁸²

A sampling of other critical CMOs that governed both administrative protocols and foundational discovery issues, which Co-Lead Counsel negotiated and/or oversaw the implementation of, include, *inter alia*: 83

Case	Description	
Management		
Order		
CMO 3	The Common Benefit Order ⁸⁴	
CMO 4	The Protective Order & ESI Order governing confidentiality and electronically stored information ⁸⁵	
CMO 5	The order governing the procedure, form and schedule for the completion of Plaintiff and Defense Fact Sheets ⁸⁶	
CMO 6	The order governing alternative service of process ⁸⁷	
CMO 8	The protocol for privileged information ⁸⁸	
CMO 9	The procedure for the exchange of documents received by a party pursuant to a subpoena 89	
CMO 11	The Remote Deposition Protocol ⁹⁰	
CMO 13	The bellwether selection process for the Water Provider Plaintiffs ⁹¹	
CMO 19	The pretrial schedule of first water provider bellwether: City of Stuart v. 3M Company ⁹²	
CMO 22	The protocol for expert witness depositions ⁹³	
CMO 26	The Order governing a second class of bellwether cases (alleging personal injuries) ⁹⁴	

⁸¹ CMO 5 [ECF No. 205].

⁸² London Decl., at ¶ 37.

⁸³ *Id.* at ¶¶ 3, 34, 35-37, 58-63, 111.

⁸⁴ CMO 3 [ECF No. 72].

⁸⁵ CMO 4 [ECF No. 99].

⁸⁶ CMO 5 [ECF No. 205].

⁸⁷ CMO 6 [ECF No. 355].

⁸⁸ CMO 8 [ECF No. 392].

⁸⁹ CMO 9 [ECF No. 524].

⁹⁰ CMO 11 [ECF No. 680].

⁹¹ CMO 13 [ECF No. 1049].

⁹² CMO 19 [ECF No. 1844].93 CMO 22 [ECF No. 2170].

⁹⁴ CMO 26 [ECF No. 3080].

While certain of these CMOs are routine in nature and commonplace in most MDLs, others required innovative thinking to meet the unique and emergent challenges of the day. For example, CMO 11, the Remote Deposition Protocol, was entered by the Court in April 2020 in the height of the COVID-19 pandemic. This CMO was entered "...to enable the parties to proceed with discovery efficiently and with due regard for the health and safety of witnesses, court reporters/videographers, counsel, and parties during the ongoing COVID-19 pandemic..." How the Comparison of CMO 11 allowed the Parties to conduct depositions remotely though the Zoom platform, have deposition exhibits in advance of depositions to allow the witness to have hard copies of potential deposition exhibits, have a seamless transition from in-person depositions to a remote protocol. How As set forth in greater detail below, the PEC and other common benefit attorneys conducted all but five (5) of the non-bellwether case-specific depositions remotely rather than in-person. This not only resulted in a pioneering solution to a unique litigation obstacle, but also had the added benefit of saving thousands of dollars in travel costs, lodging expenses, and attorney time.

To assist the Court in administering this MDL, Co-Lead Counsel advocated on behalf of the PEC at forty-five (45) CMCs, and prepared Joint Status Reports ("JSRs") in advance of each conference. ¹⁰³ The monthly JSRs provided the Court and every litigant a detailed analysis of the discovery status of each Defendant, including the United States, an update on the total number of

⁹⁵ London Decl., at ¶ 45.

 $^{^{96}}$ CMO 11, at ¶ 1.

 $^{^{97}}$ *Id.* at ¶ 5.

 $^{^{98}}$ *Id.* at ¶ 8.

 $^{^{99}}$ *Id.* at ¶ 10.

¹⁰⁰ London Decl., at ¶¶ 45-47.

 $^{^{101}} Id$

 $^{^{102}}$ *Id.* at ¶ 47.

 $^{^{103}}$ *Id.* at ¶¶ 107, 117.

documents produced in the litigation with respect to Defendants and third-parties, the total number of depositions taken (expert and fact), a report on both related and unrelated PFAS cases pending outside of the MDL, a status of bellwether efforts, an outline of any arising disputes between the Parties, and a status of Fact Sheet production. ¹⁰⁴ More recently, the JSRs included the status of settlement efforts, as well as an update on the Kidde-Fenwal, Inc.'s ("Kidde") bankruptcy proceedings. The benefits of preparing and presenting a JSR were plentiful. Not only did the regular gathering and reporting of information require Co-Lead Counsel to maintain open channels of communication on all fronts, but it also provided an efficient mechanism to keep the Court apprised of all litigation matters both historically and in real-time as they developed. ¹⁰⁵ Lastly, it provided the Parties with a consistent mechanism to raise disputes related discovery, bellwethers, case management or anything litigation related. The JSR process was terrific tool to aid in the efficient management and advancement of this MDL

Co-Lead Counsel also spearheaded additional efforts in prosecuting the litigation, including an analysis of DuPont's liability share in the AFFF marketplace ¹⁰⁶ as well as leading the charge with respect to the coordination of DOJ's forthcoming jurisdictional motions. ¹⁰⁷

Finally, prior to and after the COVID-19 lockdown, Co-Lead Counsel organized in-person PEC meetings around the scheduled CMCs. While during the COVID-19 lockdown, CMCs were held telephonically. Co-Lead held monthly PEC calls on the first Tuesday of every month to ensure that all PEC counsel was kept apprised of the litigation. The sum total of these efforts allowed Plaintiffs' counsel to maintain collegiality and momentum, and to run the litigation smoothly and

 $^{^{104}}$ *Id.* at ¶¶ 43, 107-109.

 $^{^{105}}$ *Id.* at ¶ 107.

¹⁰⁶ Napoli Decl., at ¶¶ 53-57; see also, Summy Decl., at ¶¶ 10, 24-25.

¹⁰⁷ Napoli Decl., at ¶¶ 45-52.

¹⁰⁸ London Decl., at ¶¶ 34, 48.

efficiently despite a demanding deposition and bellwether schedule, a fast-paced trial schedule, and a voluminous discovery record, in the midst of a raging global pandemic. 109

Exemplar Strike Force-Related Efforts That Assisted in the Resolution of Novel and Difficult Questions Raised in this MDL and Greatly Impacted the Results Obtained.

The Strike Force, ¹¹⁰ co-chaired by Gary Douglas of Douglas & London, P.C., Scott Summy of Baron & Budd, and Phillip Cossich of Cossich, Sumich, Parsiola & Taylor, created in advance of the Court's Science Day, has been central and critical to the prosecution of this MDL because it was formed to oversee nearly all aspects of this MDL, including coordinating across all committees with respect to the overall liability picture, the briefing efforts, the efforts to overcome the government contractor defense, and trial preparation efforts. ¹¹¹

The Strike Force worked in tandem with the Science Committee to develop the science necessary to prosecute the case, and with the Discovery Committee to establish liability with respect to each Defendant. In so doing, the Strike Force and its members fully handled, participated in and/or oversaw the coordination of 82 depositions of corporate witnesses, 7 government witness depositions, and 12 defense expert witness depositions, and defended 14 Plaintiff expert witnesses in their depositions and 56 depositions of bellwether Plaintiff witnesses. The importance of having the Strike Force integrally involved in each of these

 $^{^{109}}$ London Decl., at ¶¶ 45-65.

¹¹⁰ The members of this core team, a/k/a the Strike Force, are also members of other PEC-appointed committees such as the Science Committee, Law & Briefing Committee, and Discovery Committee and included (and continue to include), Gary Douglas, Rebecca Newman, Lara Say, Tate Kunkle and Anne Accetella of Douglas & London; Neil McWilliams and Wesley Bowden of Levin Papantonio; Christina Cossich, Brandon Taylor and Phillip Cossich of Cossich, Sumich, Parsiola & Taylor, LLC; Scott Summy, Carla Burke Pickrel, Celeste Evangelisti, of Baron & Budd; and Frederick Longer of Levin, Sedran & Berman, among others at different times. Douglas Decl., at 3 n.2.

¹¹¹ Douglas Decl., at \P 6-7.

¹¹² Douglas Decl., at ¶ 6.

¹¹³ Douglas Decl., at ¶ 16.

depositions, along with other common benefit attorneys, cannot be overemphasized because it ensured that no committee was ever working in a silo, at cross purposes with any another committee and/or undermining any other MDL efforts. In short, it allowed for consistency of message and narrative with respect to both overall liability and regarding each individual Defendant liability.

Similarly, the Strike Force worked cohesively with the Science Committee to participate and coordinate in the initial service of nine (9) general expert reports and twelve (12) case-specific expert reports, and one (1) expert report with a general sub-part and three (3) case-specific sub-parts, as well as multiple supplemental reports¹¹⁴ as the regulatory landscape changed and trial approached. Moreover, Defendants identified 50 experts, for which the Strike Force was responsible for reviewing, summarizing, and creating defense expert dossiers. Again, the Strike Force was then able to share this knowledge with other relevant committees as different issues arose over the course of the MDL.

Many of the members of the Strike Force were also members of both the Government Contractor Committee and the *Stuart* Trial Team, those exemplary efforts are both set forth below and in the annexed Douglas Declaration but include, *inter alia*, with respect to the government contractor defense: reviewing thousands of pages of documents pertaining to what the Government and Defendants knew (and when) with respect to the harms posed by PFAS, eliciting deposition testimony necessary to overcome the government contractor defense and developing necessary subject-matter themes that later became the backbone of Plaintiffs' briefing. With respect to *Stuart* Trial Team efforts, the Strike Force, along with trial counsel, was responsible for the

¹¹⁴ Douglas Decl., at ¶ 21.

¹¹⁵ Id

¹¹⁶ Douglas Decl., at ¶¶ 22-30.

drafting and/or coordination of direct witness examinations, dispositive motion practice, exhibit lists, deposition designations, jury questionnaires, exhibit objections, evidentiary motions, opening statements, among other trial-related efforts. 117

The Strike Force's efforts cross-pollinated every aspect of this case to make for a cohesive prosecution along with common benefit attorneys working on this MDL from across the nation. Its management, participation and oversight allowed for a highly streamlined and singularly honed approach, a unique function that critically served the needs of the case.

Exemplar Science Committee-Related Efforts that Developed the Complex Scientific Support to Prove Defendants' Culpability.

Considering the breadth of PFAS's impact, the Science Committee, Co-Chaired by Scott Summy of Baron & Budd, Gary Douglas of Douglas & London, Christina Cossich of Cossich Sumich, Parsiola & Taylor, LLC, and Robert Bilott of Taft, Stettinius & Hollister, LLP, faced great challenges. By necessity, it had to develop experts across a wide range of scientific disciplines: epidemiology, hydrology, fate and transport, risk assessment, analytical chemistry, public health, PFAS health effects, industrial hygiene, toxicology, environmental engineering and PFAS treatment and remediation. Thanks to the able work of its committed members an assemblage of world-class experts was identified, vetted and retained. 118

When the Court wisely decided to order there to be a Science Day in October 2019, the Science Committee, in concert with the Strike Force, was ready and able to demonstrate the type of evidence available to support Plaintiffs' claims. To do so, the PEC presented three (3) experts

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¹¹⁷ Douglas Decl., at ¶¶ 37-50.

¹¹⁸ With respect to expert retention, the PEC and the Science Committee collectively have forged a multi-layer tactical approach, which has kept consistent pressure on all Defendants, and thereby allowed every aspect of the case to advance despite the bellwether efforts specifically targeting water provider Plaintiffs.

on the following topic areas: 119

- <u>Dr. David MacIntosh</u> presented on the scientific basis for drinking water advisories; and explained why the existing standards vary by jurisdiction. Dr. MacIntosh also presented on the scientific processes for assessing potential toxic effects on humans including toxicological and epidemiological studies, exposure assessments, risk assessments and medical monitoring.
- <u>Dr. Christopher Higgins</u> presented on the scope of PFAS contamination of drinking water; the methods, costs and effectiveness of remediation technology; and the availability of products alternative to AFFF that could effectively extinguish liquid hydrocarbon fires without PFOS or PFOA as ingredients.
- **<u>Dr. Robert Bahnson</u>** presented data relating to the diseases or conditions caused uniquely or primarily by exposure to PFOS and PFOA.

The process of preparing these experts to testify before the Court began in May 2019. Many trips to Boston, MA, Golden, CO, and Columbus, OH, for meetings with these experts occurred over the course of approximately five months. ¹²⁰ This gargantuan effort culminated in the Court's Science Day of October 4, 2019, after the original hearing was postponed due to Hurricane Dorian. Of course, counsel had prepared and met with experts for weeks in advance of the originally scheduled Science Day as well.

Beyond these three (3) highly regarded experts, the Science Committee met with and retained the well-known and highly-esteemed scientist, Linda Birnbaum, PhD, a board-certified toxicologist, microbiologist, and former federal scientist for over forty (40) years with both the EPA and the National Institutes of Environmental Health Sciences ("NIEHS"). ¹²¹ Dr. Birnbaum has nearly twenty (20) publications on PFAS, and has been conducting PFAS studies herself since the 1980s. ¹²² She offered the opinions in this MDL that PFOA and PFOS are toxic to humans, that all reasonable efforts to reduce exposure should be employed, and that EPA's actions with respect

¹¹⁹ Bowden Decl., at ¶¶ 7, 10-14.

¹²⁰ Douglas Decl., at ¶ 8.

¹²¹ Bowden Decl., at ¶ 18(a).

¹²² Curriculum Vitae of Linda S. Birnbaum, Ph.D., D.A.B.T., A.T.S., attached as Ex. O.

to PFAS regulatory standards are appropriate.¹²³ Few in the world are as highly regarded when it comes to PFAS as Dr. Birnbaum. Obtaining her agreement to testify on behalf of the Plaintiffs early on in the MDL's history is a little noted but major accomplishment achieved by the Science Committee.¹²⁴

Other world-renowned PFAS experts, like Jonathan W. Martin, PhD, were also retained. ¹²⁵ Dr. Martin is a professor at Stockholm University and an expert in environmental analytical chemistry with a long-standing PFAS history. ¹²⁶ He has been conducting research on various aspects of PFAS for over twenty years, ¹²⁷ and has published on the subject over 180 times. ¹²⁸ In addition to supporting core liability theories, Dr. Martin proffered case-specific opinions in each of the Tier Two bellwether cases.

Adjunct to the Science Committee's work with Dr. Martin to develop his testimony was extensive environmental sampling efforts at all ten (10) of the Tier One Water Provider bellwether sites. 129 This began in June 2021. An independent laboratory, Eurofins Laboratory ("Eurofins"), was contracted to analyze PFAS water samples collected at each bellwether location. This testing enabled Dr. Martin to opine as to the relative contribution of PFOA contamination at each bellwether site as between 3M and the Telomer Defendants. Dr. Martin used the samples to differentiate other Defendants' PFOA isomer profile from 3M's "off-the-shelf" PFOA, 130 which the Science Committee obtained from 3M.

In total, the Science Committee, along with the Strike Force, worked-up fourteen (14)

¹²³ Bowden Decl., at ¶ 18(a).

¹²⁴ London Decl., at ¶ 42.

¹²⁵ Bowden Decl., at ¶ 18(b).

¹²⁶ Curriculum Vitae of Professor Jonathan W. Martin, Ph.D., attached as Ex. P.

 $^{^{127}}$ Id.

¹²⁸ Bowden Decl. at ¶ 18(b).

¹²⁹ Douglas Decl., at ¶ 32.

¹³⁰ *Id*.

experts who, in March 2022, produced twenty-two (22) expert reports on numerous subject matters, as below.¹³¹

- (1) Greg Walton (Chemical Engineering)
- (2) Dr. Michael Siegel (Public Health / Standard of Care / Epidemiology)
- (3) Dr. Linda Birnbaum (Toxicologist / Regulatory)
- (4) Three (3) case-specific expert reports from Dr. Christopher Higgins (Analytical Chemistry)
- (5) Dr. Ronald Kendall (Toxicology)
- (6) Dr. David MacIntosh (Toxicology)
- (7) Steven Petty (Industrial Hygiene)
- (8) Three (3) case-specific expert reports from Anthony Brown (Hydrology)
- (9) Three (3) case-specific expert reports from Kevin Berryhill (Treatment and Remediation)
- (10) Robert Johnson (Forensic Economist)
- (11) Dr. Barry Levy (Public Health / Standard of Care)
- (12) Dr. Patrick Lowder (Patent and Chemistry)
- (13) Dr. Anthony Travis (Analytical Methods of PFAS Detection)
- (14) Dr. Jonathan Martin (PFAS isomer profiling and detection of PFAS in blood)¹³²

Each expert was deposed by defense counsel. The Science Committee, in concert with the Strike Force, defended all fourteen (14) of its experts, which spanned twenty-one (21) days of testimony, and also conducted the depositions of twelve (12) defense experts.¹³³

Apart from the publicly disclosed experts, the PEC also retained consulting experts to advise on other matters. ¹³⁴ In total, over thirty (30) experts were retained in both consulting and testifying capacities on topics relating to the DuPont and 3M settlements, the Kidde bankruptcy, various personal injury health effects experts, and in connection with the DuPont fraudulent transfer claims. ¹³⁵

Finally, throughout the pendency of the litigation, the Science Committee regularly kept

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¹³¹ Subsequent to the original expert report deadline, Plaintiffs supplemented their expert opinions with additional expert reports from Mr. Berryhill, Mr. Johnson, Dr. Birnbaum and Dr. MacIntosh.

¹³² Bowden Decl., at ¶¶ 8, 15-18.

¹³³ Douglas Decl., at ¶ 35.

¹³⁴ Bowden Decl., at ¶ 8.

¹³⁵ *Id*.

the Court apprised of scientific developments related to PFOA and PFOS. To this end, the Science Committee submitted nine (9) update letters to the Court as part of these ongoing efforts. ¹³⁶ In an environmental contamination case of worldwide dimension, it was obvious that the backbone of the prosecution of this case would be supported by the Science Committee. Their work assuredly conferred substantial common benefit to every litigant and responded swiftly to novel and difficult scientific questions.

Exemplar Discovery Committee-Related Efforts that Greatly Impacted the Labor and Time Expended in this MDL Especially Given the Novel and Complex Nature of Such Discovery

Since the inception of this MDL, the PEC knew that discovery would be voluminous. Many factors contributed to this: (a) the sixty-plus year history of evidence to review; (b) the vast number of Defendants named in Plaintiffs' various lawsuits; (c) the involvement of the United States and various of its agencies, including the Department of Defense ("DoD"), and the armed forces; and (d) the significant number of third parties whose evidence would be needed. 137

I. The Complexity of the MDL Required a Massive Amount of Discovery.

The discovery undertaken by the PEC in the four-plus years of this MDL, three of which occurred during the lock-down period of the Covid-19 pandemic, is nothing short of incredible. Within six months of the creation of the MDL, the PEC carefully drafted and served sixty-one (61) interrogatories and one hundred four (104) requests for production of documents (collectively "Master Set") on eighteen (18) of the predominant Defendants and the United States. In 2020, the PEC served six (6) new Defendants with Master Sets of discovery demands. In 2021, the PEC served an additional four (4) new Defendants with Master Sets of discovery demands. Throughout 2020-2021, the PEC served dozens more second and third sets of interrogatories, document

¹³⁶ London Decl., at ¶ 52, n. 26.

 $^{^{137}}$ *Id.* at ¶ 32.

demands and requests for admissions, to leave no stone unturned. 138

Notably, many of the Defendants are unique in what they manufactured, when they manufactured their respective products, and how they manufactured them. Given this complexity, attorneys working on discovery demands were often required to do significant research to obtain enough knowledge of a Defendants' history to craft discovery that would adduce useful information. To complete discovery, PEC attorneys routinely engaged with Defendants' counsel regarding search terms, custodians and privilege issues. Each discovery response was reviewed for deficiencies and where they existed a Discovery Committee member challenged them.

Because of the Defendants' early reliance on the government contractor defense, a tremendous amount of discovery had to be obtained from the United States. ¹³⁹ Setting aside issues of national security and coordinating the staging of discovery with Defendants, the number of federal agencies involved in discovery was remarkable. Examples include the DoD, the Air Force, the Navy, the Naval Research Laboratory ("NRL"), Naval Facilities Engineering Systems Command ("NAVFAC"), the EPA, and the Food and Drug Administration. ¹⁴⁰

In addition to Defendant and United States discovery, the PEC devoted an entire team of attorneys, headed by Andrew Cvitanovic, Esq. of Cossich, Sumich, Parsiola & Taylor, LLC, for the collection of third-party discovery. The third-party discovery team served over one hundred-seventy (170) subpoenas. Many of these required extensive follow-up and negotiations with counsel to obtain the sought-after productions. ¹⁴¹ Third-party subpoenas served on FluoroCouncil, National Fire Protection Association, Cottrell Associates, Inc., Elkhart Brass, Inc, Aqueous Foam Technology, Inc. and the FFFC resulted in vital evidence for the PEC and for bellwether Plaintiffs.

¹³⁸ London Decl., at ¶ 67.

¹³⁹ Napoli Decl. at ¶¶ 25-19, 35-37, 40.

¹⁴⁰ Napoli Decl., at ¶¶ 25, 35-36.

¹⁴¹ London Decl., at ¶¶ 41, 48.

Many of the subpoenas targeted and obtained critical information from distributors related to product identification, product warnings, and intended use of AFFF. Documents from distributors showed what products were being used and where, what warnings were conveyed to end users, and how distributors directly informed purchasers to use AFFF.

An additional extensive project undertaken by Plaintiffs' counsel was the maintenance and collection of Plaintiff Fact Sheets ("PFS") and Defendant Fact Sheets ("DFS") through a Fact Sheet Committee ("FSC"). In July 2019, the FSC provided a list of all sites then at issue in the MDL to the Defendants as part of a proposed DFS process. ¹⁴² With the entry of CMO 5 on August 7, 2019, the FSC began providing monthly site lists to Defendants, triggering a DFS response from each Defendant for each site. The first DFSs were served in November 2019 and at that time the FSC began reviewing and analyzing the responses. This analysis included reviewing the DFSs for deficiencies, identifying third-parties such as distributors from which to seek further discovery, and identifying certain products used at a site and locating the referenced records. ¹⁴³

In December 2019, the FSC (Frederick Longer and Charles Schaffer of Levin, Sedran & Berman and Christiaan Marcum of Rogers, Patrick, Westbrook and Brickman and Lisa Greenberg of Douglas & London) had already amassed 255 DFSs before recognizing that consolidating them into a master spreadsheet would better benefit all Plaintiffs. The PEC then created and maintained a portal where Plaintiffs' counsel could access the master spreadsheet and DFSs for the sites applicable to their case. ¹⁴⁴ In April 2020, the FSC presented a tutorial on the DFS process to all Plaintiffs' counsel and presented their analysis of the DFS productions. Every month the FSC compiled site lists from Plaintiff's counsel (sometimes including hundreds of sites), notified the

¹⁴² London Decl., at ¶ 37, n. 17.

 $^{^{143}}$ Id.

¹⁴⁴ *Id*.

Defendants of new Plaintiff sites, and analyzed DFSs as they are received. The FSC brought, and continues to bring, great value to all Plaintiffs' case by helping to make case-specific evidence accessible to all Plaintiffs.

II. Document Review and Coding

Shortly after the creation of the MDL, in early 2019, the Document Review Management Team ("DRMT"), a committee headed by Staci Olsen of Baron & Budd, Stephanie Biehl of Sher Edling, and Tate J. Kunkle of Douglas & London, formed to lead document review and document database management, researched and interviewed ESI specialists to assist with the coordination and review of document productions. ¹⁴⁵ Ultimately, the DRMT selected Everlaw as the document review platform to be used by the PEC for the hosting of various document productions as well as to review and code these productions. ¹⁴⁶

After Everlaw was selected as the e-discovery platform, the DRMT set up the coding for numerous Defendants and issues, trained document reviewers, assembled reviewer teams, and instituted standard procedures for upload and management of documents, which included Defendants' document productions, third-party documents, Plaintiff bellwether documents, deposition transcripts and exhibits, and PEC work-product. Further, the DMRT drafted and organized a coding manual and background materials on AFFF and PFAS to train each reviewer to properly code documents. 148

Once the Defendants' documents were produced, the DRMT hosted an in-person training session which over fifty (50) attorneys attended in Dallas, Texas in the Fall of 2019. Additional

 $^{^{145}}$ Olsen Decl. at \P 8.

 $^{^{146}}$ Olsen Decl. at ¶ 9.

 $^{^{147}}$ Olsen Decl. at ¶ 10.

¹⁴⁸ Olsen Decl. at ¶ 11.

in-person and remote training sessions continued into 2020. ¹⁴⁹ To maintain comradery and synergy in the Covid era, the DRMT hosted weekly Zoom calls with the reviewers to answer questions, discuss the coding of documents, present new information on key topics, and to further educate and assist the reviewers. ¹⁵⁰ More recently, as more focused needs arose, the DRMT hosted weekly and monthly small group calls for Tier 2 document reviewers, Defendant-specific teams, deponent-specific teams, and issue-specific review teams. ¹⁵¹ These meetings, whether in-person or over Zoom, yielded better insight and strategies and thus more accurate document review coding, promoted the exchange of ideas among the group, and enabled the reviewers to maintain the pace required by the rigorous deposition and briefing schedules.

The DRMT not only maintained documents produced by Defendants, but also maintained and assigned reviewers for documents produced by over 170 third-party subpoena recipients. The DRMT also coordinated the service of subpoenaed third-party documents on Defendants. 152

In over four years of litigation, the DRMT and over 150 document reviewers effectively and efficiently coded over 4.65 million documents (totaling over 37 million pages). These document reviewers, employees of twenty-one (21) PEC firms, worked tirelessly together on various projects (e.g., custodian review projects for depositions and liability-themed reviews) to support Co-Lead Counsel, the PEC and its various committees. 154

III. Depositions

Beginning in the Summer of 2020, because of COVID-19, PEC counsel began remote depositions. Despite being among the first MDLs to prosecute their claims during a historic global

 $^{^{149}}$ Olsen Decl. at ¶ 12.

¹⁵⁰ Olsen Decl. at \P 13.

¹⁵¹ Olsen Decl. at ¶ 14.

¹⁵² Olsen Decl. at \P 15.

¹⁵³ Olsen Decl. at ¶ 18.

¹⁵⁴ Olsen Decl. at \P 20.

pandemic, the PEC, nonetheless, set an aggressive deposition schedule, sometimes conducting multiple depositions simultaneously.

Over the course of this litigation, the PEC, largely at the direction and with coordination of the Strike Force, conducted 82 depositions of corporate witnesses, seven (7) depositions of United States' witnesses, twelve (12) defense expert witness depositions, defended fourteen (14) Plaintiff expert witnesses in their depositions and defended fifty-six (56) depositions of bellwether Plaintiff witnesses. Many of these depositions were conducted in a very compressed timeframe. Preparation for the depositions required thousands of hours from members of the respective deposition teams. For those depositions conducted by the PEC, Discovery Committee teams would gather all relevant information and documents for the pertinent witness, at times formulate themes and lines of questioning, and organize potential exhibits into themes and subthemes. There were often hundreds of documents coded as "hot" by first round document reviewers from the millions of pages produced, which then necessitated further detailed Tier Two review and would often spur even further searches in the database to flesh out a certain theme. 156

Deposition teams took on the laborious task of marshalling those documents into streamlined, comprehensive themes and sub-themes that pertained to general liability, Defendant-specific liability, underlying science issues, affirmative defenses (*e.g.*, government contractor, as discussed further below), specific witnesses, specific bellwether sites and/or damages. From there, the primary depositions examiners, with assistance from members of the deposition teams, would create outlines for witnesses and topics based on strategy discussed with the larger deposition teams to elicit powerful admissible testimony to establish liability. ¹⁵⁷ The Discovery Committee

¹⁵⁵ Douglas Decl., at ¶ 16.

¹⁵⁶ Douglas Decl., at ¶ 19.

¹⁵⁷ Douglas Decl., at ¶ 20.

has been a consistent presence throughout the litigation. It managed an overwhelming amount of material, made it accessible to all Plaintiffs' counsel, and created an evidentiary tableau par excellence. The arsenal created by the Discovery Committee proved to be an overwhelming factor that drove two Defendants to settle before any disclosure of the trove of material was disclosed at trial.

Exemplar Law & Briefing Committee-Related Efforts that Required a High Level of Attorney Skill to Advocate Effectively and Persuasively and Impacted the Results Obtained.

The Law and Briefing Committee's extensive efforts in this MDL have proven to be reliably supported, amply persuasive, and crucial to the prosecution of this matter. The Law and Briefing Committee, co-chaired by Rebecca Newman of Douglas & London, Carla Burke Pickrel of Baron & Budd, Kevin Madonna of Kennedy Madonna, and Frederick Longer of Levin Sedran & Berman, routinely drafted internal memoranda at the request of Co-Lead Counsel regarding various legal research issues, letters to the Court, CMOs, motions, responses to motions and pleadings, appellate motions and briefs, and were regularly consulted on other strategic plans or documents.

From the outset of this litigation, Defendants touted their government contractor defense as the "kill shot" to Plaintiffs' claims. To meet this existential threat, as early as the Spring of 2019, the Law and Briefing Committee carefully analyzed the case law and creatively identified distinguishing features from the facts in the AFFF MDL record. These insights were spread amongst the PEC and in particular, the attorneys reviewing documents, to enable them to recognize the potential for any particular document to help Plaintiffs overcome the defense. The Law and Briefing Committee's efforts, in parallel with the Discovery Committee and Strike Force, assisted document reviewers with an understanding of the government contractor defense constituted a

¹⁵⁸ Newman Decl., at ¶ 15.

significant part of the Law and Briefing Committee's early efforts, including through in-person training sessions in the Fall of 2019. 159

The MDL docket reveals the Law and Briefing Committee's public filings, but the committee's work extended far beyond the Court docket. ¹⁶⁰ The committee's work was far-reaching into strategies, correspondence between counsel, pleadings and other papers. The charts identified in the attached Newman Dec. ¹⁶¹ outline each briefing effort for which a Court ruling was sought. ¹⁶² The first chart identifies the totality of the affirmative motions made both by members of the Law and Briefing Committee and the *City of Stuart* Trial Team ("Trial Team"), while the second chart identifies Defendants' motions for which members of the Law and Briefing Committee and/or the Trial Team were tasked with responding to or opposing. ¹⁶³

While the annexed charts simply catalogue the many papers prepared by the committee, each document required significant effort on the part of the Law and Briefing Committee, and other common benefit attorneys, and routinely also included administrative support with respect to exhibit annexation, redactions and/or filings under seal. Moreover, given the highly complex nature of the subject matter involved in the AFFF MDL, in order to be effective brief writers, the Law and Briefing Committee had to understand all aspects of the overall litigation, including the complicated scientific, regulatory, and discovery matters.

In this MDL, the Law and Briefing Committee never conducted its work in its own silo, but rather successfully intermingled with each of the other working committee groups in order to be effective written advocates for every committee. Perhaps the best example of this, was the

¹⁵⁹ *Id*.

 $^{^{160}}$ *Id.* at ¶ 7.

 $^{^{161}}$ Ex 1

¹⁶² Newman Decl., at ¶ 10.

¹⁶³ *Id*.

interplay between the Law and Briefing Committee, the Strike Force and the Government Contractor Committees who cohesively teamed-up to successfully overcome the novel and complex questions posed by the government contractor defense. Without the skill and ability of the lawyers on these Committees, Plaintiffs may not have overcome the government contractor defense, which was a landmark result for all Plaintiffs in this MDL.

Exemplar Government Contractor Committee-Related Efforts that Dealt with Unique Legal Issues and Greatly Impacted the Results Obtained.

From the outset of this MDL, Defendants repeatedly underscored that government contractor immunity was the linchpin of their defense. This defense required that Defendants prove three elements: (1) the United States approved reasonably precise specifications; (2) the equipment conformed to those specifications; and (3) the supplier warned the United States about the dangers in the use of the equipment that were known to the supplier but not to the United States. *Boyle v. United Techs. Corp.*, 487 U.S. 500, 512 (1988).

Given the centrality of the defense and pervasiveness for virtually all the Defendants, discovery efforts to overcome it began as early as December 2019, during which time the Discovery and Government Contractor Committees undertook two projects specifically designed to help Plaintiffs fully appreciate the United States' knowledge over time concerning the harms posed by PFAS. These early efforts resulted in the creation of both a timeline regarding government knowledge and a full government dossier, which were modified and updated as discovery proceeded against the United States.¹⁶⁴

By January 2021, the Government Contractor Committee along with the Strike Force turned its attention to identifying specific United States witnesses to be deposed and reviewing the

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¹⁶⁴ Napoli Decl., at ¶ 33.

documents produced related to the identified witnesses. ¹⁶⁵ In this regard, the first United States witness deposition was Robert Darwin, the former Director of the Fire Protections Division of the Naval Seas Systems Command ("NAVSEA"), who was also considered the original custodian of the AFFF military specification ("MIL-F-24385" or "MIL-Spec"). Mr. Darwin's deposition was conducted over the course of three (3) days, April 28-30, 2021. His testimony was critical evidence needed to disprove the defense. ¹⁶⁶

Whether the AFFF MIL-Spec was "reasonably precise" or whether AFFF manufacturers had discretion in manufacturing their own unique AFFF formulations had to be addressed factually. Mr. Darwin's testimony was unequivocal in responding to this inquiry. He testified: "I think the way we've always looked at it is it was up to each manufacturer to come up with his own *magic witch's brew* to meet the performance requirements." With this testimony, it became clear that, at a minimum, it would be an uphill battle for Defendants to prove that the United States' AFFF MIL-Spec dictated specific AFFF formulations.

During the Spring-Fall 2021, an additional six (6) United States witnesses were deposed, ¹⁶⁸ including, the deposition of United States' witness, John Farley, Director of Test Operations and lead qualifier for AFFF at the Naval Research Lab ("NRL"). Mr. Farley testified that *prior* to the year 2000, he had *never even heard of PFOS*. ¹⁶⁹ Given that Mr. Farley was personally responsible for determining which AFFF agents the United States could purchase during his tenure, his complete ignorance of the compound prior to 2000 lent significant credence to Plaintiffs' position that the government could not possibly have historically known of the dangers of PFOA and PFOS.

¹⁶⁵ Douglas Decl., at ¶¶ 22-24.

¹⁶⁶ Douglas Decl., at ¶ 24.

¹⁶⁷ Darwin Dep. Tr. Vol I., Ex. 2, at 46:17-47:2 [ECF No. 2063-3] (emphasis added).

¹⁶⁸ Douglas Decl., at ¶¶ 16, 18.

¹⁶⁹ Farley Dep. Tr. Vol. I, at 89:15-24 [ECF No. 2597-8](confirming he learned that PFOS was in 3M's MIL-Spec AFFF in approx. May 2000)(emphasis added).

Similarly, Mr. Darwin testified that even as of 2004, he was unaware that C8-based telomer AFFFs degrade to PFOA. ¹⁷⁰ Of course, National Foam, Inc.'s witness, Anne Regina, also made unequivocally clear in her deposition testimony, by 2001, it was well understood by industry that AFFF could create PFOA in the environment. ¹⁷¹ The carefully elicited testimony from both Mr. Farley and Ms. Regina were crucial to controvert the third element of *Boyle* as it proved that industry had superior knowledge of the dangers posed by PFOA and PFOS, which was not shared with the United States government.

Once discovery related to the government contractor defense was sufficiently complete, after input from the parties, the Court set a briefing schedule. CMO 16 issued on April 15, 2021. 172 It and CMO16A governed the initial briefing deadlines, while CMOs 16B and 16C modified the government contractor briefing protocols whereby the Court ordered that the Parties' initial briefing be limited to the first element of *Boyle*. 173 At the time, the Defendants insisted that the question of whether MIL-F-24385 was "reasonably precise" would be a cross-cutting issue for the MDL.

The first element of *Boyle* was briefed by the Government Contractor and Law and Briefing Committees between Defendants' omnibus opening brief filed on November 5, 2021,¹⁷⁴ and their Reply briefs which were filed on January 28, 2022. The Plaintiffs' responsive brief was 50 -pages long and annexed 127 exhibits, including three (3) Declarations from Plaintiff's experts, specifically, Dr. Birnbaum, Dr. Lowder and Mr. Walton.¹⁷⁵

¹⁷⁰ Darwin Dep. Tr. Vol. I, at 190:6-22 and 199:1-15 [ECF No. 2063-3](Objs. omitted) (emphasis added).

¹⁷¹ Regina Dep. at 232:15-21 [ECF No. 2597-17].

¹⁷² London Decl., at \P 70.

¹⁷³ London Decl., at ¶ 70-71.

¹⁷⁴ Douglas Decl., at ¶ 25.

¹⁷⁵ Newman Decl., at \P 16.

Oral argument on the first element of *Boyle* was scheduled for March 2022. The Government Contractor Committee and the Strike Force intensely prepared for this hearing by reviewing case law, preparing visual aids, and prepping argument outlines. ¹⁷⁶ Unfortunately, oral argument was canceled after a member of the defense team was diagnosed with COVID-19. ¹⁷⁷ Even at that time, the Court recognized that the government contractor briefs were "excellent," and that "[b]oth sides have just done first-rate briefs."

While unfortunate, the cancelation had its benefits. The Court recognized an interconnection between the first and third elements of *Boyle*, and that it would be difficult to rule on the defense with briefing limited to only the first element. The Court therefore issued CMO 16D, which expanded the briefing to include the second and third elements of *Boyle*. ¹⁷⁹ Once again, the Law and Briefing Committee, Strike Force and Government Contractor Committees returned to work to prepare oppositions with respect to the second and third elements of *Boyle*. Briefing occurred between May 13, 2022 and July 1, 2022.

In this second round of briefing the Plaintiffs submitted a 92-page brief annexed with 128 exhibits. As before, the Law and Briefing, Government Contractor Committees and the Strike Force intensely prepared for the August 19, 2022 oral argument. The Court opened the August 19, 2022 hearing by again noting that "...the briefing on all of these issues is the best briefing that I've seen in my dozen years on the bench. All of y'all have just done an outstanding job of marshalling what is incredible complicated information in a way that is digestible and

¹⁷⁶ Douglas Decl., at ¶ 26.

¹⁷⁷ London Decl., at ¶ 73.

¹⁷⁸ March 25, 2022, H'ring Tr., at 2:22

¹⁷⁹ London Decl., at ¶ 73.

¹⁸⁰ Newman Decl., at ¶ 17.

¹⁸¹ Douglas Decl., at ¶ 28.

understandable."¹⁸² In fact, after the argument, the Court requested that Plaintiffs submit a number of their visual aids. ¹⁸³

On September 16, 2022, the Court issued an Order denying Defendants' motion for summary judgment on the government immunity defense in every major respect. ¹⁸⁴ Plaintiffs defeated the Defendants' Goliath after well over two years of steadfast effort. Without the successful result of these efforts, today, the AFFF MDL would likely be in a very different place. There can be no doubt that these committees' work conferred an unparalleled common benefit for all Plaintiffs in this litigation.

Exemplar Bellwether Discovery Efforts That Added Enormously to the Time and Labor Expended in this MDL on Complex and Novel Issues and to the Results Obtained.

In mid-2020, the PEC initiated efforts to identify potential public water provider Plaintiffs to serve as bellwether cases. ¹⁸⁵ These efforts included a thorough investigation of all eligible pending cases in order to find those water provider cases the PEC was satisfied were sufficiently representative of the overall docket to be appropriate bellwether selections. ¹⁸⁶ This process of identifying initial bellwethers concluded in February 2021, when the PEC, through Co-Lead Counsel, submitted to the Court the Joint Submission Regarding Water Provider Bellwether Discovery Pool Cases. ¹⁸⁷

This submission identified the following ten (10) initial Tier One Water Provider bellwether cases:

- (1) Bakman Water Company v. 3M Company, et al., 2:19-cv-02784-RMG;
- (2) *City of Dayton v. 3M Company, et al.*, 2:18-cv-03496-RMG;
- (3) City of Sioux Falls v. 3M Company, et al., 2:19-cv-1806-RMG;

¹⁸² August 19, 2022, CMC, at 57:2-14.

¹⁸³ Order [ECF Nos. 2560-10-13].

¹⁸⁴ Order and Opinion [ECF No. 2601].

¹⁸⁵ London Decl., at ¶¶ 54-63.

¹⁸⁶ Douglas Decl., at ¶ 31.

¹⁸⁷ Joint Submission Regarding Water Provider Bellwether Discovery Pool Cases [ECF No. 1222].

- (4) *City of Stuart, Florida v. 3M Company, et al.*, 2:18-ev-03487-RMG;
- (5) Emerald Coast Utilities Authority v. 3M Company, et al., 2:18-cv-03488-RMG;
- (6) Hampton Bays Water District v. 3M Company et al., 2:18-cv-03339-RMG;
- (7) *Town of Ayer v. 3M Company, et al.*, 2:19-cv-03120-RMG;
- (8) Town of Maysville v. 3M Company, et al., 2:19-cv-03434-RMG;
- (9) Warminster Township Municipal Authority v. 3M Company et al., 2:19-cv-02472; and
- (10) Warrington Township v. 3M Company et al., 2:19-cv-02473.

Once these Tier One bellwethers were selected, the Tier One Water Provider Bellwether Team began weekly calls to manage the work-up and prosecution of these bellwether cases. Initially, during the Spring of 2021, the team addressed written discovery propounded by Defendants, as well as collaborating on noticing and taking FED. R. CIV. 30(b)(6) depositions¹⁸⁸ related to product identification and sales. Bellwether counsel also drafted and served their own written discovery, *i.e.*, interrogatories and requests for production. Then, in the Fall 2021, case-specific depositions began in the Tier One Water Provider bellwether cases. In September 2021 alone, sixteen 30(b)(6) depositions were defended by Plaintiffs' counsel in the Tier One Water Provider bellwether cases.

Once Tier One bellwether discovery largely concluded, the Water Provider Bellwether Selection Committee, with input from the Strike Force, began its work of reviewing and assessing the status and discovery of the Tier One Water Provider Bellwether Cases to ascertain the most appropriate bellwether trial selections for the three Tier Two Water Provider bellwether cases. ¹⁹⁰ On October 13, 2021, following a joint submission by the Parties, the Court entered an Order Selecting Tier Two Water Provider Bellwether Trial Pool Cases. ¹⁹¹

The following three (3) cases thereafter became the Tier Two Water Providers cases from

¹⁸⁸ London Decl., at ¶¶ 66-67, 76.

¹⁸⁹ London Decl., at ¶ 76.

¹⁹⁰ Douglas Decl., at ¶ 33.

¹⁹¹ Order Selecting Tier Two Water Provider Bellwether Trial Pool Cases [ECF No. 1931].

which the first trial case would be selected:

- City of Sioux Falls v. 3M Company, et al., 2:19-cv-1806-RMG;
- City of Stuart Florida v. 3M Company, et al., 2:18-cv-03487-RMG; and
- Town of Ayer v. 3M Company, et al., 2:19-cv-0312-RMG. 192

Once the Tier Two Water Provider bellwether cases were selected, the Tier Two Bellwether Committee self-organized to engage in weekly calls to coordinate their continued work-up and prosecution. For example, each of the three (3) bellwether cases had site visits that included Plaintiffs' counsel in addition to multiple Plaintiffs' experts. Subsequently, each Tier Two Water Provider bellwether had a second site visit wherein Plaintiffs' counsel along with defense counsel and their experts again visited each bellwether site. Also, between November 2021-April 2022, forty (40) case-specific Tier Two depositions were defended by Plaintiffs' counsel and four (4) FED. Civ. R. P. 30(b)(6) case-specific depositions were conducted. 194, 195

Once fact discovery closed in the Tier Two Water Provider bellwether cases, the Court set a deadline for expert discovery and disclosures for all three (3) cases with Plaintiffs' disclosures being due on March 18, 2022, Defendants disclosures on April 29, 2022, and rebuttal reports, if any, on May 13, 2022, with expert discovery requiring completion by August 16, 2022. Given this schedule, bellwether efforts pivoted towards working in connection with the Science Committee and the Strike Force to develop case-specific expert reports relating to each of three (3) bellwether cases. These case-specific expert reports initially included three (3) expert reports from Dr. Higgins (hydrology), three (3) expert reports for Dr. Martin (isomer profiling), three (3)

¹⁹² London Decl., at ¶ 82.

¹⁹³ Douglas Decl., at ¶ 36.

¹⁹⁴ All these activities were occurring during the same time frame that counsel was briefing the first round of opposition to the government contractor defense and preparing for the initial oral argument in March 2022.

¹⁹⁵ Douglas Decl., at ¶ 34.

¹⁹⁶ Douglas Decl., at ¶ 35.

expert reports for Mr. Berryhill (fate and transport), one (1) three-part case-specific expert report from Mr. Johnson and three (3) expert reports for Mr. Brown on the case-specific topics of damages. ¹⁹⁷ The Tier Two Bellwether Committee was likewise heavily involved in preparing each of these expert witnesses for their respective depositions.

When the Court directed the Parties to identify their preferred trial sequencing as between the three (3) Tier Two Water Provider bellwether cases, 198 the Water Provider Bellwether Committee was prepared with all the datapoints available from the discovery of our experts. Pursuant to letter-briefing undertaken by the Water Provider Bellwether Committee, through Co-Lead and Liaison Counsel, Plaintiffs recommended that the *City of Stuart* be set as the initial trial case, followed by *City of Sioux Falls* and, lastly, the *Town of Ayer*. 199 Defendants agreed that the *City of Stuart* case should be the initial trial selection, but requested it be followed by *Town of Ayer* and, lastly, *City of Sioux Falls*. Given the Parties' agreement that the *City of Stuart* case be the first trial case, it was so selected.

Exemplar Stuart Trial Team-Related Efforts That Involved Significant Litigation Risk, Attorney Skill, Required Resolution of a Multitude of Complex Issues and Greatly Impacted the Results Obtained:

On September 23, 2022, the *City of Stuart* case was selected as the first bellwether trial case with an anticipated June 5, 2023, trial date.²⁰⁰ Immediately after its selection, a Trial Team was assembled comprised of many Strike Force members, other committee members, and counsel for *Stuart*, all of whom began to prepare the *Stuart* case for trial.²⁰¹ Early efforts in this regard

¹⁹⁸ Fifth Amended Scheduling Order Governing First Water Provider Bellwether Trial [ECF No. 2548]

¹⁹⁷ Id

^{2548]. &}lt;sup>199</sup> Letter from Plaintiffs' Liaison Counsel to the Court, dated September 9, 2022 [ECF No. 2592].

²⁰⁰ Order Designating the First Bellwether Water Provider Trial and Regarding Submissions to the Court [ECF No. 2613].

²⁰¹ Douglas Decl., at ¶ 37.

included identifying both potential expert and fact witnesses, meeting with these potential witnesses and beginning to prepare them for their anticipated trial testimony.

On December 2, 2022, Defendants filed their dispositive motion briefing, including both summary judgment and *Daubert* motions. As such, during the month of December 2022 and into early January 2023, the Trial Team's efforts turned towards briefing oppositions to Defendants' dispositive motions. As part of these efforts, the Trial Team opposed an omnibus *Daubert* motion attacking eleven (11) of Plaintiff's fourteen (14) experts.²⁰² With respect to *Daubert*, all but one of Plaintiff's experts were permitted to proffer opinions at the *Stuart* trial.²⁰³

The Trial Team likewise opposed an omnibus summary judgment motion seeking to dismiss Plaintiff's damages theories, its nuisance cause of action and arguing failure to prove specific causation. Except for Plaintiff's nuisance claim, Defendants' omnibus motion for summary judgment was denied in its entirety. In addition to the omnibus summary judgment motions, the Trial Team opposed six (6) Defendant-specific summary judgment motions that raised various arguments, *inter alia*, a lack of product identification and failure to prove specific causation. On the provestic causation.

After dispositive motions were addressed, the team had to confront trial motions. The Trial Team prepared seven (7) motions in *limine* and opposed a nine-part omnibus motion *in limine*, a five-part 3M-specific motion *in limine*, a four-part DuPont-specific motion *in limine* and an

²⁰³ Order regarding Defendants' Co-Lead Counsel's omnibus motion to exclude [ECF No. 3059].

 $^{^{202}}$ Newman Decl., at ¶ 19.

²⁰⁴ Newman Decl. at ¶ 18.

²⁰⁵ Order and Opinion regarding Defendants' Co-Lead Counsel's omnibus motion for summary judgment [*Stuart* ECF No. 291].

²⁰⁶ Eight (8) Defendants made Defendant-specific summary judgment motions but two, namely, Defendants Buckeye Fire Equipment Company ("Buckeye") and BASF as a successor in interest to Ciba, Inc., were dismissed prior to the filing of Plaintiff's oppositions. [ECF No. 2885].

omnibus Telomer-Defendant motion in limine. 207

In the legal profession, preparing for trial is akin to preparing for war. Much treasure is expended. Logistics, strategy, equipment acquisitions, personnel, witnesses' schedules, and more, are all in play. As the June 5 trial date approached, to comply with the Court's pretrial procedures, the Trial Team compiled a trial exhibit list, which included approximately 7,000 Plaintiff trial exhibits, which was later winnowed down to approximately 500 likely to be used trial exhibits.²⁰⁸ The Trial Team was forced to lodge objections to hundreds of trial exhibits listed on Defendants' exhibit list without justification.²⁰⁹ The exhibit objection process resulted in a game-changing evidentiary order whereby nearly all of Defendants' authenticity objections were dropped as were their improper FED. R. EVID. 602 objections.²¹⁰ The Court's ruling cleared a path for *Stuart* to proffer its evidence without needless delay from improper objections. Any remaining objections were argued by trial counsel during both the May 12th and June 2nd evidentiary hearings.²¹¹

Simultaneously, the Trial Team prepared deposition designations serving affirmative deposition designations with respect to thirty-five (35) days of deposition testimony. The Trial Team likewise lodged objections to Defendants' affirmative deposition designations and prepared counter designations to Defendants' affirmative deposition designations. Finally, among other efforts, the Trial Team met and conferred with defense counsel in order to ready proposed jury instructions, jury questionnaires and a *voir dire*. It also prepared opening statements, a pretrial brief, trial demonstratives, witness lists, and ultimately reviewed over 200 prospective juror

 $^{^{207}}$ Newman Decl., at ¶ 20.

²⁰⁸ Douglas Decl., at ¶ 40.

²⁰⁹ Douglas Decl., at ¶¶ 42-43.

²¹⁰ Order regarding exhibit objections [*Stuart* ECF No. 285](holding that FED. R. EVID. 602 does not address the admissibility of documentary evidence).

²¹¹ Douglas Decl., at ¶ 43.

²¹² Douglas Decl., at ¶ 41.

²¹³ Douglas Decl., at ¶ 46.

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In mid-May 2023, Kidde filed for Chapter 11 bankruptcy, which caused a colossal shift in the Trial Team's preparation given that the trial was being prepared as against both Defendants Kidde and National Foam in addition to Defendants 3M and DuPont.²¹⁵ Additionally, these bankruptcy proceedings required significant PEC efforts, including to retain bankruptcy counsel and create a PEC committee tasked with keeping the MDL apprised of the bankruptcy proceedings to ensure Plaintiffs' interests are protected there.²¹⁶

In late May 2023, in anticipation of selecting a jury on June 5, 2023, the entire Trial Team moved to Charleston, South Carolina.²¹⁷ The Trial Team on the ground in Charleston, South Carolina, included seventeen (17) lawyers, four (4) support staff and a trial technician.²¹⁸

On June 5, 2023, the *Stuart* trial was continued upon joint motion by the Parties given the Parties' intent, with the Court-appointed mediator Judge Layn Phillips (ret), to devote all efforts to try to achieve a settlement with 3M in the three weeks the Court afforded in its Order.²¹⁹

DuPont Specific Settlement Negotiation Details that Required Implementation of Novel Settlement Concepts and Greatly Impacted the Results Obtained.

In the Spring of 2020, when leadership was first hopeful that settlement discussions would eventually ensue, Scott Summy enlisted the assistance of PEC member Christina Cossich and her partner Phil Cossich to create the Resolution Team. ²²⁰ Over the ensuing years the Resolution Team, utilizing its vast experience in complex environmental negotiations, and working on

 $^{^{214}}$ Douglas Decl., at ¶¶ 46-48.

²¹⁵ Douglas Decl., ¶ 21, n.8; *see also*, London Decl., at ¶¶ 114-116.

²¹⁶ London Decl., at ¶¶ 115.

²¹⁷ Douglas Decl., at ¶ 49.

 $^{^{218}}$ Douglas Decl., at ¶¶ 37, 49.

²¹⁹ ECF No. 3256.

²²⁰ Summy Decl., at \P 9.

separate but inexorably related tracks with the Strike Force, developed the foundation for the settlement that is now before the Court.

While the Strike Force forged ahead developing the liability case against each of the Defendants, the Resolution Team started the arduous legwork of data gathering and scientific analysis required in preparation for anticipated settlement negotiations. Plaintiffs agreed that the actual negotiations would be conducted by Scott Summy along with Co-Lead Counsel, Michael London and Paul Napoli (the "Negotiation Team"), which began preliminary settlement discussions with DuPont representatives in the Spring of 2020. Later in 2020 and at the beginning of 2021, the Negotiating Team began meeting with DuPont's national settlement counsel, who made clear that the DuPont wanted to focus settlement discussions on resolving only the PWS, and that a class resolution would be needed to provide as much finality as possible.

To that end, the Resolution Team set about gathering all obtainable information about public water systems that would help inform settlement efforts, establish a Damages Model to be used in negotiations, define the Class that would likely be required by a settling Defendant(s), identify Class Members, and assist with an eventual allocation of settlement funds. This work eventually culminated in a Master PFAS Detection Dataset (the "Master Dataset") – the most robust collection of PFAS detections in PWS in existence, and a tool that would prove critical to the negotiations that resulted in these resolutions.

 $^{^{221}}$ *Id.* at ¶¶ 9-10.

 $^{^{222}}$ *Id.* at ¶ 9.

 $^{^{223}}$ *Id.* at ¶¶ 21.

 $^{^{224}}$ *Id.* at ¶¶ 21-22

 $^{^{225}}$ *Id.* at ¶ 11.

 $^{^{226}}$ *Id.* at ¶ 12.

The Resolution Team held numerous in-person and remote meetings. ²²⁷ Through these sessions and using the Master Dataset, the Resolution Team determined the likely extent of PFAS in PWS across the country, estimated the likely rate of PFAS detections in states that did not yet require testing, and estimated the total costs to treat these identified and estimated Impacted Water Sources. ²²⁸ These calculations were crucial in creating an extensive, credible, and objective damage model for use in the initial settlement discussions with DuPont; moreover, they helped the Resolution team craft the elegant concept of Baseline Testing – particularly significant as it allows Class Members to maintain their future claims for water sources that currently do not currently have a PFAS detection. ²²⁹ The Master Dataset was also used to create presentations for the Negotiation Team. ²³⁰ These presentations were particularly effective because they contained real statistics of likely numbers of PFAS-impacted PWS and the populations and classifications of each PFAS Impacted PWS. ²³¹

As the Master Dataset was being developed, the Resolution Team also took on the task of developing the Allocation Procedures as a means, if a settlement could be achieved, to equitably divide potential settlement funds among claimants.²³² The Resolution Team began drafting Allocation Procedures in 2021, which were final in July 2023.²³³

In the Spring of 2022, DuPont expanded their negotiation team to officially include national settlement counsel for both Chemours and Corteva.²³⁴ Over the next year, the Negotiating Team had continuous calls and a number of in-person meetings in New York with the DuPont's

 $^{^{227}}$ *Id.* at ¶¶ 12-14

 $^{^{228}}$ *Id.* at ¶ 13.

 $^{^{229}}$ *Id.* at ¶ 14, 18-19.

 $^{^{230}}$ Id. at ¶ 14, 20-22.

 $^{^{231}}$ *Id.* at ¶ 14.

 $^{^{232}}$ *Id.* at ¶ 16.

 $^{^{233}}$ *Id.* at ¶ 17.

 $^{^{234}}$ *Id.* at ¶ 22.

counsel,²³⁵ although the negotiations were contentious, and at times, broke down for several months.²³⁶ Despite these intense negotiations spanning over two years, the Negotiation Team was unable to reach a comprehensive settlement with DuPont.²³⁷

Two events increased the pressure on the negotiations with DuPont. The first was strategically initiated by this Court, when, on October 26, 2022, it appointed Judge Layn Phillips (ret) as Mediator to oversee the settlement discussions.²³⁸ Second, preparations began in earnest for the start of the first PWS bellwether trial involving the *City of Stuart*, scheduled to start on June 5, 2023.²³⁹ Under the oversight of Judge Phillips and his staff, the parties met extensively from March through May of 2023, with numerous and ongoing sessions occupying substantial time.²⁴⁰

The parties worked incredibly hard to agree on a structure that would compensate not only those PWS that had already detected PFAS but also those that had not detected it yet but were required to test under either federal or state law.²⁴¹ The Negotiating Team also spent significant time protecting claims that would be carved out of the Release.²⁴² Many PWS are facing or will face damages associated with airports, wastewater, and stormwater.²⁴³ These claims that are unrelated to drinking water are preserved.²⁴⁴

On June 1, 2023, the parties signed a Memorandum of Understanding that included certain material terms of the proposed Settlement, though other issues remained unresolved.²⁴⁵ Thereafter,

²³⁵ *Id*.

²³⁶ *Id*.

²³⁷ *Id*.

 $^{^{238}}$ *Id.* at ¶ 27.

²³⁹ *Id*.

²⁴⁰ *Id*.

 $^{^{241}}$ *Id.* at ¶ 28.

²⁴² *Id*.

²⁴³ *Id*.

²⁴⁴ *Id*.

 $^{^{245}}$ *Id.* at ¶ 30.

Judge Phillips and his team continued to moderate multiple discussions with Counsel for the Parties to resolve the outstanding issues.²⁴⁶ With the help of Judge Phillips, the Parties reached agreement on the remaining issues and executed the Settlement Agreement on June 30, 2023.²⁴⁷

Shortly after the Motion for Preliminary Approval was filed, a group of more than 20 States filed formal objections to various provisions of the settlement.²⁴⁸ In July and August, 2023, the Negotiating Team spent hours nearly every day negotiating with the States and DuPont to reconcile the States' objections.²⁴⁹ After intense negotiations, the parties agreed to make several changes to the Master Settlement Agreement to satisfy the States' collective concerns.²⁵⁰ Shortly after filing a Joint Consent Motion outlining the changes and signifying the States withdrawal of their objections, the MDL Court granted Preliminary Approval.²⁵¹

Over the last six to nine months, the Negotiating Team/Co-Leads have worked arduously to prepare for filing the instant motion. The current fee proposal was developed only after many hours of consultation with the experts,²⁵² and other counsel. In particular, on September 21, 2023, the PEC convened in-person in Miami to consider the matters *sub judice*.²⁵³ After a comprehensive discussion, the PEC members unanimously supported the fee structure being proposed to the Court,²⁵⁴ which enabled Class Counsel to present this motion.

²⁴⁶ *Id*.

²⁴⁷ *Id*.

 $^{^{248}}$ *Id.* at ¶ 33.

²⁴⁹ *Id*.

²⁵⁰ *Id*.

²⁵¹ *Id*.

 $^{^{252}}$ *Id.* at ¶ 35

 $^{^{253}}$ *Id.* at ¶ 36.

²⁵⁴ *Id*.

IV. LEGAL STANDARD AND ARGUMENT

A. CLASS COUNSEL HAVE EARNED A PERCENTAGE FEE AWARD OF 8% OF THE COMMON FUND.

Class Counsel who create a common fund are entitled to receive from it a reasonable fee. See In re Aqueous Film-Forming Foams Prods. Liab. Litig., No. 18-2873, 2021 WL 5822993, at *2 (D.S.C. Aug. 4, 2021) ["Campbell"]; Boeing Co. v. Van Gemert, 444 U.S. 472, 478 (1980); FED. R. CIV. 23(h). The Fourth Circuit authorizes "two main methods for calculating the reasonableness of attorneys' fees—the lodestar method and the percentage-of-recovery method." McAdams v. Robinson, 26 F.4th 149, 162 (4th Cir. 2022). District courts have discretion to choose between the two methods based on their "judgment and the facts of the case." Id. "The vast majority of courts use the percentage of recovery method, which is advantageous because it ties the attorneys' award to the overall result achieved rather than the number of hours worked." In re Allura Fiber Cement Siding Litig., No. 19-2886, 2021 WL 2043531, at *4 (D.S.C. May 21, 2021).²⁵⁵ This is especially true where, as here, Plaintiffs' counsel prosecuted the case on a contingency fee basis with the risk of non-payment. See e.g., Brundle ex rel. Conestellis Employee Stock Ownership Plan v. Wilmington Tr., N.A., 919 F.3d 763, 785-86 (4th Cir. 2019)(noting that fees based on a percentage of the common fund "hold[s] beneficiaries of judgment responsible for compensating the counsel who obtained the judgment or settlement for them").

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²⁵⁵ See also Berry v. Wells Fargo & Co., No. 17-304, 2020 WL 9311859, at *12 (D.S.C. July 29, 2020) ("Within the Fourth Circuit, district courts prefer the percentage method in common fund cases."); Blum v. Stenson, 465 U.S. 886, 900 n.16 (1984) ("a reasonable fee is based on a percentage of the fund bestowed on the class."). See generally In re Lumbar Liquidators Chinese-Manufactured Flooring Prods. Mktg., Sales Pracs. & Prods. Liab. Litig., 952 F.3d 471, 491 (4th Cir. 2020) (vacating fee award because it failed to apply CAFA's coupon settlement provisions, 28 U.S.C. §1712).

To assess the reasonableness of a class fee, this Court employs the guiding principles announced in *Barber v. Kimbrell's Inc.*, 577 F.2d 216, 226 n.28 (4th Cir. 1978), which reprise the factors announced by the Fifth Circuit in *Johnson v. Georgia Highway Express, Inc.*, 488 F. 2d 714 (5th Cir. 1974). *See Campbell*, 2021 WL 5822993, at *2. The District of South Carolina Local Rule 54.02(A) mandates the application of *Barber*'s principles to the percentage-fee method. These twelve guiding principles include: "(1) the time and labor expended; (2) the novelty and difficulty of the questions raised; (3) the skill required to properly perform the legal services rendered; (4) the attorney's opportunity costs in pressing the instant litigation; (5) the customary fee for like work; (6) the attorney's expectations at the outset of the litigation; (7) the time limitations imposed by the client or circumstances; (8) the amount in controversy and the results obtained; (9) the experience, reputation and ability of the attorney; (10) the undesirability of the case within the legal community in which the suit arose; (11) the nature and length of the professional relationship between attorney and client; and (12) attorneys' fees awards in similar cases." *Campbell*, 2021 WL 5822993, at *2, citing *Barber*, *supra*.

Even in megafund level (> \$100 million) and super-megafund level (> \$1 billion)²⁵⁶ cases, basic fee award principles still apply. *See, e.g., In re Enron Corp. Sec., Deriv. & ERISA Litig.*, 586 F. Supp. 2d 732, 754 (S.D. Tex. 2008) ("the megafund rule is contrary to the Fifth Circuit's approach that the district court scrutinize each case for the particular facts that will determine what constitutes a reasonable fee award."). Each case must be evaluated pursuant to uniform standards to determine what constitutes a reasonable fee award.

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²⁵⁶ See In re Cendant Corp. PRIDES Litig., 243 F.3d 722, 737 (3d Cir. 2001) (referring to "large settlement cases" as "cases in which the common fund exceeded \$100 million."); In re Diet Drugs (Phentermine, Fenfluramine, Dexfenfluramine) Prods. Liab. Litig., 553 F. Supp. 2d 442, 480 (E.D. Pa. 2008), as corrected (Apr. 9, 2008), judgment entered, No. 99-20593, 2008 WL 2890878 (E.D. Pa. July 21, 2008), and aff'd sub nom. In re Diet Drugs, 582 F.3d 524 (3d Cir. 2009) (defining "super-mega-fund settlements," as "settlements of one billion dollars or more.").

As demonstrated both above and below, and through the various declarations being filed concurrently herewith, the work performed by counsel to obtain this landmark settlement is, by definition, exceptional. The Supreme Court has defined "exceptional" in the patent realm as "simply one that stands out from others with respect to the substantive strength of a party's litigating position (considering both the governing law and the facts of the case)." *Octane Fitness, LLC v. ICON Health & Fitness, Inc.*, 572 U.S. 545, 554 (2014). Class Counsel's work truly "stands out" under the *Barber* standards, which fully justify the requested 8% award.

B. THE PRINCIPLES GOVERNING THE DETERMINATION OF AN APPROPRIATE FEE AWARD UNDER *BARBER* SUPPORT THE PROPOSED 8% AWARD PLUS OUT OF POCKET COSTS.

1. The Time and Labor Required

All told, so far, the PEC expended a collective 414,900.9 hours by approximately 40 law firms and 650 timekeepers (including partners/members, senior associates, associates, paralegals, and law clerks) from the beginning of this MDL.²⁵⁷ This is an impressive number of hours, which would have been even larger, but much time was saved as the efficiencies of telephonic conferences and Zoom depositions, mediations and meetings proved to be effective virtual substitutes for actual in-person events.²⁵⁸ Both the hours spent and the work performed over the course of those many hundreds of thousands of hours ensured an excellent result for the Settlement Class. This enormous collective effort of time and labor, as outlined above and detailed in the Declarations of Perry, Douglas, Summy, London, Napoli, Newman, Bowden and Olsen, supports the requested 8% fee award.

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²⁵⁷ Perry Decl., at ¶¶ 10, 20.

²⁵⁸ London Decl., at ¶ 47.

These PEC efforts culminated in the announcement of the landmark settlements on the eve of the bellwether trial.

2. The Novelty and Difficulty of the Questions Involved

Throughout this litigation, the Court has repeatedly been reminded of the complex nature and uniqueness of this multidistrict, multi-party litigation. This MDL was particularly difficult given the number of Defendants which the PEC was required to litigate against. As part of its efforts, from the outset, the PEC sought to establish liability stories with respect to each Defendant. This approach was critical because the liability with respect to each Defendant in this case is inextricably intertwined with each of the other Defendants. Moreover, many of the Defendants have unique positions in the AFFF market, which required the PEC to understand the varying AFFF market channels, including the relationships between the Defendants. This litigation has also been difficult given the complex science involved. Given the complexity, and as noted in the Douglas Decl., the Strike Force routinely engaged in hours long phone conferences with their experts to understand the totality of the implicated science. This litigation of the experts to understand the totality of the implicated science.

At the outset of the MDL, the Defendants insisted that the government contractor defense announced in *Boyle v. v. United Technologies Corp.*, 487 U.S. 500 (1988), would prove to be a cross-cutting issue that would preclusively limit the capacity of Plaintiffs to prosecute their claims. ²⁶³ Those predictions proved themselves fallible. The issue was originally scheduled to be resolved on just the first *Boyle* element -- whether the MIL-Spec was "reasonably precise" -- but after extensive briefing over the course of several months (November 2021 to January 2022), the

²⁵⁹ London Decl., at ¶¶ 11-13, 25, 32, 52.

 $^{^{260}}$ Id. at ¶ 52.

²⁶¹ Douglas Decl., at ¶¶ 11-15, 18; *see also*, London Decl., at ¶¶ 90-93.

 $^{^{262}}$ *Id.* at ¶ 8.

 $^{^{263}}$ *Id.* at ¶ 22.

Court determined that supplemental briefing covering the entire controversy was necessary to resolve the matter. ²⁶⁴ Over the next four months (April to June 2022) Plaintiffs responded to all of Defendants' arguments with excellent briefing that established the fallacy of Defendants' defense. ²⁶⁵ Plaintiffs proved that the Defendants' novel application of the doctrine to this situation --where the government's continued use of the product occurred notwithstanding its fundamental ignorance of the environmental defect presented by AFFF – was flawed. And the Court routinely noted the excellence of the arguments presented by the Plaintiffs to counter Defendants' elaborate efforts. ²⁶⁶

The challenges to Plaintiffs never ceased as Defendants continued to defend against the bellwether trial by asserting *Daubert* motion practice on Plaintiffs' experts and summary judgment motions.²⁶⁷ These motions presented a variety of complex issues that again required assembling a top-notch briefing team, in conjunction with the Strike Force, capable of addressing the many detailed factual issues as well as the capacity to fend off the difficult legal questions presented.²⁶⁸ These efforts successfully moved the case forward to trial and, ultimately, towards resolution.

At trial, significant litigation risks also likely would have presented themselves, which Plaintiff would have had to overcome. These include, *inter alia*, establishing that:

 The PFOA and/or PFOS in Plaintiff's drinking water wells emanated from Defendants' AFFF products, a process that requires the application of complex principles of environmental science, including a fate and transport analysis and chemical fingerprinting;

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²⁶⁴ London Decl., at ¶¶ 70-71; see also, Douglas Decl., at ¶¶ 25-26.

²⁶⁵ London Decl., at ¶ 73; see also, Douglas Decl., at ¶¶ 27-30.

²⁶⁶ See e.g., March 25, 2022, H'ring Tr., at 2:22-24 (noting "first-rate briefs"); see also, July 8, 2022, H'ring Tr., at 11:8-10 (noting that briefing was "excellent.")

²⁶⁷ Douglas Decl., at ¶ 38; see also, Newman Decl., at ¶¶ 18-19.

 $^{^{268}}$ Newman Decl., at ¶¶ 18-19.

- It was foreseeable to each of the Defendants that the chemicals in their products would contaminate drinking water generally and more specifically the Plaintiff's public drinking wells;
- PFOA and PFOS are toxic to humans and that same was either known and or foreseeable to the Defendants;
- That the levels of PFOA/PFOS in Plaintiff's drinking water and wells exceeded the EPA's Health Advisory Limit of 70 ppt and that, therefore, under Florida state law [Stuart bellwether case], and as a reasonably prudent water utility, Plaintiff was required to and did expend capital costs to construct treatment facilities to remove PFAS from its wells;
- That the warnings and/or instructions affixed to Defendants' AFFF concentrates and/or fluorosurfactants failed to adequately warn and/or instruct firefighters on how to properly use, train with and/or dispose of AFFF;
- That despite knowledge of health risks associated with use, disposal and bioaccumulation of AFFF concentrates and/or fluorosurfactants, Defendants did not warn Plaintiff of same;
- That Defendants' AFFF concentrates and/or fluorosurfactants were defectively designed, and more specifically, that a safer alternative design existed that could have been utilized to make AFFF, which included the use of shorter chain fluorocarbons that do not contain nor degrade to PFOA or PFOS;
- That Plaintiff, as a user of AFFF, was not contributorily negligent with respect to the contamination of Plaintiff's drinking water wells with PFOA and/or PFOS;
- That the preponderance of the evidence established that Defendants conduct was unreasonable given their knowledge over time of the harms posed by PFOS and PFOA; and
- That Plaintiff established by clear and convincing evidence that Defendants acted with *intentional misconduct* and had actual knowledge of the wrongfulness of their conduct, or that there was a high probability of injury to the Plaintiff; and/or *gross negligence* in that Defendants acted with a conscious disregard and/or indifference to the life, safety, or rights of others entitling it to punitive damages.²⁶⁹

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²⁶⁹ Florida Standard Jury Instructions (Civil) 503.1 [Stuart case].

Even the settlement with DuPont and calculation of the company's share of liability was fraught with complex legal and factual questions.²⁷⁰ Because DuPont made only a component part of AFFF, and its telomer-based PFOA could not easily be distinguished in the environment from that made by others, the company would argue its production and sales could be linked only to a small amount of PFAS contamination.²⁷¹ Finally, of course, there are general risks of jury trials, re-litigating of issues before the transferor court and various state law arguments and defenses such as statutes of limitations and the like.

As these complexities for Plaintiffs were ever present, this factor favors a substantial fee award in this case.

3. The Skill Requisite to Perform the Legal Service Properly

The Court regularly witnessed the high quality of Plaintiffs' counsel's legal work, which conferred an exceptional benefit on the clients in the face of daunting litigation obstacles and highly sophisticated defense counsel. As the Court is aware, it is a formidable and complicated challenge to successfully prosecute a case like this. Moreover, the orderly and effective management of this massive MDL, with claims against numerous Defendants on behalf of thousands of claimants, presented challenges that many law firms and lawyers simply would not be able to meet. Indeed, litigation of a case like this requires counsel highly trained in class action law and procedure, as well as in the specialized subject matters these cases present. Those lawyers, whom the MDL Court appointed to represent Plaintiffs, possess these attributes, and their participation as Plaintiffs' counsel added significant value to the representation of the clients. The record before the Court establishes that the litigation involved a wide array of complex and novel challenges, which Plaintiffs' counsel met at every juncture based on their collective, extensive

²⁷⁰ Summy Decl., at ¶¶ 10, 24-25.

²⁷¹ *Id*.

experience in complex litigation and class action litigation. Both trial preparation and settlement negotiations required a thorough understanding of the scientific, legal, and factual issues as well as a sophisticated familiarity with how PWS operate and how to compensate them for their PFAS contamination. As such, the skill and diligence demonstrated by Plaintiffs' Counsel in this litigation supports the requested fee.

4. The Preclusion of Other Employment by the Attorneys Due to Acceptance of the Case

Many members of the firms leading the common benefit effort on Plaintiffs' behalf, by necessity, had to forego other cases and potential fees. Many lawyers involved in the common benefit effort expended the vast majority, if not all, of their available time to the pursuit of this litigation for a period of more than four years. Almost all Plaintiffs prosecuted this litigation entirely on a contingent fee basis and self-funded the litigation through assessments on the PEC. Meeting the immense time and expense demands of the case limited the ability of Class Counsel to work on numerous other matters, all without any guarantee that such a substantial investment of the many years' worth of time and effort would ever be reimbursed. This significant risk of nonpayment or underpayment warrants the requested fee.

Numerous cases recognize that contingent-fee risk is an important factor in determining the fee award. "In complex, multi-year class actions, the risks inherent in the litigation are immense and the risk of receiving little or no recovery is a major factor in awarding attorney fees." *In re LandAmerica 1031 Exchange Svcs.*, No. 2054, 2012 WL 5430841, at *4 (D.S.C. Nov. 7, 2012); see also In re Continental Ill. Sec. Litig., 962 F.2d 566 (7th Cir. 1992) (holding that when a common fund case has been prosecuted on a contingent basis, plaintiffs' counsel must be compensated adequately for the risk of non-payment). Therefore, this factor favors the fee award requested in this case.

5. The Customary Fee

Class action percentage fee recoveries in the amount of 30% are typical. *Campbell, supra*. In *LandAmerica*, Judge Anderson relied on a survey of common fund fees in the Fourth Circuit and elsewhere approving "percentage awards that ranged from 18% to 30%, inclusive of megafund recoveries that reached into the nine figure range." *LandAmerica 1031 Exchange Svcs.*, 2012 WL 5430841, at *4, citing *In re Mills Corp. Sec. Litig.*, 265 F.R.D. 246, 264 (E.D. Va. 2009). As Professor Fitzpatrick's Declaration makes clear, a review of every billion-dollar class action settlement demonstrates the average and median percentages for attorneys' fees awards were 12.1% and 9.52%, respectively. Given these ranges in value, the amount requested in this water contamination case – 8% - is eminently reasonable and well-supported. Arguably, an even greater percentage fee is warranted, the claims being resolved against 3M. To request a different percentage of the fund simply because of the size of the fund was not deemed justified. This factor supports the percentage fee requested.

6. Whether the Fee Is Fixed or Contingent

Virtually all Plaintiffs' counsel undertook this litigation on a contingent fee basis, assuming a substantial risk that the litigation would yield no recovery and leave them uncompensated. Courts have consistently recognized that the risk of receiving little or no recovery is a major factor in considering an award of attorneys' fees. *See, e.g., LandAmerica, supra; Enron,* 586 F. Supp. 2d at 791. The time in which to evaluate the risk is *ex ante, i.e.*, as of the time suit was initiated, not with the benefit of hindsight. *See Harman v. Lyphomed, Inc.*, 945 F.2d 969, 974 (7th Cir. 1991). Where

²⁷² Fitzpatrick Decl., at ¶ 17.

²⁷³ Id at ¶¶ 3 8

 $^{^{274}}$ *Id.* at ¶¶ 14-17 (opining that the instant fee request is below the norm).

counsel face such substantial risks and recover significant compensation for their clients, courts find this factor to favor the fee applicant. *See LandAmerica*, 2012 WL 5430841, at *4; *Enron*, 586 F. Supp. 2d at 796. "Class Counsel has worked for years with no payment, undertaking the risk of walking away with no fee at all. Such 'burdens are relevant circumstances' that support the requested award." *Savani v. URS Pro. Sols. LLC*, No. 06-02805, 2014 WL 172503, at *5 (D.S.C. Jan. 15, 2014), quoting *Torrisi v. Tucson Elec. Power Co.*, 83 F.3d 1370, 1377 (9th Cir.1993).

7. Time Limitations Imposed by the Client or the Circumstances

This MDL was conducted during the height of the world-wide pandemic caused by COVID-19. In the face of logistical difficulties that COVID restrictions imposed on the parties, counsel and the Court, Class Counsel persevered and conducted enormous amounts of discovery, including document review and a multitude of significant depositions. ²⁷⁵ Under the aegis of this Court who regularly held monthly status conferences and employed "hands-on" management to see that discovery was being conducted promptly and that the litigation was progressing at an appropriate rate, time was efficiently used, not squandered. Notwithstanding the impediments presented by the pandemic, the first bellwether trial was ready to present to a jury on June 5, 2023, within 4 ½ years of the Transfer Order that initiated this MDL. *See In re Aqueous Film-Forming Foams Prods. Liab. Litig.*, 357 F. Supp. 3d 1391 (U.S. Jud. Pan. Mult. Lit. 2018). At the same time, settlement negotiations had taken place over the course of two years, and those efforts were proceeding efficiently using the totality of time before trial to explore resolution.

The fact that all these enormous efforts were performed during these challenging times speaks volumes of the pace of this litigation and dedication of counsel to fulfilling their obligations to their clients and to the Court. This "time" factor deserves weight in the Court's analysis.

 $^{^{275}}$ See \S I.A.2, supra.

8. The Amount Involved and the Results Obtained

The eighth *Barber* factor – the amount involved and the results achieved – is entitled to arguably the most significant weight when, as in this case, the efforts of counsel were instrumental in realizing a high recovery on behalf of the Plaintiffs. Indeed, the Supreme Court and the Fourth Circuit have observed that "the most critical factor' in determining the reasonableness of a fee award is the degree of success obtained." *Hensley v. Eckerhart*, 461 U.S. 424, 436 (1983). *See also Brodziak v. Runyon*, 145 F.3d 194, 196 (4th Cir. 1998) (recognizing the degree of overall success must be considered for all claims raised by the plaintiff). An approximately \$1.2 billion settlement against a manufacturer with a limited liability/market share is clearly an outstanding result obtained for Plaintiffs. If outcome weighs as "the most critical" consideration, then surely the requested fee award should be deemed fair and appropriate.

As described above, the DuPont settlement provides significant economic value to Public Water Systems that have been damaged by Defendants' products. This settlement not only benefits class members, but also the customers/ratepayers of these water authorities who need and depend upon clean water in their daily lives. In *Deepwater Horizon*, Judge Barbier noted that "[s]uccess is determined not only by the gross amount of the recovery but also by the number of individuals who benefit from the class settlement, the degree to which it provides them with full compensation for their injuries, and the extent to which the settlement benefits the public at large." *In Re: Oil Spill by the Oil Rig "Deepwater Horizon" in the Gulf of Mexico, on Apr. 20, 2010*, No. 2179, 2016 WL 6215974, at *18 (E.D. La. Oct. 25, 2016). Here, thousands of public water systems benefit from this settlement. Moreover, their customers are derivatively benefitted because the settlement funding will be available to ensure that these customers are drinking PFAS-free drinking water. In fact, the settlement benefits over 100 million Americans by providing resources to the Public

Water Systems that supply them with drinking water so they can remediate PFAS contamination, currently found in 45% of America's drinking water. ²⁷⁶ As such, there can be no question that due to the common benefit work of Class Counsel over the course of this litigation, there was a tremendous result.

The complexity of the settlement, too, underscores the analysis and inquiry involved in resolution. The parties did not merely agree to a dollar figure to be doled out to each PWS with a PFAS detection. The parties structured a system that identifies each contaminated water source, applies engineering factors to that source, and calculates compensation. The system recognizes, too, that some PWS have not yet tested their sources and allows a testing period and claim period to compensate for those sources as well. By any measure, the settlement is an outstanding result. Given such a result, this factor supports the requested fee award.

9. The Experience, Reputation, and Ability of the Attorneys

When this MDL litigation began, the Court underwent an arduous vetting and selection process to appoint experienced, reputable and able counsel to serve on the PEC.²⁷⁷ Since then, because of the exceptional work-product performed, the Court has reappointed the PEC Members with twenty-eight (28) PEC firms being appointed for the 2022-2023 Term.²⁷⁸ On August 22, 2023, the Court agreed to add a fourth Co-Lead Counsel to aid in the future prosecution of this MDL. Moreover, this Court-appointed Class Counsel, which included both Co-Lead Counsel and additional counsel with specific class experience and Phase 2 class member dedication. This factor supports the requested percentage here.

²⁷⁶ Smalling et al., Per- and polyfluoroalkyl substances (PFAS) in United States tapwater: Comparison of underserved private-well and public-supply exposures and associated health implications, Environment International, Volume 178, August 2023, 108033, *available at*: https://www.sciencedirect.com/science/article/pii/S0160412023003069?via%3Dihub.

²⁷⁷ See generally, CMO No. 2.

²⁷⁸ ECF No. 2259.

The PEC and common benefit attorneys prosecuting this MDL have far more experience both in PFAS litigation and in environmental law, by far, than any other law firms in the country, and the results and efficiency here demonstrate the impact of this prior experience.²⁷⁹ This factor clearly supports the fee request.

10. The "Undesirability" of the Case

The risks presented by taking on such a massive case with so many Defendants were daunting at the inception of this litigation. "Cases may be deemed 'undesirable' when the defendant is a large corporation with substantial resources, financial and otherwise, for a vigorous defense; and the legal and factual issues presented risks to recovery absent settlement. Where class counsel is a relatively small group of attorneys with limited resources pitted against ... [a larger entity] with access to enormous legal resources, the tenth factor weighs in favor of a substantial fee." *Burford v. Cargill, Inc.,* No. 05-0283, 2012 WL 5471985, at *5 (W.D. La. Nov. 8, 2012) (citations omitted). Considering the expense and time involved in prosecuting this case against well-resourced defense counsel on a purely contingent basis, with no guarantee of a positive result and ever-mounting litigation costs in excess of \$21 million, risky cases such as this are not for the faint of heart. Whereas many shied away from this litigation, the Court-appointed counsel poured their heart and soul into this litigation and should be rewarded accordingly. This factor also supports the requested percentage.

11. The Nature and Length of the Professional Relationship with the Client.

This *Barber* factor was designed to consider those instances when "a lawyer in private practice may vary his fee for similar work in the light of the professional relationship of the client with his office." *Johnson*, 488 F.2d at 719. "The meaning of this factor, however, and its effect on

²⁷⁹ Herman Decl., at ¶¶ 8, 16 Fitzpatrick Decl., at ¶ 26.

the calculation of a reasonable fee has always been unclear...Courts applying the [Barber] factors typically state this particular standard is irrelevant or immaterial. *Bruner v. Sprint/United Mgmt*. *Co.*, Nos. 08-2133-KHV, 08-2149-KHV, 2009 WL 2058762, at *9 (D. Kan. July 14, 2009).

Here, many counsel have longstanding client relations with their PWS clients having represented them other contamination cases. If this factor is to be given weight, then it should weigh in favor of Counsel' fee request because the long-standing relationships that certain counsel have with established clients motivates them to conduct high-quality work to maintain these ongoing client relationships.

12. Awards in Similar Cases

All but two of the *Barber* fee adjudication factors are abstract in that they do not purport to have any mathematical correlation to the computation of an appropriate percentage award. The final *Barber* factor provides guidance as to how to concretize abstract consideration of the other factors into a definitive percentage fee award. This factor prescribes consideration of "awards in similar cases." *Barber*, 577 F.2d at 226 n.28. Such consideration is a dominant feature of contemporary Percentage of Funds fee adjudication.²⁸⁰

To aid the Court in making this evaluation, as noted above, Plaintiffs retained Mr. Fitzpatrick, a renowned academician in this area of the law, to review the *Barber* factors to opine on the reasonableness of Class Counsel's fee request. He determined with respect to the factors relating to fee awards in other cases, that is, factors five (the customary fee) and twelve (awards in similar cases), counsel's fee request here is below the norm. ²⁸¹ In fact, in this Circuit, Plaintiff's expert's empirical study found that the mean and median percentage-method awards were 25.2%

²⁸⁰ See generally, Fitzpatrick Decl.

²⁸¹ Fitzpatrick Decl., at ¶¶ 14-17.

and 28%.²⁸² Far greater than what is being requested here. Moreover, this same study found that across all percentage method fee awards considered, the fee request herein is at very low end of the spectrum, as depicted below (the red arrow depicts the fee request here):²⁸³

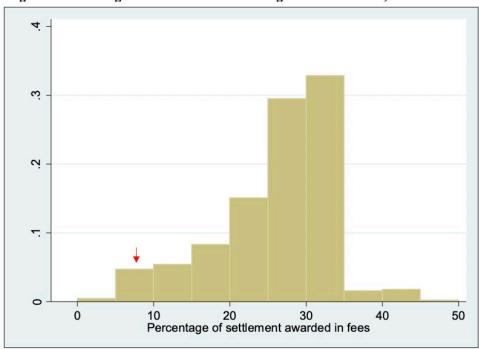


Figure 1: Percentage-method fee awards among all federal courts, 2006-2007

Of course, as a super mega fund settlement, this settlement is far larger than most. However, notwithstanding this size of the settlement, even among other billion-dollar-plus settlements, this fee request still remains below the norm²⁸⁴ and thus these factors clearly support the fee request.

With respect to those factors that address the results obtained in the litigation, namely, factors: two (the novelty and difficulty of the questions raised); three (skill required to properly perform the legal services rendered); four (the quality of representation); six (the attorney's

²⁸² *Id.* at 14.

 $^{^{283}}$ *Id.* at ¶15.

 $^{^{284}}$ *Id.* at ¶ 17.

expectorations at the outset of the litigation) eight (results obtained) and ten (the undesirability of the case), as set forth above, given the extensive risks in pursuing this litigation, and the settlements obtained, there can be little doubt that this is a formidable outcome for the Class.²⁸⁵

With respect to factor one (time and labor required), this factor supports the fee request. This litigation has been ongoing for over 4.5 years, and as set forth in the Perry Decl., Douglas Decl., Napoli Decl., London Decl., Summy Decl., Newman Decl., Olsen Decl. and Bowden Decl., counsel have expended 414,900.9 hours in attorney time and conducted massive common benefit work on behalf of the Class.

Finally, with respect to the *Barber* factors that go to the skills of class counsel and their relationship to the plaintiffs, these factors likewise support Class Counsel's requested fee. ²⁸⁶ These factors include: three (Skill Requisite to Perform the Legal Service Properly); four (The Preclusion of Other Employment by the Attorneys Due to Acceptance of the Case); seven (Time Limitations Imposed by the Client or the Circumstances); nine (The Experience, Reputation, and Ability of the Attorneys) and eleven (The Nature and Length of the Professional Relationship with the Client). As set forth the Fitzpatrick Decl., with respect to skill of counsel specifically, the result speaks for itself. ²⁸⁷ As such, these factors likewise support the fee request.

As demonstrated above, the requested fee percentage is well within the range of percentages that have been awarded in super-megafund cases and by courts in this Circuit. Accordingly, the "awards in similar cases" factor powerfully argues in support of the reasonableness of the 8% fee requested. As the other *Barber* factors fully endorse the requested fee, the fee requested should be awarded.

²⁸⁵ Fitzpatrick Decl., at ¶¶ 18-20.

 $^{^{286}}$ *Id.* at ¶¶ 18, 26.

 $^{^{287}}$ *Id.* at ¶ 26.

C. THE LODESTAR CROSS-CHECK CONFIRMS THAT CLASS COUNSEL'S FEE REQUEST IS REASONABLE

Although optional, a lodestar cross-check is often employed to ensure that the percentage awarded describes a reasonable attorney's fee. ²⁸⁸ Indeed, the first *Barber* principle (the time and labor expended) encourages this consideration. *See Allura*, 2021 WL 2043531, at *4. When undertaken as a "cross-check on the reasonableness of a percentage fee request," the Court need not "exhaustively scrutinize the hours documented by counsel and the reasonableness of the claimed lodestar can be tested by the court's familiarity with the case." *Savani v. URS Professional Solutions LLC*, 121 F. Supp. 3d 564, 575–76 (D.S.C. 2015). Indeed, the cross-check is applied in a "broad," "rough," "abbreviated," "streamlined," and "imprecise" way. ²⁸⁹

To conduct the lodestar cross check, the Court multiplies the number of hours reasonably spent by a reasonable hourly rate. A "reasonable hourly rate" is determined by the "customary fee for services by experienced counsel in a case like this," *Savani*, 121 F. Supp. 3d at 576, and "should be in line with the market rate for 'similar services by lawyers of reasonably comparable skill, experience, and reputation," *Berry v. Wells Fargo & Company*, 2020 WL 9311859, at *14 (D.S.C. 2020).

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²⁸⁸ However, when the lodestar method is employed, because it is deemed "presumptively reasonable," a percentage of fund crosscheck is contraindicated. *See In re Lumber Liquidators Chinese-Manufactured Flooring Prods. Mktg., Sales Pracs. & Prods. Liab. Litig.*, 27 F.4th 291, 307 (4th Cir. 2022).

Herman Decl. at ¶¶ 22, 71 (citing *Cantu-Guerrero v. Lumber Liquidators*, 952 F.3d 471, 482 n.7 (4th Cir. 2020) (a so-called "lodestar cross-check" is the comparison of a calculation of attorney's fees using the percentage-of-recovery method to a "rough" or "imprecise" lodestar calculation); *In re Deepwater Horizon*, MDL No. 2179, Rec. Doc. 21849 [2016 U.S. Dist. LEXIS 147378] (E.D. La. Oct. 25, 2016) at p.30 ("the Court will perform an abbreviated lodestar analysis as a broad cross-check on the on the reasonableness of the fee arrived at by the percentage method") and at p.39 ("the loadstar cross-check is a streamlined process, avoiding the detailed analysis that goes into a traditional lodestar examination"); *In re Vioxx*, 760 F.Supp.2d 640, 652 (E.D. La. 2010) ("The lodestar analysis is not undertaken to calculate a specific fee, but only to provide a broad cross check on the reasonableness of the fee arrived at by the percentage method")).

Because the MDL procedure consolidates cases filed by lawyers who typically practice in varied and disparate jurisdictions, district courts often look to a "national rate" rather than the market rate of the locality where the MDL happens to be. In the *Transvaginal Mesh Litigation*, Judge Goodwin, sitting in the Southern District of West Virginia, observed that "these MDLs encompass law firms from across the country and are national in scope" and therefore: "When selecting an hourly rate for determining legal fees the court cannot consider just one market because 'the relevant legal community' is one national in nature."²⁹⁰

Although some MDL litigation may involve more localized parties, justifying giving great weight to the local "market," MDL 2873 reaches a national and international scope of Plaintiffs and Defendants and involves legal issues that turn on national security policy, national environmental regulations, nationwide contamination, nationwide and international product distribution, and universal health concerns. See In re Actos (Pioglitazone) Prods. Liab. Litig., 274 F. Supp. 3d 485, 520 (W.D. La. 2017) (where "plaintiffs and plaintiffs' counsel span the entire United States of America; the venue proper as to each individual claim spans the entire United States, and the PSC, PEC, and Participating Counsel comprise attorneys whose practices span the entire United States," the "relevant legal community," " is national in nature.").

The Fourth Circuit agrees with this approach. Although "[t]he relevant market for determining the prevailing rate is ordinarily the community in which the court where the action is prosecuted sits," National Wildlife Federation v. Hanson, 859 F.2d 313, 317 (4th Cir.1988), "[i]n circumstances where it is reasonable to retain attorneys from other communities, however, the rates in those communities may also be considered." Rum Creek Coal Sales, Inc v. Caperton, 31 F.3d 169, 175 (4th Cir. 1994); Morris v. Bland, 2015 WL 12910631, at *3 (D.S.C. 2015)

²⁹⁰ Herman Decl. at ¶¶ 26, 36-37 (citing In re Cook Medical, Inc., Pelvic Repair Systems Prods. Liab. Litig., 365 F. Supp. 3d 685, 701 (S.D. W.Va. 2019)).

("Charleston is ordinarily the community that the Court would consider. However, because Plaintiff is a resident of York County, it was reasonable for her to obtain local counsel there, and the Court will consider the rates where counsel is located as well.").²⁹¹

In this case, a lodestar crosscheck confirms the reasonableness of the fee request. ²⁹² The lodestar calculated here ranges between \$300,803,152.50 and \$342,293,242.50 based on the 414,900.9 hours that were submitted to Mr. Perry²⁹³ and the blended hourly rates of \$725-\$825 approved by Mr. Herman. ²⁹⁴ Viewed in insolation, counsel's lodestar vastly exceeds the \$94,800,000 fee requested from the DuPont Settlement. Indeed, a negative multiplier would have to be applied to arrive at the fee requested from the DuPont Settlement alone. This cross-check resoundingly proves that even a greater fee is in order here. However, because Class Counsel submit that the DuPont Settlement should be considered in tandem with the 3M Settlement for purposes of fee calculations a different math applies. If the aggregate minimum of both Settlements are considered, the requested 8% fee equals \$ 934,800,000 ((\$1,185,000,000 + \$10,500,000,000,000) x .08). This combined fee is fully justified as it merely requires a lodestar multiplier ranging between 2.8 and 3.12, depending on the blended rate employed. Either multiplier is well within the range of permissible multipliers, and thus the lodestar cross check fully supports the fee request. ²⁹⁵

In fact, a higher multiplier is likely warranted as this is on the lower end of the range of multipliers seen in billion-dollar cases, which is between 1.0 and 6.2.²⁹⁶ The fact that the range of multipliers here (2.8-3.12) is within the appropriate range (1.0 to 6.2), supports the appropriateness

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²⁹¹ Herman Decl. ¶ 38.

²⁹² Fitzpatrick Decl., at ¶¶ 21-25.

²⁹³ Perry Decl., at ¶ 20.

²⁹⁴ Herman Decl., at ¶¶ 11, 56-83.

²⁹⁵ Fitzpatrick Decl., at ¶¶ 24-25.

²⁹⁶ *Id.* at 24.

of the already lower than norm fee request. Moreover, even if additional settlements occur in this, the Court can continue to do Lodestar analyses should it so choose in order to confirm that the multiplier remains within this appropriate range.²⁹⁷

D. PLAINTIFFS' COUNSEL ARE ENTITLED TO REIMBURSEMENT OF OUT-OF-POCKET COSTS

Class Counsel also request that the Court grant Plaintiffs' application for reimbursement of their out-of-pocket costs incurred in prosecuting and resolving this litigation for Class Members. As discussed above, Plaintiffs have incurred \$21,362,132.10 in total costs.²⁹⁸ At present, Plaintiffs seek 10% of those incurred costs, or \$2,136,213.21,²⁹⁹ which approximates DuPont's proportionate share of the aggregate Settlement Amounts of the DuPont and 3M PWS Settlements.³⁰⁰

As courts have recognized, "Class Counsel had a strong incentive to keep expenses at a reasonable level due to the high risk of no recovery when the fee is contingent." *Beesley v. Int'l Paper Co.*, No. 3:06-CV-703-DRH-CJP, 2014 WL 375432, at *3 (S.D. Ill. Jan. 31, 2014). This is certainly true, here, where Plaintiffs' counsel only expended what was reasonably necessary to prosecute and resolve the case for the Class Members, and, as discussed above, with the remote protocols that were put in place in this MDL, significant expenses were saved. As such, Plaintiffs respectfully submit that the cost reimbursement here is reasonable and appropriate and should be reimbursed. ³⁰¹

²⁹⁷ Fitzpatrick Decl., at ¶ 23.

²⁹⁸ Perry Decl., at ¶ 21.

²⁹⁹ Fitzpatrick, at ¶ 27.

³⁰⁰ See § II.B, supra.

³⁰¹ Fitzpatrick, at ¶ 28.

V. CONCLUSION

For the reasons set forth above, Class Counsel respectfully request that this Court recognize the exceptional work performed to achieve this historic settlement with DuPont by awarding them:

8% in fees of the DuPont settlement in the amount of \$94,800,000, with 5% of that amount, or \$4,740,000.00, held back for legal fees to administer the DuPont PWS settlement through 2030; and

Reimbursement of costs in the amount of \$2,136,213.21.

Further, for this class settlement, Class Counsel request that the Court direct the 8% fee award to be credited against any individual counsel's retainer fee such that any private contract will be reduced by 8%.

Dated: October 15, 2023

Respectfully submitted,

/s/ Michael A. London
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Class Counsel

IN THE UNITED STATES DISTRICT COURT FOR THE DISTRICT OF SOUTH CAROLINA

IN RE: AQUEOUS FILM-FORMING FOAMS PRODUCTS LIABILITY LITIGATION) Master Docket No.:) 2:18-mn-2873-RMG	
CITY OF CAMDEN, et al., Plaintiffs,) Civil Action No.:) 2:23-cv-03230-RMG	
-vs- E.I. DUPONT DE NEMOURS AND COMPANY (n/k/a EIDP, Inc.), et al., Defendants.))))))))	
[PROPOSED] ORDER GRANTING CLASS FOR ATTORNEYS' FEES AND FOR GRANTED as follows: • 8% in fees of the DuPont PWS Settlement	or Attorneys' Fees and Costs and the in the amount of \$94,800,000.00;	
 5% of that amount, or \$4,740,000.00, held back for legal fees to administer the DuPont PWS Settlement through 2030; and Reimbursement of costs in the amount of \$2,136,213.21. The 8% attorneys' fee award is to be credited against any individual counsel's retainer 		
fee, such that any private contract will be reduced by 8%. SO ORDERED.		
Charleston, South Carolina, this day of, 20		
Uſ	NITED STATES DISTRICT JUDGE	

CERTIFICATE OF SERVICE

I hereby certify that a true and correct copy of the foregoing was electronically filed with this Court's CM/ECF on this 15th day of October, 2023 and was thus served electronically upon counsel of record.

/s/ Michael A. London
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Class Counsel's Motion for Attorneys' Fees and Costs Exhibit List

Exhibit	Title	
A	Declaration of John Perry in Support of Class Counsel's Motion for Attorneys' Fees and Costs ("Perry Decl.")	
В	Declaration of Brian Fitzpatrick in Support of Class Counsel's Motion for Attorneys' Fees and Costs ("Fitzpatrick Decl.")	
C	Declaration of Michael A. London in Support of Class Counsel's Motion for Attorneys' Fees and Costs ("London Decl.")	
D	Declaration of Scott Summy in Support of Class Counsel's Motion for Attorneys' Fees and Costs ("Summy Decl.")	
E	Declaration of Gary J. Douglas in Support of Class Counsel's Motion for Attorneys' Fees and Costs ("Douglas Decl.")	
F	Declaration of Paul J. Napoli in Support of Class Counsel's Motion for Attorneys' Fees and Costs ("Napoli Decl.")	
G	Declaration of Steve J. Herman in Support of Class Counsel's Motion for Attorneys' Fees and Costs ("Herman Decl.")	
Н	Declaration of Staci J. Olsen in Support of Class Counsel's Motion for Attorneys' Fees and Costs ("Olsen Decl.")	
I	Declaration of Wesley Bowden in Support of Class Counsel's Motion for Attorneys' Fees and Costs ("Bowden Decl.")	
J	Declaration of Rebecca G. Newman in Support of Class Counsel's Motion for Attorneys' Fees and Costs ("Newman Decl.")	
K	Huntington Bank statement showing establishment of the DuPont PFAS Water Provider Settlement Trust Fund and wire transfer of the Settlement Amount thereto	
L	Letter from Robert A. Bilott, Esq. to the United States Environmental Protection Agency, dated March 6, 2001, EPA01-00171880-172830	
M	Excerpt of Steve Korzeniowski deposition transcript	
N	Congressional testimony of Daryl Roberts	

Exhibit	Title
О	Curriculum Vitae of Linda S. Birnbaum, Ph.D, D.A.B.T., A.T.S.
P	Curriculum Vitae of Professor Jonathan W. Martin, Ph.D

EXHIBIT A

IN THE UNITED STATES DISTRICT COURT FOR THE DISTRICT OF SOUTH CAROLINA CHARLESTON DIVISION

IN RE: AQUEOUS FILM-FORMING FOAMS PRODUCTS LIABILITY LITIGATION))))	MDL No. 2:18-mn-2873-RMG
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Declaration of John W. Perry, Jr.

I, JOHN W. PERRY, JR., declare under penalty of perjury as follows:

1. I am over 18 years of age, I am competent to make this declaration, and I have personal knowledge of the matters and facts recited herein.¹

Nature of Involvement

2. As more fully detailed below, I am the Court-appointed Special Master tasked with review of plaintiffs' counsel's common benefit submissions. I have been assisted by my partner Daniel J. Balhoff in this regard. Mr. Balhoff has been heavily involved on a day-to-day basis in this matter, and I have relied upon him for much of the information supplied below.

Background and Qualifications

- 3. I attended Nicholls State University, where I graduated magna cum laude from the College of Business Administration in 1976. I then attended LSU Law School, where I was elected to the Moot Court Board. I graduated in 1978 and was later inducted into the Hall of Fame.
- 4. I served on both the Louisiana Association of Defense Counsel Board of Directors and the Louisiana Trial Lawyers Association Board of Governors. I am a member of many professional organizations, including the American College of Trial Lawyers. I previously

¹ For many of the representations below, I have relied in part upon information relayed to me by others, as referenced herein.

- taught as an Adjunct Professor of Law at LSU. The Louisiana Supreme Court appointed me to serve as a Judge Pro Tempore.
- 5. I have served as a court-appointed neutral and/or mediator in numerous complex cases, including at the Multidistrict litigation, federal, and state levels. The following is a partial list of these matters:
 - In re Combat Arms Earplug Products Liability Litigation, MDL No. 2885 (N.D. Fla.)
 - In re: General Motors LLC Ignition Switch Litigation, MDL No. 2543 (S.D.N.Y.
 J.P.M.L.) (mediator and Special Master)
 - In re: E.I. DuPont de Nemours and Company C-8 Personal Injury Litigation, MDL No. 2433 (S.D. Oh. J.P.M.L.) (mediator)
 - In re: Oil Spill by the Oil Rig "Deepwater Horizon" in the Gulf of Mexico, on April 20, 2010, MDL No. 2179 (E.D. La. J.P.M.L.) (Special Master and Court-Designated Neutral)
 - Elias Membreno, et al. v. 1031 Canal Investments, L.L.C. (Hard Rock Hotel Collapse), No. 2019-10819 (C.D.C La.) (Special Master)
 - In re: Smith & Nephew Birmingham Resurfacing (BHR) Hip Implant Products
 Liability Litigation, MDL No. 2775 (D. Md. J.P.M.L.) (mediator)
 - In re: Aredia and Zometa Products Liability Litigation, MDL No. 1760 (M.D. Tenn.
 J.P.M.L) (mediator)
 - In re: Genetically Modified Rice Litigation, MDL No. 1811 (E.D. Mo. J.P.M.L) (mediator)

- In re: FEMA Trailer Formaldehyde Products Liability Litigation, MDL No. 1873
 (E.D. La. J.P.M.L.) (mediator)
- In re: Chinese-Manufactured Drywall Products Liability Litigation, MDL No. 2047
 (E.D. La. J.P.M.L.) (mediator and Special Master)
- In re: Coloplast Corp. Pelvic Support Systems Products Liability Litigation (Vaginal Mesh), MDL No. 2387 (S.D.W.Va. J.P.M.L.) (mediator)
- In re: Pradaxa (Dabigatran Etexilate) Products Liability Litigation, MDL No. 2385
 (S.D. Ill. J.P.M.L.) (mediator)
- In re: Yasmin and Yaz (Drospirenone) Marketing, Sales Practices and Products
 Liability Litigation, MDL No. 2100 (S.D. Ill. J.P.M.L.) (mediator)
- Patrick Joseph Turner, et al. v. Murphy Oil USA, Inc. (Murphy Oil Spill), 05-4206
 (E.D. La.) (mediator)
- Kate Reid, et al. v. The Doe Run Resources Corporation, 4:11-00044 (E.D. Mo.) (mediator)
- Terral Evans, et al. v. TIN, et al. (Bogalusa Fish Kill), 2:11-0267 (E.D. La.) (mediator)
- Mass Depakote Litigation, 12-52, etc. (S.D. Ill.) (mediator)
- Ian Pollard, et al. v. Remington Arms Co., et al., 4:13-00086 (W.D. Mo.) (mediator)
- *Medtronic Infuse Litigation* (multiple jurisdictions) (mediator)
- In re: Vulcan Litigation April 2001 Incidents, 69,388 (La. 23rd J.D.C.) (Special Master)
- Avandia Deceptive Marketing Litigation (multiple jurisdictions) (mediator)

- Jane Doe No. 1, et al. v. The Johns Hopkins Health System Corporation, d/b/a The Johns Hopkins Hospital, et al., 24-C-13-00141 (Md. Baltimore City Cir. Ct.) (mediator)
- 6. Among my assignments, I have reviewed attorney time and expenses and I have made recommendations concerning requests for attorneys' fees/expenses, including the aggregate amount, the division between common benefit fees/expenses and private contract fees/expenses, and the allocation of common benefit fees/expenses.

Submissions of Time and Expenses

- 7. On December 7, 2018, the United States Judicial Panel on Multidistrict Litigation transferred this matter to the District of South Carolina and assigned it to the Honorable Richard M. Gergel. RD 1.
- On April 26, 2019, Judge Gergel entered Case Management Order No. 3 ("CMO 3"). RD
 Relevant to my task as the Special Master, CMO 3 established the procedure for submitting common benefit time and expenses:
- 9. Pursuant to CMO 3, the firms began submitting time and expense information to Mr. Betsill in June 2019 (for all time and expenses incurred through May 31, 2019). The firms thereafter typically (but not always) submitted additional time and expenses on a monthly basis.
- 10. As of August 22, 2023, approximately 40 firms and 650 timekeepers (including partners/members, senior associates, associates, paralegals, and law clerks) submitted time and expenses to Mr. Betsill.

My Appointment and Performance of Duties

- 11. On May 19, 2021, the Plaintiffs' Executive Committee ("PEC") filed an "Unopposed Motion to Appoint John W. Perry Jr. as Special Master." RD 1615. Specifically, the PEC asked the Court to appoint me "to assist in the management and oversight of the Common Benefit time submitted by the PEC and associated plaintiffs' counsel, including to assist the PEC in its yearly PEC re-application process."
- 12. On May 19, 2021, the Court entered Case Management Order No. 18 ("CMO 18"). RD 1618. CMO 18 "provide[d] the parties notice of [the Court's] intent to appoint John W. Perry, Jr. as Special Master relating to the review of plaintiffs' counsel's Common Benefit Fund submissions."
- 13. On June 8, 2021, the Court entered Case Management Order No. 18.A ("CMO 18.A"). RD 1686. Among other things, CMO 18.A provided that I "shall assist in the management and oversight of the Common Benefit Fund time and expense submissions provided by the PEC and associated with plaintiff's counsel."
- 14. On June 23, 2021, Mr. Balhoff, Jonathon Perry, and I² participated in a telephone conference with Co-Lead Plaintiffs' Counsel Michael London, Paul Napoli, and Scott Summy.
- 15. Co-Lead Counsel gave us an overview of the case and offered to put us in touch with Jeremy Betsill (the Court-Appointed CPA) so that we would have access to the time and expenses that had been submitted pursuant to CMO 3.

² Mr. Balhoff, Jonathon Perry, and I are partners in the same firm.

- 16. Mr. Betsill developed a portal so that we could access each firm's monthly submissions pursuant to CMO 3. These typically included a detailed time spreadsheet, a detailed expense spreadsheet, and pdf backup of any expenses.
- 17. On June 23, 2021, Mr. Balhoff contacted Dustin Mire of Postlethwaite & Netterville (now Eisner Advisory Group), to enlist his assistance with management of the Betsill database.
- 18. Mr. Mire specializes in claims administration and consulting in class actions and mass torts.

 We have worked with Mr. Mire and his team on complex litigation projects for approximately 15 years.
- 19. At the most recent count, Mr. Betsill's portal contains 3,466 files in 50 folders. These include 2,386 Excel spreadsheets, 1,056 pdf files, and 24 other files (such as photographs or emails). This amounts to about five gigabytes of data.

Conclusions

- 20. As of August 22, 2023, the 40 reporting firms submitted 434,764.10 common benefit hours. The PEC and the firms thereafter determined that 19,863.20 of those hours should be withdrawn for various reasons, including not meeting the criteria of CMO 3. The Co-Lead Counsel therefore instructed my office to remove those hours from consideration. After taking into account this reduction, Mr. Mire's team reports that, as of August 22, 2023, the firms have submitted 414,900.90 common benefit hours.
- 21. As of August 22, 2023, the total (shared and held) costs were \$21,362,132.10.
 - As of August 22, 2023, Mr. Betsill reports that the shared costs were \$16,224,303.00.
 - As of August 22, 2023, the firms submitted \$6,246,046.75 in held costs. The Co-Lead Counsel thereafter determined that \$1,108.217.69 should be

withdrawn for various reasons, including not meeting the criteria of CMO 3. Co-Lead Counsel therefore instructed my office to remove that amount from consideration. As a result, Mr. Mire's team reports that, as of August 22, 2023, the firms have submitted \$5,137,829.06 in held costs.

- 22. Along with Mr. Mire's team, we are auditing the participating firms' submissions (including their prior submissions) on a continuing basis, and we will continue to work with the firms and Mr. Betsill to correct any errors in the submissions.
- 23. We have reviewed time and expense submissions with the objective of presenting aggregate numbers to the Court (as was done in the above paragraphs). Based upon my experience as a neutral in complex litigation, and in light of the settlement achieved by the attorneys, I believe that the aggregate hours and costs appear reasonable in these circumstances. Moreover, the aggregate hours billed are certainly appropriate for Lodestar cross check purposes even though such hours will be analyzed in a different way for the purposes of allocation among firms at a later date.
- 24. I have served as a neutral in complex settlements that entail lengthy backend administration. It is my understanding that the firms are requesting that 5% of the attorneys' fees being requested are to be held back and available for legal fees incurred by Class Counsel or their designees for the remainder of the settlement's administration. Based on my experience, I believe that this is a reasonable approach.

Dated October 44, 2023

John W. Perry, Jr.

EXHIBIT B

UNITED STATES DISTRICT COURT FOR THE DISTRICT OF SOUTH CAROLINA CHARLESTON DIVISION

In re Aqueous Film-Forming Foams Products Liability Litigation

MDL No. 2873

DECLARATION OF BRIAN T. FITZPATRICK

BACKGROUND AND QUALIFICATIONS

- 1. I am a Professor of Law at Vanderbilt University in Nashville, Tennessee. I joined the Vanderbilt law faculty in 2007, after serving as the John M. Olin Fellow at New York University School of Law in 2005 and 2006. I graduated from the University of Notre Dame in 1997 and Harvard Law School in 2000. After law school, I served as a law clerk to The Honorable Diarmuid O'Scannlain on the United States Court of Appeals for the Ninth Circuit and to The Honorable Antonin Scalia on the United States Supreme Court. I also practiced law for several years in Washington, D.C., at Sidley Austin LLP. My C.V. is attached as Exhibit 1. I speak only for myself and not for Vanderbilt. My compensation for this Declaration was \$950 per hour.
- 2. My teaching and research at Vanderbilt have focused on class action litigation. I teach the Civil Procedure, Federal Courts, and Complex Litigation courses. In addition, I have published a number of articles on class action litigation in such journals as the University of Pennsylvania Law Review, the Journal of Empirical Legal Studies, the Vanderbilt Law Review, the NYU Journal of Law & Business, the Fordham Law Review, and the University of Arizona Law Review. My work has been cited by numerous courts, scholars, and media outlets such as the New York Times, USA Today, and Wall Street Journal. I have also been invited to speak at symposia and other events about class action litigation, such as the ABA National Institute on

Class Actions in 2011, 2015, 2016, 2017, 2019, and 2023, as well as the ABA Annual Meeting in 2012 and 2022. Since 2010, I have also served on the Executive Committee of the Litigation Practice Group of the Federalist Society for Law & Public Policy Studies. In 2015, I was elected to membership in the American Law Institute.

3. In December 2010, I published an article in the Journal of Empirical Legal Studies entitled An Empirical Study of Class Action Settlements and Their Fee Awards, 7 J. Empirical L. Stud. 811 (2010) (hereinafter "Empirical Study"). This article is still the most comprehensive examination of federal class action settlements and attorneys' fees that has ever been published. Unlike other studies of class actions, which have been confined to securities cases or have been based on samples of cases that were not intended to be representative of the whole (such as settlements approved in published opinions), my study attempted to examine every class action settlement approved by a federal court over a two-year period, 2006-2007. See id. at 812-13. As such, not only is my study based on an unbiased sample of settlements, but the number of settlements included in my study is several times the number of settlements per year that has been identified in any other empirical study of class action settlements: over this two-year period, I found 688 settlements, including 30 from the Fourth Circuit alone. See id. at 817. I presented the findings of my study at the Conference on Empirical Legal Studies at the University of Southern California School of Law in 2009, the Meeting of the Midwestern Law and Economics Association at the University of Notre Dame in 2009, and before the faculties of many law schools in 2009 and 2010. This study has been relied upon by a number of courts, scholars, and testifying experts.¹ I will draw upon this study in this Declaration and I attach it as Exhibit 2.

¹ See, e.g., In re Stericycle Sec. Litig., 35 F.4th 555, 561 (7th Cir. 2022) (relying on article to assess fees); Silverman v. Motorola Solutions, Inc., 739 F.3d 956, 958 (7th Cir. 2013) (same); In re Ranbaxy Generic Drug Application Antitrust Litig., 2022 WL 4329646, at *5 (D. Mass., Sep. 19, 2022) (same); de la Cruz v. Manhattan Parking Group, 2022 WL 3155399, at *4 (S.D.N.Y., Aug. 8, 2022) (same); Kukorinis v. Walmart, 2021 WL 8892812,

4. In addition to my empirical works, I have also published many papers on what law-and-economics can tell us about how to create the best incentives for attorneys and others in class action litigation. *See, e.g.*, Brian T. Fitzpatrick, *A Fiduciary Judge's Guide to Awarding Fees in*

...

at *4 (S.D.Fla., Sep. 21, 2021) (same); Kuhn v. Mayo Clinic Jacksonville, No. 3:19-cv-453-MMH-MCR, 2021 WL 1207878, at *12-13 (M.D. Fla. Mar. 30, 2021) (same); In re LIBOR-Based Fin. Instruments Antitrust Litig., No. 11 MD 2262 (NRB), 2020 WL 6891417, at *3 (S.D.N.Y. Nov. 24, 2020) (same); Shah v. Zimmer Biomet Holdings, Inc., No. 3:16-cv-815-PPS-MGG, 2020 WL 5627171, at *10 (N.D. Ind. Sept. 18, 2020) (same); In re GSE Bonds Antitrust Litig., No. 19-cv-1704 (JSR), 2020 WL 3250593, at *5 (S.D.N.Y. June 16, 2020) (same); In re Wells Fargo & Co. S'holder Derivative Litig., No. 16-cv-05541-JST, 2020 WL 1786159, at *11 (N.D. Cal. Apr. 7, 2020) (same); Arkansas Teacher Ret. Sys. v. State St. Bank & Trust Co., No. CV 11-10230-MLW, 2020 WL 949885, 2020 WL 949885, at *52 (D. Mass. Feb. 27, 2020), appeal dismissed sub nom. Arkansas Tchr. Ret. Sys. v. State St. Corp., No. 20-1365, 2020 WL 5793216 (1st Cir. Sept. 3, 2020) (same); In re Equifax Inc. Customer Data Sec. Breach Litig., No. 1:17-MD-2800-TWT, 2020 WL 256132, at *34 (N.D. Ga. Jan. 13, 2020) (same); In re Transpacific Passenger Air Transp. Antitrust Litig., No. 3:07-cv-05634-CRB, 2019 WL 6327363, at *4-5 (N.D. Cal. Nov. 26, 2019) (same); Espinal v. Victor's Cafe 52nd St., Inc., No. 16-CV-8057 (VEC), 2019 WL 5425475, at *2 (S.D.N.Y. Oct. 23, 2019) (same); James v. China Grill Mgmt., Inc., No. 18 Civ. 455 (LGS), 2019 WL 1915298, at *2 (S.D.N.Y. Apr. 30, 2019) (same); Grice v. Pepsi Beverages Co., 363 F. Supp. 3d 401, 407 (S.D.N.Y. 2019) (same); Alaska Elec. Pension Fund v. Bank of Am. Corp., No. 14-CV-7126 (JMF), 2018 WL 6250657, at *2 (S.D.N.Y. Nov. 29, 2018) (same); Rodman v. Safeway Inc., No. 11-cv-03003-JST, 2018 WL 4030558, at *5 (N.D. Cal. Aug. 23, 2018) (same); Little v. Washington Metro. Area Transit Auth., 313 F. Supp. 3d 27, 38 (D.D.C. 2018) (same); Hillson v. Kelly Servs. Inc., No. 2:15-cv-10803, 2017 WL 3446596, at *4 (E.D. Mich. Aug. 11, 2017) (same); Good v. W. Virginia-Am. Water Co., No. 14-1374, 2017 WL 2884535, at *23, *27 (S.D.W. Va. July 6, 2017) (same); McGreevy v. Life Alert Emergency Response, Inc., 258 F. Supp. 3d 380, 385 (S.D.N.Y. 2017) (same); Brown v. Rita's Water Ice Franchise Co. LLC, No. 15–3509, 2017 WL 1021025, at *9 (E.D. Pa. Mar. 16, 2017) (same); In re Credit Default Swaps Antitrust Litig., No. 13MD2476 (DLC), 2016 WL 2731524, at *17 (S.D.N.Y. Apr. 26, 2016) (same); Gehrich v. Chase Bank USA, N.A., 316 F.R.D. 215, 236 (N.D. Ill. 2016); Ramah Navajo Chapter v. Jewell, 167 F. Supp 3d 1217, 1246 (D.N.M. 2016); In re: Cathode Ray Tube (Crt) Antitrust Litig., No. 3:07-cv-5944 JST, 2016 WL 721680, at *42 (N.D. Cal. Jan. 28, 2016) (same); In re Pool Products Distribution Mkt. Antitrust Litig., No. MDL 2328, 2015 WL 4528880, at *19-20 (E.D. La. July 27, 2015) (same); Craftwood Lumber Co. v. Interline Brands, Inc., No. 11-cv-4462, 2015 WL 2147679, at *2-4 (N.D. Ill. May 6, 2015) (same); Craftwood Lumber Co. v. Interline Brands, Inc., No. 11-cv-4462, 2015 WL 1399367, at *3-5 (N.D. Ill. Mar. 23, 2015) (same); In re Capital One Tel. Consumer Prot. Act Litig., 80 F. Supp. 3d 781, 797 (N.D. Ill. 2015) (same); In re Neurontin Marketing and Sales Practices Litig., 58 F.Supp.3d 167, 172 (D. Mass. 2014) (same); Tennille v. W. Union Co., No. 09-cv-00938-JLK-KMT, 2014 WL 5394624, at *4 (D. Colo. Oct. 15, 2014) (same); In re Colgate-Palmolive Co. ERISA Litig., 36 F. Supp. 3d 344, 349-51 (S.D.N.Y. 2014) (same); In re Payment Card Interchange Fee & Merchant Discount Antitrust Litig., 991 F. Supp. 2d 437, 444-46 & n.8 (E.D.N.Y. 2014) (same); In re Fed. Nat'l Mortg. Association Sec., Derivative, and "ERISA" Litig., 4 F. Supp. 3d 94, 111-12 (D.D.C. 2013) (same); In re Vioxx Prod. Liab. Litig., No. 11-1546, 2013 WL 5295707, at *3-4 (E.D. La. Sep. 18, 2013) (same); In re Black Farmers Discrimination Litig., 953 F. Supp. 2d 82, 98-99 (D.D.C. 2013) (same); In re Se. Milk Antitrust Litig., No. 2:07-CV 208, 2013 WL 2155387, at *2 (E.D. Tenn., May 17, 2013) (same); In re Heartland Payment Sys., Inc. Customer Data Sec. Breach Litig., 851 F. Supp. 2d 1040, 1081 (S.D. Tex. 2012) (same); Pavlik v. FDIC, No. 10 C 816, 2011 WL 5184445, at *4 (N.D. Ill. Nov. 1, 2011) (same); In re Black Farmers Discrimination Litig., 856 F. Supp. 2d 1, 40 (D.D.C. 2011) (same); In re AT & T Mobility Wireless Data Servs. Sales Tax Litig., 792 F. Supp. 2d 1028, 1033 (N.D. Ill. 2011) (same); In re MetLife Demutualization Litig., 689 F. Supp. 2d 297, 359 (E.D.N.Y. 2010) (same).

Class Actions, 89 Ford. L. Rev. (2021) (hereinafter "Fiduciary Judge"); Brian T. Fitzpatrick, Do Class Action Lawyers Make Too Little?, 158 U. Pa. L. Rev. 2043 (2010) (hereinafter "Class Action Lawyers"). Much of this work is found in a book published in 2019 by the University of Chicago Press entitled THE CONSERVATIVE CASE FOR CLASS ACTIONS. The thesis of the book is that a so-called "private attorney general" is superior to the public attorney general in enforcing the rules that free markets need in order to operate effectively, and that courts should appropriately incentivize class action lawyers to encourage this private attorney general behavior. I will also draw upon this work in this Declaration.

SUMMARY OF OPINIONS

- 5. I have been asked by class counsel to opine on whether the attorneys' fees and expenses they have requested here are reasonable in light of the empirical studies and research on economic incentives in class action litigation. To formulate my opinion, I reviewed a number of documents provided to me by class counsel and I have attached a list of these documents as Exhibit 3. As I explain, based on the empirical studies and research on economic incentives, my opinions are as follows:
 - As is the practice of most courts in class action litigation—including those awarding
 fees from billion-dollar settlements like this one—the Court should use the
 percentage method rather the lodestar method to assess the fee request.
 - Under the percentage method, the 8% fee request here is below the norm, which is around 25% in all cases, and 9.3-13.7% in billion-dollar cases (depending on the data source and the statistic), and easily justified by the *Barber* factors.
 - Although a lodestar crosscheck is not required, it shows that the fee request here—
 whether on its own or considered alongside the expected fee request in 3M, which I

understand will be the same percentage—is below or within the range of multipliers in other billion-dollar cases, which have spanned 1.0 to 6.2, and therefore provides no reason to further reduce an already below-the-norm fee request.

• The expenses sought here are only a fraction of one percent of the settlement. That number is well below average for class action litigation, including in billion-dollar settlements, and is therefore easy to justify as well.

CASE BACKGROUND

6. As the Court is of course well aware, in 2018 the Judicial Panel on Multidistrict Litigation created this MDL and transferred it to this Court. The case involves allegations by water providers and others against dozens of defendants for chemical contamination by compounds known as PFAS. Without any exaggeration, it is one of the most complicated multidistrict litigations in American history. Litigation has gone on for many years and will continue for many more. Most of the work has been intertwined among defendants and is impossible to disaggregate, including nearly 200 depositions; review of millions of documents totaling tens of millions of pages; unusual discovery against agencies of the United States government; briefing of dozens of motions and responses thereto, including several jurisdictional motions, numerous summary judgment motions, motions in limine, as well as an appeal to the Fourth Circuit; and preparation of the first bellwether case to the very eve of trial. A memorandum of understanding with the DuPont defendants was executed on June 1, 2023, after which the parties executed the settlement agreement between them on June 30, 2023. The Court gave preliminary approval to that settlement on August 22, 2023. Class counsel will move for final approval next month and have now filed their fee petition in anticipation thereof.

- The settlement class includes, with minor exceptions, "Public Water Systems in the United States" that have either already found PFAS in their water or are subject to various monitoring and testing requirements and may find PFAS in the future. Settlement Agreement ¶ 5.1.1. Pursuant to the settlement, the defendants will pay \$1.185 billion in cash. Id. at 2.50. These monies are already in escrow and accruing interest. Upon final approval, they will be distributed to class members in two phases pursuant to an allocation process that is too complex to describe here, but, for my purposes, the important part is that none of the monies can revert back to the defendants. In exchange, the class members will release the defendants from the claims thoroughly described in id. at ¶ 12.1.
- 8. Class counsel are moving for an award of fees equal to 8% of the settlement fund² and an award of expenses of some \$2.1 million. As I explain below, both requests are below the norm, and, in my opinion, easily justified in light of the empirical studies and research on economic incentives in class action litigation.

ASSESSMENT OF THE REQUEST FOR ATTORNEYS' FEES

9. When a class action reaches settlement or judgment and no fee-shifting statute is triggered, and the defendant has not agreed to pay class counsel's fees, class counsel are paid by the class members themselves, pursuant to the common law of unjust enrichment. This is sometimes called the "common fund" or "common benefit" doctrine. It requires the court to decide how much of their class action proceeds is fair to ask class members to pay to class counsel.

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² If class members have retained their own counsel, the class fee will be taken and credited out of their lawyers' percentage of the recovery rather than from their own net recovery. This is a common practice in MDL litigation, *see*, *e.g.*, William B. Rubenstein, 5 Newberg on Class Actions § 15:115 (6th ed.) ("In some cases, the common benefit fund is comprised exclusively of assessments upon the individually retained lawyers' contingent fees. In yet other cases, courts have ordered specific portions of the common benefit assessment to be paid by individual plaintiffs and portions by their lawyers' contingent fees."), and it avoids the need—which is very controversial in some circles—to "cap" the percentages in agreements with retained counsel.

Lodestar Versus Percentage Method

10. At one time, courts that awarded fees in common fund class action cases did so using the familiar "lodestar" approach. See Fitzpatrick, Class Action Lawyers, supra, at 2051 (2010). Under this approach, courts awarded class counsel a fee equal to the number of hours they worked on the case (to the extent the hours were reasonable), multiplied by a reasonable hourly rate as well as by a discretionary multiplier that courts often based on the risk of non-recovery and other factors. See id. Over time, however, the lodestar approach fell out of favor in common fund class actions. It did so largely for two reasons. First, courts came to dislike the lodestar method because it was difficult to calculate; courts had to review voluminous time records. Second—and more importantly—courts came to dislike the lodestar method because it did not align the interests of class counsel with the interests of the class; class counsel's recovery did not depend on how much the class recovered, but, rather, on how many hours could be spent on the case. See id. at 2051-52. According to my empirical study, the lodestar method is now used to award fees in only a small percentage of class action cases, usually those involving fee-shifting statutes or those in which the relief is entirely or almost entirely injunctive in nature. See Fitzpatrick, Empirical Study, supra, at 832 (finding the lodestar method used in only 12% of settlements). The other large-scale academic study of class action fees, authored over time by Geoff Miller and the late Ted Eisenberg, agrees with my findings. See Theodore Eisenberg et al., Attorneys' Fees in Class Action Settlements: 2009-2013, 92 N.Y.U. L. Rev. 937, 945 (2017) ("Eisenberg-Miller 2017") (finding lodestar method used less than 7% of the time since 2009); Theodore Eisenberg & Geoffrey P. Miller, Attorneys' Fees and Expenses in Class Action Settlements: 1993-2008, 7 J. Empirical L. Stud. 248, 267 (2010) ("Eisenberg-Miller 2010") (finding lodestar method used only 13.6% of the time before 2002 and less than 10% of the time thereafter and before 2009). As I show below in

Table 1, this remains true even in billion-dollar settlements like this one: almost none of the fee awards in such cases are awarded based on the lodestar method alone.

- The more common method of calculating attorneys' fees today is known as the "percentage" method. Under this approach, courts select a percentage of the settlement fund that they believe is fair compensation for class counsel, multiply the settlement amount by that percentage, and then award class counsel the resulting product. The percentage approach has become the preferred method for awarding fees to class counsel in common fund cases precisely because it corrects the deficiencies of the lodestar method: it is less cumbersome to calculate, and, more importantly, it aligns the interests of class counsel with the interests of the class because the more the class recovers, the more class counsel recovers. *See* Fitzpatrick, *Class Action Lawyers, supra,* at 2052. This is why private parties—including sophisticated corporations—that hire lawyers on contingency almost always use the percentage method over the lodestar method. *See, e.g.,* David L. Schwartz, *The Rise of Contingent Fee Representation in Patent Litigation,* 64 Ala. L. Rev. 335, 360 (2012); Herbert M. Kritzer, RISKS, REPUTATIONS, AND REWARDS 39-40 (1998).
- 12. In the Fourth Circuit, district courts have discretion to use either the lodestar or percentage method. *See, e.g., McAdams v. Robinson*, 26 F.4th 149, 162 (4th Cir. 2022) ("A district court may choose the method it deems appropriate based on its judgment and the facts of the case."). In light of the well-recognized disadvantages of the lodestar method and the well-recognized advantages of the percentage method, it is my professional opinion that courts should use the percentage method in common fund cases whenever the value of the settlement or judgment can be reliably calculated; further, it is my opinion that the lodestar method should be used only when the value of the settlement or judgment cannot be reliably calculated and the percentage method is therefore not feasible. This is not just my opinion, but also the opinion of other leading

class action scholars, *see* Principles of the Law of Aggregate Litigation § 3.13 (2010) (cmt. b) ("Although many courts in common-fund cases permit use of either a percentage-of-the-fund approach or a lodestar . . . most courts and commentators now believe that the percentage method is superior."); of many district judges in the Fourth Circuit, *see*, *e.g.*, *Galloway v. Williams*, 2020 WL 7482191, at *4 (E.D. Va. Dec. 18, 2020) ("[T]he favored method for calculating attorneys' fees in common fund cases is the percentage of the fund method."); and, as I show in Table 1, the many judges who have awarded fees in billion-dollar cases. Because this settlement is all cash and therefore can be easily valued, it is my opinion that the percentage method should be used here. I will therefore proceed under that method.

Factors Under the Percentage Method

13. When selecting the appropriate percentage, courts usually examine a number of factors. See Fitzpatrick, Empirical Study, supra, at 832. Absent further instruction from the Fourth Circuit, see McAdams, 26 F.4th at 162 ("The Fourth Circuit has [not] identified factors for district courts to apply when using the percentage method."), this Court is to consider the factors from Barber v. Kimbrell's Inc., 577 F.2d 216, 226 n.28 (4th Cir. 1978). See Local Rule 54.02(A). These are the same twelve factors adopted by the Fifth Circuit in Johnson v. Georgia Highway Express, Inc., 488 F.2d 714 (5th Cir. 1974). They are: "(1) the time and labor expended; (2) the novelty and difficulty of the questions raised; (3) the skill required to properly perform the legal services rendered; (4) the attorney's opportunity costs in pressing the instant litigation; (5) the customary fee for legal work; (6) the attorney's expectations at the outset of litigation; (7) the time limitations imposed by the client or circumstances; (8) the amount in controversy and the results obtained; (9) the experience, reputation[,] and ability of the attorney; (10) the undesirability of the case within the legal community in which the suit arose; (11) the nature and length of the professional

relationship between attorney and client; and (12) attorneys' fees awards in similar cases." *Barber*, 577 F.2d at 226 n.28. In my opinion, the 8% fee requested here is supported by each of these factors according to the empirical studies and research on economic incentives in class action litigation.

Data from Other Cases

14. Consider first the factors which relate to the fee awards in other cases: "(5) the customary fee for legal work" and "(12) attorneys' fees awards in similar cases." The fee request here is far below the norm. According to my empirical study, the most common percentages awarded by federal courts nationwide using the percentage method were 25%, 30%, and 33%. See Fitzpatrick, Empirical Study, supra, at 833-34, 838. The mean and median were 25.4% and 25%, respectively. See id. The other large-scale studies of class action fees have again found much the same, including the possibility that the mean and median percentages have ranged even higher in recent years. See Eisenberg-Miller 2017, supra, at 951 (finding mean and median of 27% and 29% nationwide since 2009); Eisenberg-Miller 2010, supra, at 260 (finding mean and median of 24% and 25% nationwide before 2009). The same is true when looking at fee awards from the Fourth Circuit in particular. In my study, the mean and median percentage-method awards in the Fourth Circuit were 25.2% and 28%, respectively. See Fitzpatrick, Empirical Study, supra, at 836. The Eisenberg-Miller studies found more or less the same thing, albeit with lower numbers in their older study (but still well above the fee percentage requested here). See Eisenberg-Miller 2017, supra, at 951 (finding mean and median in the Fourth Circuit of 26% and 25%, respectively); Eisenberg-Miller 2010, supra, at 260 (20% and 21%, respectively). Again, the fee request here is far below the norm.

15. In order to visualize *how far* below the norm the fee request here is, consider Figure 1, below, which shows the distribution of all percentage-method fee awards in my study. The figure shows what fraction of settlements (y-axis) had fee awards within each five-point range of fee percentages (x-axis); each bar includes the number on its left edge and excludes the number on its right edge. The range that includes the fee request here is depicted with a red arrow. As the Figure shows, this request is among the lowest percentages awarded in a class action in the federal judiciary.

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Figure 1: Percentage-Method Fee Awards Among All Federal Courts, 2006-2007

16. Of course, this is not a normal class action settlement. It is unusually large. Indeed, it will be one of the largest class action settlements in federal court this entire year. In the two years of my study, there were only eight class action settlements over \$1 billion. *See id.* at 829 n.59. This is notable because my empirical study showed that settlement size had a statistically

significant, inverse relationship to the fee percentages awarded by federal courts—*i.e.*, that federal courts tend to award lower percentages of larger settlements. *See id.* at 838, 842-44. This relationship was found in the other large-scale academic studies as well. *See Eisenberg-Miller 2017, supra*, at 947-48; *Eisenberg-Miller 2010, supra*, at 263-65. In my professional opinion, this practice is counterproductive because it gives lawyers bad incentives *see, e.g.*, Fitzpatrick, *Fiduciary Judge, supra*, at 1169—and not all courts follow it, as Table 1 shows below—but that is neither here nor there in this case, because the fee request here is modest even when compared to the *largest* possible settlements. For example, in settlements above \$1 billion in my study, the average and median fee percentages were 13.7% and 9.5%, respectively. *See id.* at 839. (The Eisenberg-Miller studies did not separately report numbers for billion-dollar settlements.) Thus, the request here is below the norm even in billion-dollar settlements.

17. But because there are so few billion-dollar settlements every year, in order to give the Court as much data as possible, I collected the fee awards in every billion-dollar class action recovery in federal court that I could find from any year and listed them below in Table 1.³ The Table includes 36 awards, 33 of which used the percentage-method (including those that used both the percentage and lodestar methods). The average and median percentages awarded in these cases were 12.1% and 9.52%, respectively (or 11.43% and 9.31% if the total values rather than cash values of the two settlements indicated in the Table are used). Thus, all of the available data support my conclusion: the request here is below the norm even when judged against the biggest previous cases. In short, no matter how you slice it, this is a modest fee request and, in my opinion, these factors therefore strongly support the requested fee.

³ The table excludes multi-defendant settlements approved piecemeal over time even if they totaled to more than \$1 billion if fees were not awarded on a single piece of at least \$1 billion.

Table 1: All Federal Class Action Settlements Greater Than or Equal to \$1 Billion

Case	Settlement	Fee	Fee	Lodestar	Expenses
Case	Amount	Method	Percentage	Multiplier	Expenses
Wells Fargo Securities (2023) ⁴	\$1 billion	Percent	18%	Not calculated	\$4.4 million
Blue Cross Blue Shield Antitrust (2022) ⁵	\$2.67 billion	Percent	23.47%	3.23	\$40.9 million
Valeant Securities (2021) ⁶	\$1.21 billion	Percent	13%	3.6	\$1.7 million
ARCP Securities (2020) ⁷	\$1.03 billion	Both	9.76%	1.5	\$5.2 million
Payment Card Interchange Fees Antitrust (2019) ⁸	\$5.62 billion	Percent	9.31%	2.4	\$39.2 million
Foreign Exchange Antitrust (2018) ⁹	\$2.31 billion	Percent	13%	1.72	\$22.5 million
Petrobras Securities (2018) ¹⁰	\$3 billion	Lodestar	N/A	1.8	\$14.5+ million
Syngenta Corn (2018) ¹¹	\$1.51 billion	Percent	33.33%	1.4	\$31.3 million
Chinese Drywall (2018) ¹²	\$1.12 billion	Both	9.18%	1.0	\$35.3 million
NFL Concussion (2018) ¹³	\approx \$1 billion	Both	10.8%	3.0	\$5.6 million
Volkswagen Diesel Engine (Consumer) (2017) ¹⁴	\$10 billion	Percent	1.7%	2.6	\$8 million
Volkswagen Diesel Engine (Dealer) (2017) ¹⁵	\$1.2 billion	Lodestar	N/A	2.0	\$87,000
Credit Default Swaps Antitrust (2016) ¹⁶	\$1.87 billion	Percent	13.6%	6.2	\$10.2 million

⁴ In re Wells Fargo & Co. Securities Litig., No. 20-cv-04494 (S.D.N.Y. Sep. 8, 2023).

⁵ In re Blue Cross Blue Shield Antitrust Litig., 2022 WL 4587617 (N.D. Ala. Aug. 9, 2022).

⁶ In re Valeant Pharms. Int'l, Inc. Sec. Litig., 2021 WL 358611 (D.N.J. Feb. 1, 2021).

⁷ In re American Realty Capital Properties Litig., No. 15-mc-00040 (D.N.J. Jan. 23, 2020).

⁸ In re Payment Card Interchange Fee & Merch. Disc. Antitrust Litig., 2019 WL 6888488 (E.D.N.Y. Dec. 16, 2019).

⁹ In re Foreign Exchange Benchmark Rates Antitrust Litigation, No. 13-7789 (S.D.N.Y. Nov. 8, 2018).

¹⁰ In re Petrobras Sec. Litig., No. 14-9662 (S.D.N.Y. Jun. 22, 2018).

¹¹ In re: Syngenta AG MIR 162 Corn Litigation, 357 F.Supp.3d 1094 (D. Kan. 2018).

¹² In re: Chinese Manufactured-Drywall Products Liab. Litig., No. 2047 (E.D.La. Jan. 31, 2018).

¹³ In re Nat'l Football League Players' Concussion Injury Litig., 2018 WL 1635648 (E.D. Pa. Apr. 5, 2018).

¹⁴ In re Volkswagen "Clean Diesel" Mktg., Sales Practices, & Prod. Liab. Litig., MDL No. 2672, 2017 WL 1047834 (N.D. Cal. Mar. 17, 2017). The settlement was uncapped and the amount in the Table was an estimate used at the time fees were awarded.

¹⁵ In re Volkswagen "Clean Diesel" Mktg., Sales Practices, & Prod. Liab. Litig., MDL No. 2672, 2017 WL 1352859 (N.D. Cal. Apr. 12, 2017).

¹⁶ In re Credit Default Swaps Antitrust Litig., 2016 WL 2731524 (S.D.N.Y. Apr. 26, 2016).

Case	Settlement Amount	Fee Method	Fee Percentage	Lodestar Multiplier	Expenses
Household Securities (2016) ¹⁷	\$1.58 billion	Percent	24.7%	Not calculated	\$33.6 million
Bank of America Securities (2013) ¹⁸	\$2.4 billion	Not specified	6.5%	Not calculated	\$8 million
Toyota Unintended Acceleration (2013) ¹⁹	\$1.6 billion (est. total) \$757 million (cash)	Percent	12.3% (total) 26.4% (cash)	2.9	\$27 million
Black Farmers Discrimination (2013) ²⁰	\$1.2 billion	Percent	7.4%	<2.0	\$28+ million
TFT-LCD Antitrust (2013) ²¹	\$1.1 billion	Percent	28.6%	≈2.5	\$8.7 million
BP Gulf Oil Spill (2012) ²²	\$13 billion	Percent	4.3%	2.3	\$44.8 million
Indian Trust (2011) ²³	\$3.4 billion	Not specified	2.9%	Not calculated	Included
Enron Securities Fraud (2008) ²⁴	\$7.2 billion	Percent	9.52%	5.2	\$39+ million
Diet Drugs Products Liability (2008) ²⁵	\$6.4 billion	Percent	6.75%	2.6+	\$24.2 million
Tyco Securities (2007) ²⁶	\$3.3 billion	Percent	14.5%	2.7	\$28.9 million
AOL Securities (2006) ²⁷	\$2.65 billion	Percent	5.9%	3.7	\$3.4 million
Nortel Securities I (2006) ²⁸	\$1.1 billion	Percent	3%	2.1	\$3.7 million
Nortel Securities II (2006) ²⁹	\$1.1 billion	Percent	8%	Not calculated	\$3 million
Royal Ahold Securities (2006) ³⁰	\$1.1 billion	Percent	12%	2.6	\$3.3 million

¹⁷ Lawrence E. Jaffe Pension Plan v. Household Int'l, Inc., No. 2-cv-05893 (N.D.III. Nov. 10, 2016).

¹⁸ In re Bank of America Corp. Sec., Derivative, and ERISA Litig., No. 09-md-2058 (S.D.N.Y. Apr. 8, 2013).

¹⁹ In re Toyota Motor. Corp. Unintended Acceleration Marketing, Sales Practices, and Products Liab. Litig., No. 10-ml-2151 (C.D. Cal., June 17, 2013).

 $^{^{20}}$ In re Black Farmers Discrimination Litig., 953 F. Supp. 2d 82 (D.D.C. 2013) (incurred rather than awarded expenses).

²¹ In re TFT-LCD (Flat Panel) Antitrust Litig., 2013 WL 1365900 (N.D. Cal. Apr. 3, 2013).

²² In Re: Oil Spill by the Oil Rig "Deepwater Horizon" in the Gulf of Mexico, on April 20, 2010, 2016 WL 6215974 (E.D.La. Oct. 25, 2016). The settlement was uncapped and the amount in the Table was an estimate used at the time fees were awarded.

²³ Cobell v. Salazar, No. 96-cv-01285 (D.D.C. Jul. 27, 2011).

²⁴ In re Enron Corp. Sec., Derivative & ERISA Litig., 586 F. Supp. 2d 732 (S.D. Tex. 2008).

²⁵ In re Diet Drugs (Phentermine, Fenfluramine, Dexfenfluramine) Products Liab. Litig., 553 F. Supp. 2d 442 (E.D. Pa. 2008).

²⁶ In re Tyco Int'l, Ltd. Multidistrict Litig., 535 F. Supp. 2d 249 (D.N.H. 2007).

²⁷ In re AOL Time Warner, Inc. Sec., 2006 WL 3057232 (S.D.N.Y. Oct. 25, 2006).

²⁸ In re Nortel Networks Corp. Sec. Litig., No. 01-cv-1855 (S.D.N.Y., Jan. 29, 2007).

²⁹ In re Nortel Networks Corp. Sec. Litig., No. 04-cv-2115 (S.D.N.Y., Dec. 26, 2006).

³⁰ In re Royal Ahold N.V. Sec. & ERISA Litig., 461 F. Supp. 2d 383 (D. Md. 2006).

Case	Settlement	Fee	Fee	Lodestar	Expenses
	Amount	Method	Percentage	Multiplier	
Allapattah Contract (2006) ³¹	\$1.1 billion	Percent	31.33%	Not calculated	\$4.1 million
WorldCom Securities (2005) ³²	\$6.1 billion	Percent	5.5%	4.0	\$10.7 million
Visa Antitrust (2003) ³³	\$3.4 billion	Percent	6.5%	3.5	\$18.7 million
Cendant Securities (2003) ³⁴	\$3.2 billion	Percent	1.73%	Not calculated	\$14.6 million
Tobacco Antitrust (2003) ³⁵	\$1.2 billion	Lodestar	N/A	4.5	\$4.5 million
Sulzer Hip (2003) ³⁶	>\$1 billion	Both	4.8%	2.4	\$3.7 million
Toshiba Diskette (2000) ³⁷	\$2.1 billion (total) \$1 billion (cash)	Both	7.1% (total) 15% (cash)	Not calculated	\$3 million
Prudential Insurance (2000) ³⁸	\$1.8 billion	Percent	4.8%	2.1	\$5+ million
Nasdaq Antitrust (1998) ³⁹	\$1 billion	Percent	14%	4.0	\$1.1 million
			Avg = 12.10% Med = 9.52% (cash) Avg = 11.43% Med = 9.31% (total)	Avg = 2.9 Med = 2.6	

The Risks Versus the Recovery

18. Consider next the factors that speak to the results obtained by class counsel in light of the risks presented by the litigation: "(2) the novelty and difficulty of the questions raised; (3) skill required to properly perform the legal services rendered; (4) the quality of representation;"

³¹ Allapattah Servs., Inc. v. Exxon Corp., 454 F. Supp. 2d 1185 (S.D. Fla. 2006); Allapattah Servs., Inc. v. Exxon Corp., No. 91-cv-986 (S.D.Fla. Apr. 16, 2007).

³² In re WorldCom, Inc. Sec. Litig., 388 F. Supp. 2d 319 (S.D.N.Y. 2005).

³³ In re Visa Check/Mastermoney Antitrust Litig., 297 F. Supp. 2d 503 (E.D.N.Y. 2003).

³⁴ In re Cendant Corp. Litig., 243 F. Supp. 2d 166 (D.N.J. 2003).

³⁵ DeLoach v. Phillip Morris Cos., 2003 WL 23094907 (M.D.N.C. Dec. 19, 2003).

³⁶ In re Sulzer Hip Prosthesis & Knee Prosthesis Liab. Litig., 268 F. Supp. 2d 907, 939 (N.D. Ohio 2003).

³⁷ Shaw v. Toshiba Am. Info. Sys., Inc., 91 F. Supp. 2d 942 (E.D. Tex. 2000).

³⁸ In re Prudential Ins. Co. of Am. Sales Practice Litig., 106 F. Supp. 2d 721, 736 (D.N.J. 2000).

³⁹ In re NASDAQ Mkt.-Makers Antitrust Litig., 187 F.R.D. 465, 489 (S.D.N.Y. 1998).

"(6) the attorney's expectations at the outset of the litigation;" "(8) the amount in controversy and the results obtained;" and "(10) the undesirability of the case within the legal community in which the suit arose." Although the settlement here is very large, it must be measured against the class's damages. One measure of the class's potential damages can be found in the amount of money the defendants set aside to pay potential liabilities that might arise from PFAS litigation. According to a recent report to shareholders, that was \$4 billion. See DuPont de Nemours, Inc. Quarterly Report on Form 10-Q (June 30, 2023) p. 22. That number includes all PFAS litigation and the share attributable to the class members here was therefore only a portion of the \$4 billion, but, in order to be as conservative as possible, we can assume the class might have recovered that entire sum. This means that the settlement here will recover more than 25% of the class's damages and perhaps well more depending on how conservative this assumption is. This recovery is excellent in a class action. Although we do not have data on recoveries-as-a-percentage-ofdamages in other environmental class actions, the contexts in which we do have data—securities fraud and antitrust—suggest that the recovery here may be well above the norm. See, e.g., Recent Trends in Securities Class Action Litigation: 2022 Full-Year Review, at p. 18 (fig. 19), available https://www.nera.com/publications/archive/2023/recent-trends-in-securities-class--actionat litigation--2022-full-.html (finding that the median securities fraud class action between 2013 and 2022 settled for between 1.5% and 2.5% of the most common measure of investor losses, depending on the year); John M. Connor & Robert H. Lande, Not Treble Damages: Cartel Recoveries are Mostly Less Than Single Damages, 100 Iowa L. Rev. 1997, 2010 (2015) (finding the weighted average of recoveries—the authors' preferred measure—to be 19% of single damages for cartel cases between 1990 and 2014).

- 19. Of course, the recovery must be measured against the risks the class faced. If this had been a "slam dunk" case, recovering a quarter or even more of the class's potential damages might not be very impressive. But this case was far from a slam dunk. To the contrary, below are some of the issues that the class would likely have had to prevail on in order to get *any* recovery from the defendants, or that may have affected the *magnitude* of that recovery:
 - That the defendants did not have immunity as a contractor of the federal government;
 - That, under state law, class members were required to expend capital costs to construct treatment facilities to remove PFAS from their wells;
 - That the PFAS in the class's drinking water wells emanated from the DuPont
 defendants' products as opposed to others' products, a hurdle that would have
 required the application of complex principles of environmental science, including
 fate and transport analysis as well as chemical fingerprinting;
 - That PFAS are toxic to humans and that this was either known or foreseeable to the defendants;
 - That the levels of PFAS in the class's wells exceeded the EPA's Health Advisory Limit of 70 ppt;
 - That the warnings affixed to defendants' products failed to adequately warn and/or instruct users how to properly dispose of those products;
 - That the defendants' products were defectively designed because a safer alternative existed;
 - That defendants' conduct was unreasonable given their knowledge of the harms posed by PFAS;

- That defendants acted with the requisite state of mind to recover punitive damages;
 and
- That class members were not contributorily negligent with respect to the contamination of their water wells.
- 20. It is true that on the first of these issues, the plaintiffs had thus far prevailed before this Court, but there was still risk at trial and on appeal. In addition, even if the class could have prevailed on all or most of the rest of the issues, both before this Court and on appeal, there were major questions about the solvency of Chemours, which DuPont claimed owned the PFAS liabilities at issue here. In my opinion, if one creates a litigation decision tree and multiplies the probability of success on each of the outstanding issues against one another, and then multiplies that number again by the probability of losing on appeal the issue class counsel has already won before this Court, it is not difficult to conclude that the settlement is an excellent outcome for the class. Moreover, litigating all of these issues before this Court and on appeal would have taken years of time and further millions of dollars of the class's money. As such, in my opinion, these factors, too, strongly weigh in favor of the settlement and fee request.

Lodestar Crosscheck

21. Consider next the factor "(1) the time and labor expended by counsel." This litigation has spanned a time period *much* longer than the typical class action case lasts before it reaches final approval of any settlement. *See* Fitzpatrick, *Empirical Study, supra*, at 820 (finding average and median times to final settlement approval of around three years). And class counsel have certainly been very busy during that time: they have conducted almost 200 depositions, reviewed tens of millions of pages of documents, prepared over a dozen experts, defeated

numerous dispositive and non-dispositive motions, and prepared a bellwether case to the eve of trial.

- Some courts leave it at that on these factors, see, e.g., Brown v. Phillips Petroleum 22. Co., 838 F.2d 451, 456 (10th Cir. 1988) ("[I]n awarding attorneys' fees in a common fund case, the 'time and labor involved' factor need not be evaluated using the lodestar formulation."), but others—albeit a minority—"crosscheck" the percentage method with class counsel's lodestar for the purpose of capping the percentage to prevent class counsel from reaping a so-called "windfall." See Fitzpatrick, Empirical Study, supra, at 833 (finding that only 49% of courts consider the lodestar when awarding fees using the percentage method); Eisenberg-Miller 2017, supra, at 945 (finding percent method with lodestar crosscheck used 38% of the time versus 54% for percent method without lodestar crosscheck). There is nothing in Fourth Circuit caselaw that requires courts to use the lodestar crosscheck, see 5 William B. Rubenstein, Newberg on Class Actions § 15:88 (6th ed. 2022), and, in my opinion, using the lodestar as a crosscheck is counterproductive because it reintroduces the very same undesirable incentives endemic to the lodestar method that the percentage method was supposed to correct in the first place. See Fitzpatrick, Fiduciary Judge, supra, at 1167. For this reason, clients entering into contingent-fee contracts—even the most sophisticated ones in the biggest cases—do not use it. See, e.g., Schwartz, supra, at 360; Kritzer, SUPRA, AT 39-40. In my opinion, the Court should not impose upon class members fee practices they would never choose for themselves. See generally Fitzpatrick, Fiduciary Judge, supra.
- 23. Nonetheless, if the Court wishes to perform the lodestar crosscheck, in my opinion there is nothing about class counsel's lodestar that should give the Court any pause. In this case, as I noted, class counsel are unable to disaggregate their time spent on the case against the DuPont defendants from the time spent on the case against other defendants in this MDL. This is not

unusual for MDLs of this size and complexity, and, in my opinion, any attempt to assign a portion of the hours to the DuPont defendants would be arbitrary if not impossible. As such, in my opinion, the best the Court can do here is to consider all of the common benefit time class counsel have spent in this MDL and use that number in the lodestar calculation. Yet, because that number is overinclusive of the work against DuPont, I think the Court should compare it to all of the common benefit fees class counsel will seek from this MDL. This is not uncommon in complex, multidefendant litigation. See, e.g., In re Capacitors Antitrust Litig., No. 3:14-CV-03264-JD, 2018 WL 4790575, at *6 (N.D. Cal. Sept. 21, 2018) ("Because the total work performed by counsel from inception of the case makes each settlement possible, courts typically base fee awards in subsequent settlements on all work performed in the case. Indeed, when considering fee awards for subsequent settlements, courts typically calculate the lodestar multiplier by dividing (1) all past and requested fee awards by (2) all of counsel's time from inception of the case."); In re Se. Milk Antitrust Litig., No. 2:07-CV 208, 2013 WL 2155387, at *4 (E.D. Tenn. May 17, 2013) (aggregating two fee awards over time and dividing by the litigation's total lodestar to perform lodestar crosscheck); In re Ins. Brokerage Antitrust Litig., 282 F.R.D. 92, 124 (D.N.J. 2012) (aggregating four fee awards over time and dividing by the litigation's total lodestar to perform lodestar crosscheck). At this time, that includes only the 8% class award requested from the settlement with the DuPont defendants and the 6% common benefit assessments already received from the settlements in Campbell v. Tyco Fire Prods., et al., No. 19-cv-00422, and City of Stuart v. 3M, et al., No. 18-cv-3487, and, as I show below, the resulting multiplier would be very small. But even if we add the 8% class counsel plans to seek from the settlement with 3M, the resulting multiplier is still well within the range of previous cases, which, as I show below, has been in billion-dollar cases between 1.0 and 6.2. If additional settlements materialize in this MDL and the

Court wishes to do the lodestar crosscheck, the Court can continue to perform the lodestar crosscheck by dividing the total common benefit time into the accumulated total fees to double check that the multiplier remains within this range of previous cases.

- 24. Class counsel have reported working over 410,000 common benefit hours to date in this MDL with a total value of over \$300 million. At this time, the only fees common benefit counsel have sought in this MDL are the 8% here and the 6% from the settlements in City of Stuart and Campbell. If those fees are added together, the total would be around \$100 million. If that total is divided into the total common benefit lodestar thus far, the resulting multiplier would be less than even 1.0. This is known as a "negative" multiplier and it is far below the norm even in run-of-the-mill cases, which tend to be in between 1.5 and 2.0, see Fitzpatrick, Empirical Study, supra, at 834 (finding multipliers ranging from 0.07 to 10.3, with a mean of 1.65 and median of 1.34); see also Eisenberg-Miller 2017, supra, at 965 (finding mean multiplier of 1.48 for cases between 2009 and 2013); Eisenberg & Miller 2010, supra, at 273 (finding mean multiplier of 1.81 for cases between 1993 and 2008), let alone in billion-dollar cases, see Eisenberg-Miller 2010, supra, at 274 ("As the recovery decile increases, the multiplier also tends to increase, with the multiplier in the highest recovery decile more than triple that of the multiplier in the lowest recovery decile."). Indeed, as Table 1 shows, the average lodestar multiplier in such cases is 2.9 and the median 2.6, with a range from 1.0 to 6.2.
- 25. But even if we add the 8% fee that will be requested from the settlement with 3M, it would still only produce a multiplier around 3.0. This multiplier is still well within the 1.0 to 6.2 range of previous billion-dollar cases. Thus, nothing about the common benefit multiplier, either with or without a 3M fee award, suggests that class counsel would reap a "windfall" if this

fee request is granted. As such, in my opinion, nothing about the multiplier requires a further reduction from the already-below-the-norm percentage requested here.

Other Factors

26. Consider finally the factors that go to the skill of class counsel and their relationship with the plaintiffs: "(4) the attorney's opportunity costs in pressing the instant litigation;" "(7) the time limitations imposed by the client or circumstances;" "(9) the experience, reputation[,] and ability of the attorney;" and "(11) the nature and length of the professional relationship between attorney and client." Class counsel are some of the most talented mass tort lawyers in the United States. Although I was not privy to their attorney-client relationships here, I think the results speak for themselves. In my opinion, these factors, too, weigh in favor of the fee request.

ASSESSMENT OF THE REQUEST FOR EXPENSES

Class counsel have requested some \$2.1 million in expenses in connection with this settlement. Although I have not reviewed the expense reports in any detail, the overall number is very modest compared to other settlements. The expenses here are a fraction of one percent of the total settlement amount. Although I did not report findings for expense in my empirical study, the Eisenberg-Miller studies did, and the typical expense-to-settlement ratio they found was an order of magnitude greater than the one here. *See Eisenberg-Miller 2010, supra*, at 267 (mean and median of 2.8% and 1.7% before 2002 and 2.7% and 1.7% thereafter); *Eisenberg-Miller 2017, supra*, at 945 (mean and median of 3.9% and 1.7% since 2009). Moreover, Table 1 shows that, among billion-dollar settlements in particular, the expenses request here would be among the lowest ever awarded. As such, in my opinion, the expenses requested here are well below the norm in previous cases.

CONCLUSION

28. For all these reasons, I believe the fees and expenses requested here are reasonable in light of the empirical studies and research on economic incentives in class action litigation.

New York, NY

October 15, 2023

Brian T. Fitzpatrick

Exhibit 1

BRIAN T. FITZPATRICK

Vanderbilt University Law School 131 21st Avenue South Nashville, TN 37203 (615) 322-4032 brian.fitzpatrick@law.vanderbilt.edu

ACADEMIC APPOINTMENTS

VANDERBILT UNIVERSITY LAW SCHOOL, *Milton R. Underwood Chair in Free Enterprise*, 2020 to present

- FedEx Research Professor, 2014-2015
- *Professor of Law*, 2012 to present
- Associate Professor, 2010-2012; Assistant Professor, 2007-2010
- Classes: Civil Procedure, Complex Litigation, Federal Courts
- Hall-Hartman Outstanding Professor Award, 2008-2009
- Vanderbilt's Association of American Law Schools Teacher of the Year, 2009

HARVARD LAW SCHOOL, Visiting Professor, Fall 2018

• Classes: Civil Procedure, Litigation Finance

FORDHAM LAW SCHOOL, Visiting Professor, Fall 2010

Classes: Civil Procedure

EDUCATION

HARVARD LAW SCHOOL, J.D., magna cum laude, 2000

- Fay Diploma (for graduating first in the class)
- Sears Prize, 1999 (for highest grades in the second year)
- Harvard Law Review, Articles Committee, 1999-2000; Editor, 1998-1999
- Harvard Journal of Law & Public Policy, Senior Editor, 1999-2000; Editor, 1998-1999
- Research Assistant, David Shapiro, 1999; Steven Shavell, 1999

UNIVERSITY OF NOTRE DAME, B.S., Chemical Engineering, summa cum laude, 1997

- First runner-up to Valedictorian (GPA: 3.97/4.0)
- Steiner Prize, 1997 (for overall achievement in the College of Engineering)

CLERKSHIPS

HON. ANTONIN SCALIA, Supreme Court of the United States, 2001-2002

HON. DIARMUID O'SCANNLAIN, U.S. Court of Appeals for the Ninth Circuit, 2000-2001

EXPERIENCE

NEW YORK UNIVERSITY SCHOOL OF LAW, Feb. 2006 to June 2007 *John M. Olin Fellow*

HON. JOHN CORNYN, United States Senate, July 2005 to Jan. 2006 Special Counsel for Supreme Court Nominations

SIDLEY AUSTIN LLP, Washington, DC, 2002 to 2005 *Litigation Associate*

BOOKS

THE CAMBRIDGE HANDBOOK OF CLASS ACTIONS: AN INTERNATIONAL SURVEY (Cambridge University Press 2021) (ed., with Randall Thomas)

THE CONSERVATIVE CASE FOR CLASS ACTIONS (University of Chicago Press 2019) (winner of the Pound Institute's 2022 Civil Justice Scholarship Award)

BOOK CHAPTERS

Climate Change and Class Actions in CLIMATE LIBERALISM: PERSPECTIVES ON LIBERTY, PROPERTY, AND POLLUTION (Jonathan Adler, ed., Palgrave Macmillan 2023)

How Many Class Actions are Meritless?, in THE CAMBRIDGE HANDBOOK OF CLASS ACTIONS: AN INTERNATIONAL SURVEY (ed., with Randall Thomas, Cambridge University Press 2021)

The Indian Securities Fraud Class Action: Is Class Arbitration the Answer?, in THE CAMBRIDGE HANDBOOK OF CLASS ACTIONS: AN INTERNATIONAL SURVEY (ed., with Randall Thomas, Cambridge University Press 2021) (with Randall Thomas)

Do Class Actions Deter Wrongdoing? in THE CLASS ACTION EFFECT (Catherine Piché, ed., Éditions Yvon Blais, Montreal, 2018)

Judicial Selection in Illinois in AN ILLINOIS CONSTITUTION FOR THE TWENTY-FIRST CENTURY (Joseph E. Tabor, ed., Illinois Policy Institute, 2017)

Civil Procedure in the Roberts Court in BUSINESS AND THE ROBERTS COURT (Jonathan Adler, ed., Oxford University Press, 2016)

Is the Future of Affirmative Action Race Neutral? in A NATION OF WIDENING OPPORTUNITIES: THE CIVIL RIGHTS ACT AT 50 (Ellen Katz & Samuel Bagenstos, eds., Michigan University Press, 2016)

ACADEMIC ARTICLES

Distributing Attorney Fees in Multidistrict Litigation, 13 J. Leg. Anal. 558 (2021) (with Ed Cheng & Paul Edelman)

A Fiduciary Judge's Guide to Awarding Fees in Class Actions, 89 FORD. L. REV. 1151 (2021)

Many Minds, Many MDL Judges, 84 L. & Contemp. Problems 107 (2021)

Objector Blackmail Update: What Have the 2018 Amendments Done?, 89 FORD. L. REV. 437 (2020)

Why Class Actions are Something both Liberals and Conservatives Can Love, 73 VAND. L. REV. 1147 (2020)

Deregulation and Private Enforcement, 24 LEWIS & CLARK L. REV. 685 (2020)

The Indian Securities Fraud Class Action: Is Class Arbitration the Answer?, 40 NW. J. INT'L L. & BUS. 203 (2020) (with Randall Thomas)

Can the Class Action be Made Business Friendly?, 24 N.Z. BUS. L. & Q. 169 (2018)

Can and Should the New Third-Party Litigation Financing Come to Class Actions?, 19 THEORETICAL INQUIRIES IN LAW 109 (2018)

Scalia in the Casebooks, 84 U. CHI. L. REV. 2231 (2017)

The Ideological Consequences of Judicial Selection, 70 VAND. L. REV. 1729 (2017)

Judicial Selection and Ideology, 42 OKLAHOMA CITY UNIV. L. REV. 53 (2017)

Justice Scalia and Class Actions: A Loving Critique, 92 Notre Dame L. Rev. 1977 (2017)

A Tribute to Justice Scalia: Why Bad Cases Make Bad Methodology, 69 VAND. L. REV. 991 (2016)

The Hidden Question in Fisher, 10 NYU J. L. & LIBERTY 168 (2016)

An Empirical Look at Compensation in Consumer Class Actions, 11 NYU J. L. & Bus. 767 (2015) (with Robert Gilbert)

The End of Class Actions?, 57 ARIZ. L. REV. 161 (2015)

The Constitutionality of Federal Jurisdiction-Stripping Legislation and the History of State Judicial Selection and Tenure, 98 VA. L. REV. 839 (2012)

Twombly and Iqbal Reconsidered, 87 NOTRE DAME L. REV. 1621 (2012)

An Empirical Study of Class Action Settlements and their Fee Awards, 7 J. EMPIRICAL L. STUD. 811 (2010) (selected for the 2009 Conference on Empirical Legal Studies)

Do Class Action Lawyers Make Too Little?, 158 U. PA. L. REV. 2043 (2010)

Originalism and Summary Judgment, 71 OHIO ST. L.J. 919 (2010)

The End of Objector Blackmail?, 62 VAND. L. REV. 1623 (2009) (selected for the 2009 Stanford-Yale Junior Faculty Forum)

The Politics of Merit Selection, 74 MISSOURI L. REV. 675 (2009)

Errors, Omissions, and the Tennessee Plan, 39 U. MEMPHIS L. REV. 85 (2008)

Election by Appointment: The Tennessee Plan Reconsidered, 75 TENN. L. REV. 473 (2008)

Can Michigan Universities Use Proxies for Race After the Ban on Racial Preferences?, 13 MICH. J. RACE & LAW 277 (2007)

Strict Scrutiny of Facially Race-Neutral State Action and the Texas Ten Percent Plan, 53 Baylor L. Rev. 289 (2001)

ACADEMIC PRESENTATIONS

Non-Securities Class Action Settlements in CAFA's First Eleven Years, University of Florida Law School, Gainesville, FL (Feb. 6, 2023)

Entrapment of the Little Guy: Resisting the Erosion of Investor, Employee and Consumer Protections, Institute for Law and Economic Policy, San Diego, CA (Jan. 27, 2023)

A New Source of Data for Non-Securities Class Actions, William & Mary Law School, Williamsburg, VA (Nov. 10, 2022)

Can Courts Avoid Politicization in a Polarized America?, American Bar Association Annual Meeting, Chicago, IL (Aug. 5, 2022) (panelist)

A New Source of Data for Non-Securities Class Actions, Seventh Annual Civil Procedure Workshop, Cardozo Law School, New York, NY (May 20, 2022)

Resolution Issues in Class Actions and Mass Torts, Miami Law Class Action & Complex Litigation Forum, University of Miami School of Law, Miami, FL (Mar. 11, 2022) (panelist)

Developments in Discovery Reform, George Mason Law & Economics Center Fifteenth Annual Judicial Symposium on Civil Justice Issues, Charleston, SC (Nov. 16, 2021) (panelist)

Locality Litigation and Public Entity Incentives to File Lawsuits: Public Interest, Politics, Public Finance or Financial Gain?, George Mason Law & Economics Center Symposium on Novel Liability Theories and the Incentives Driving Them, Nashville, TN (Oct. 25, 2021) (panelist)

A Fiduciary Judge's Guide to Awarding Fees in Class Actions, University of California Hastings College of the Law, San Francisco, CA (Nov. 3, 2020)

A Fiduciary Judge's Guide to Awarding Fees in Class Actions, The Judicial Role in Professional Regulation, Stein Colloquium, Fordham Law School, New York, NY (Oct. 9, 2020)

Objector Blackmail Update: What Have the 2018 Amendments Done?, Institute for Law and Economic Policy, Fordham Law School, New York, NY (Feb. 28, 2020)

Keynote Debate: The Conservative Case for Class Actions, Miami Law Class Action & Complex Litigation Forum, University of Miami School of Law, Miami, FL (Jan. 24, 2020)

The Future of Class Actions, National Consumer Law Center Class Action Symposium, Boston, MA (Nov. 16, 2019) (panelist)

The Conservative Case for Class Actions, Center for Civil Justice, NYU Law School, New York, NY (Nov.11, 2019)

Deregulation and Private Enforcement, Class Actions, Mass Torts, and MDLs: The Next 50 Years, Pound Institute Academic Symposium, Lewis & Clark Law School, Portland, OR (Nov. 2, 2019)

Class Actions and Accountability in Finance, Investors and the Rule of Law Conference, Institute for Investor Protection, Loyola University Chicago Law School, Chicago, IL (Oct. 25, 2019) (panelist)

Incentivizing Lawyers as Teams, University of Texas at Austin Law School, Austin, TX (Oct. 22, 2019)

"Dueling Pianos": A Debate on the Continuing Need for Class Actions, Twenty Third Annual National Institute on Class Actions, American Bar Association, Nashville, TN (Oct. 18, 2019) (panelist)

A Debate on the Utility of Class Actions, Contemporary Issues in Complex Litigation Conference, Northwestern Law School, Chicago, IL (Oct.16, 2019) (panelist)

Litigation Funding, Forty Seventh Annual Meeting, Intellectual Property Owners Association, Washington, DC (Sep. 26, 2019) (panelist)

The Indian Securities Fraud Class Action: Is Class Arbitration the Answer?, International Class Actions Conference, Vanderbilt Law School, Nashville, TN (Aug. 24, 2019)

A New Source of Class Action Data, Corporate Accountability Conference, Institute for Law and Economic Policy, San Juan, Puerto Rico (April 12, 2019)

The Indian Securities Fraud Class Action: Is Class Arbitration the Answer?, Ninth Annual Emerging Markets Finance Conference, Mumbai, India (Dec. 14, 2018)

MDL: Uniform Rules v. Best Practices, Miami Law Class Action & Complex Litigation Forum, University of Miami Law School, Miami, FL (Dec. 7, 2018) (panelist)

Third Party Finance of Attorneys in Traditional and Complex Litigation, George Washington Law School, Washington, D.C. (Nov. 2, 2018) (panelist)

MDL at 50 - The 50th Anniversary of Multidistrict Litigation, New York University Law School, New York, New York (Oct. 10, 2018) (panelist)

The Discovery Tax, Law & Economics Seminar, Harvard Law School, Cambridge, Massachusetts (Sep. 11, 2018)

Empirical Research on Class Actions, Civil Justice Research Initiative, University of California at Berkeley, Berkeley, California (Apr. 9, 2018)

A Political Future for Class Actions in the United States?, The Future of Class Actions Symposium, University of Auckland Law School, Auckland, New Zealand (Mar. 15, 2018)

The Indian Class Actions: How Effective Will They Be?, Eighth Annual Emerging Markets Finance Conference, Mumbai, India (Dec. 19, 2017)

Hot Topics in Class Action and MDL Litigation, University of Miami School of Law, Miami, Florida (Dec. 8, 2017) (panelist)

Critical Issues in Complex Litigation, Contemporary Issues in Complex Litigation, Northwestern Law School (Nov. 29, 2017) (panelist)

The Conservative Case for Class Actions, Consumer Class Action Symposium, National Consumer Law Center, Washington, DC (Nov. 19, 2017)

The Conservative Case for Class Actions—A Monumental Debate, ABA National Institute on Class Actions, Washington, DC (Oct. 26, 2017) (panelist)

One-Way Fee Shifting after Summary Judgment, 2017 Meeting of the Midwestern Law and Economics Association, Marquette Law School, Milwaukee, WI (Oct. 20, 2017)

The Conservative Case for Class Actions, Pepperdine Law School Malibu, CA (Oct. 17, 2017)

One-Way Fee Shifting after Summary Judgment, Vanderbilt Law Review Symposium on The Future of Discovery, Vanderbilt Law School, Nashville, TN (Oct. 13, 2017)

The Constitution Revision Commission and Florida's Judiciary, 2017 Annual Florida Bar Convention, Boca Raton, FL (June 22, 2017)

Class Actions After Spokeo v. Robins: Supreme Court Jurisprudence, Article III Standing, and Practical Implications for the Bench and Practitioners, Northern District of California Judicial Conference, Napa, CA (Apr. 29, 2017) (panelist)

The Ironic History of Rule 23, Conference on Secrecy, Institute for Law & Economic Policy, Naples, FL (Apr. 21, 2017)

Justice Scalia and Class Actions: A Loving Critique, University of Notre Dame Law School, South Bend, Indiana (Feb. 3, 2017)

Should Third-Party Litigation Financing Be Permitted in Class Actions?, Fifty Years of Class Actions—A Global Perspective, Tel Aviv University, Tel Aviv, Israel (Jan. 4, 2017)

Hot Topics in Class Action and MDL Litigation, University of Miami School of Law, Miami, Florida (Dec. 2, 2016) (panelist)

The Ideological Consequences of Judicial Selection, William J. Brennan Lecture, Oklahoma City University School of Law, Oklahoma, City, Oklahoma (Nov. 10, 2016)

After Fifty Years, What's Class Action's Future, ABA National Institute on Class Actions, Las Vegas, Nevada (Oct. 20, 2016) (panelist)

Where Will Justice Scalia Rank Among the Most Influential Justices, State University of New York at Stony Brook, Long Island, New York (Sep. 17, 2016)

The Ironic History of Rule 23, University of Washington Law School, Seattle, WA (July 14, 2016)

A Respected Judiciary—Balancing Independence and Accountability, 2016 Annual Florida Bar Convention, Orlando, FL (June 16, 2016) (panelist)

What Will and Should Happen to Affirmative Action After Fisher v. Texas, American Association of Law Schools Annual Meeting, New York, NY (January 7, 2016) (panelist)

Litigation Funding: The Basics and Beyond, NYU Center on Civil Justice, NYU Law School, New York, NY (Nov. 20, 2015) (panelist)

Do Class Actions Offer Meaningful Compensation to Class Members, or Do They Simply Rip Off Consumers Twice?, ABA National Institute on Class Actions, New Orleans, LA (Oct. 22, 2015) (panelist)

Arbitration and the End of Class Actions?, Quinnipiac-Yale Dispute Resolution Workshop, Yale Law School, New Haven, CT (Sep. 8, 2015) (panelist)

The Next Steps for Discovery Reform: Requester Pays, Lawyers for Civil Justice Membership Meeting, Washington, DC (May 5, 2015)

Private Attorney General: Good or Bad?, 17th Annual Federalist Society Faculty Conference, Washington, DC (Jan. 3, 2015)

Liberty, Judicial Independence, and Judicial Power, Liberty Fund Conference, Santa Fe, NM (Nov. 13-16, 2014) (participant)

The Economics of Objecting for All the Right Reasons, 14th Annual Consumer Class Action Symposium, Tampa, FL (Nov. 9, 2014)

Compensation in Consumer Class Actions: Data and Reform, Conference on The Future of Class Action Litigation: A View from the Consumer Class, NYU Law School, New York, NY (Nov. 7, 2014)

The Future of Federal Class Actions: Can the Promise of Rule 23 Still Be Achieved?, Northern District of California Judicial Conference, Napa, CA (Apr. 13, 2014) (panelist)

The End of Class Actions?, Conference on Business Litigation and Regulatory Agency Review in the Era of Roberts Court, Institute for Law & Economic Policy, Boca Raton, FL (Apr. 4, 2014)

Should Third-Party Litigation Financing Come to Class Actions?, University of Missouri School of Law, Columbia, MO (Mar. 7, 2014)

Should Third-Party Litigation Financing Come to Class Actions?, George Mason Law School, Arlington, VA (Mar. 6, 2014)

Should Third-Party Litigation Financing Come to Class Actions?, Roundtable for Third-Party Funding Scholars, Washington & Lee University School of Law, Lexington, VA (Nov. 7-8, 2013)

Is the Future of Affirmative Action Race Neutral?, Conference on A Nation of Widening Opportunities: The Civil Rights Act at 50, University of Michigan Law School, Ann Arbor, MI (Oct. 11, 2013)

The Mass Tort Bankruptcy: A Pre-History, The Public Life of the Private Law: A Conference in Honor of Richard A. Nagareda, Vanderbilt Law School, Nashville, TN (Sep. 28, 2013) (panelist)

Rights & Obligations in Alternative Litigation Financing and Fee Awards in Securities Class Actions, Conference on the Economics of Aggregate Litigation, Institute for Law & Economic Policy, Naples, FL (Apr. 12, 2013) (panelist)

The End of Class Actions?, Symposium on Class Action Reform, University of Michigan Law School, Ann Arbor, MI (Mar. 16, 2013)

Toward a More Lawyer-Centric Class Action?, Symposium on Lawyering for Groups, Stein Center for Law & Ethics, Fordham Law School, New York, NY (Nov. 30, 2012)

The Problem: AT & T as It Is Unfolding, Conference on AT & T Mobility v. Concepcion, Cardozo Law School, New York, NY (Apr. 26, 2012) (panelist)

Standing under the Statements and Accounts Clause, Conference on Representation without Accountability, Fordham Law School Corporate Law Center, New York, NY (Jan. 23, 2012)

The End of Class Actions?, Washington University Law School, St. Louis, MO (Dec. 9, 2011)

Book Preview Roundtable: Accelerating Democracy: Matching Social Governance to Technological Change, Searle Center on Law, Regulation, and Economic Growth, Northwestern University School of Law, Chicago, IL (Sep. 15-16, 2011) (participant)

Is Summary Judgment Unconstitutional? Some Thoughts About Originalism, Stanford Law School, Palo Alto, CA (Mar. 3, 2011)

The Constitutionality of Federal Jurisdiction-Stripping Legislation and the History of State Judicial Selection and Tenure, Northwestern Law School, Chicago, IL (Feb. 25, 2011)

The New Politics of Iowa Judicial Retention Elections: Examining the 2010 Campaign and Vote, University of Iowa Law School, Iowa City, IA (Feb. 3, 2011) (panelist)

The Constitutionality of Federal Jurisdiction-Stripping Legislation and the History of State Judicial Selection and Tenure, Washington University Law School, St. Louis, MO (Oct. 1, 2010)

Twombly *and* Iqbal *Reconsidered*, Symposium on Business Law and Regulation in the Roberts Court, Case Western Reserve Law School, Cleveland, OH (Sep. 17, 2010)

Do Class Action Lawyers Make Too Little?, Institute for Law & Economic Policy, Providenciales, Turks & Caicos (Apr. 23, 2010)

Originalism and Summary Judgment, Georgetown Law School, Washington, DC (Apr. 5, 2010)

Theorizing Fee Awards in Class Action Litigation, Washington University Law School, St. Louis, MO (Dec. 11, 2009)

An Empirical Study of Class Action Settlements and their Fee Awards, 2009 Conference on Empirical Legal Studies, University of Southern California Law School, Los Angeles, CA (Nov. 20, 2009)

Originalism and Summary Judgment, Symposium on Originalism and the Jury, Ohio State Law School, Columbus, OH (Nov. 17, 2009)

An Empirical Study of Class Action Settlements and their Fee Awards, 2009 Meeting of the Midwestern Law and Economics Association, University of Notre Dame Law School, South Bend, IN (Oct. 10, 2009)

The End of Objector Blackmail?, Stanford-Yale Junior Faculty Forum, Stanford Law School, Palo Alto, CA (May 29, 2009)

An Empirical Study of Class Action Settlements and their Fee Awards, University of Minnesota School of Law, Minneapolis, MN (Mar. 12, 2009)

The Politics of Merit Selection, Symposium on State Judicial Selection and Retention Systems, University of Missouri Law School, Columbia, MO (Feb. 27, 2009)

The End of Objector Blackmail?, Searle Center Research Symposium on the Empirical Studies of Civil Liability, Northwestern University School of Law, Chicago, IL (Oct. 9, 2008)

Alternatives To Affirmative Action After The Michigan Civil Rights Initiative, University of Michigan School of Law, Ann Arbor, MI (Apr. 3, 2007) (panelist)

OTHER PUBLICATIONS

Racial Preferences Won't Go Easily, WALL St. J. (June 1, 2023)

Memo to Mitch: Repeal the Republican Tax Increase, THE HILL (July 17, 2020)

The Right Way to End Qualified Immunity, THE HILL (June 25, 2020)

I Still Remember, 133 HARV. L. REV. 2458 (2020)

Proposed Reforms to Texas Judicial Selection, 24 TEX. R. L. & Pol. 307 (2020)

The Conservative Case for Class Actions?, NATIONAL REVIEW (Nov. 13, 2019)

9th Circuit Split: What's the math say?, DAILY JOURNAL (Mar. 21, 2017)

Former clerk on Justice Antonin Scalia and his impact on the Supreme Court, THE CONVERSATION (Feb. 24, 2016)

Lessons from Tennessee Supreme Court Retention Election, THE TENNESSEAN (Aug. 20, 2014)

Public Needs Voice in Judicial Process, THE TENNESSEAN (June 28, 2013)

Did the Supreme Court Just Kill the Class Action?, THE QUARTERLY JOURNAL (April 2012)

Let General Assembly Confirm Judicial Selections, CHATTANOOGA TIMES FREE PRESS (Feb. 19, 2012)

"Tennessee Plan" Needs Revisions, THE TENNESSEAN (Feb. 3, 2012)

How Does Your State Select Its Judges?, INSIDE ALEC 9 (March 2011) (with Stephen Ware)

On the Merits of Merit Selection, THE ADVOCATE 67 (Winter 2010)

Supreme Court Case Could End Class Action Suits, SAN FRANCISCO CHRONICLE (Nov. 7, 2010)

Kagan is an Intellect Capable of Serving Court, THE TENNESSEAN (Jun. 13, 2010)

Confirmation "Kabuki" Does No Justice, Politico (July 20, 2009)

Selection by Governor may be Best Judicial Option, THE TENNESSEAN (Apr. 27, 2009)

Verdict on Tennessee Plan May Require a Jury, THE MEMPHIS COMMERCIAL APPEAL (Apr. 16, 2008)

Tennessee's Plan to Appoint Judges Takes Power Away from the Public, THE TENNESSEAN (Mar. 14, 2008)

Process of Picking Judges Broken, CHATTANOOGA TIMES FREE PRESS (Feb. 27, 2008)

Disorder in the Court, Los Angeles Times (Jul. 11, 2007)

Scalia's Mistake, NATIONAL LAW JOURNAL (Apr. 24, 2006)

GM Backs Its Bottom Line, DETROIT FREE PRESS (Mar. 19, 2003)

Good for GM, Bad for Racial Fairness, LOS ANGELES TIMES (Mar. 18, 2003)

10 Percent Fraud, WASHINGTON TIMES (Nov. 15, 2002)

OTHER PRESENTATIONS

Abstention, Tennessee Attorney General's Office Continuing Legal Education, Nashville, TN (Apr. 13, 2022)

Does the Way We Choose our Judges Affect Case Outcomes?, American Legislative Exchange Council 2018 Annual Meeting, New Orleans, Louisiana (August 10, 2018) (panelist)

Oversight of the Structure of the Federal Courts, Subcommittee on Oversight, Agency Action, Federal Rights and Federal Courts, United States Senate, Washington, D.C. (July 31, 2018)

Where Will Justice Scalia Rank Among the Most Influential Justices, The Leo Bearman, Sr. American Inn of Court, Memphis, TN (Mar. 21, 2017)

Bringing Justice Closer to the People: Examining Ideas for Restructuring the 9th Circuit, Subcommittee on Courts, Intellectual Property, and the Internet, United States House of Representatives, Washington, D.C. (Mar. 16, 2017)

Supreme Court Review 2016: Current Issues and Cases Update, Nashville Bar Association, Nashville, TN (Sep. 15, 2016) (panelist)

A Respected Judiciary—Balancing Independence and Accountability, Florida Bar Annual Convention, Orlando, FL (June 16, 2016) (panelist)

Future Amendments in the Pipeline: Rule 23, Tennessee Bar Association, Nashville, TN (Dec. 2, 2015)

The New Business of Law: Attorney Outsourcing, Legal Service Companies, and Commercial Litigation Funding, Tennessee Bar Association, Nashville, TN (Nov. 12, 2014)

Hedge Funds + *Lawsuits* = *A Good Idea?*, Vanderbilt University Alumni Association, Washington, DC (Sep. 3, 2014)

Judicial Selection in Historical and National Perspective, Committee on the Judiciary, Kansas Senate (Jan. 16, 2013)

The Practice that Never Sleeps: What's Happened to, and What's Next for, Class Actions, ABA Annual Meeting, Chicago, IL (Aug. 3, 2012) (panelist)

Life as a Supreme Court Law Clerk and Views on the Health Care Debate, Exchange Club, Nashville, TN (Apr. 3, 2012)

The Tennessee Judicial Selection Process—Shaping Our Future, Tennessee Bar Association Leadership Law Retreat, Dickson, TN (Feb. 3, 2012) (panelist)

Reexamining the Class Action Practice, ABA National Institute on Class Actions, New York, NY (Oct. 14, 2011) (panelist)

Judicial Selection in Kansas, Committee on the Judiciary, Kansas House of Representatives (Feb. 16, 2011)

Judicial Selection and the Tennessee Constitution, Civil Practice and Procedure Subcommittee, Tennessee House of Representatives (Mar. 24, 2009)

What Would Happen if the Judicial Selection and Evaluation Commissions Sunset?, Civil Practice and Procedure Subcommittee, Tennessee House of Representatives (Feb. 24, 2009)

Judicial Selection in Tennessee, Chattanooga Bar Association, Chattanooga, TN (Feb. 27, 2008) (panelist)

Ethical Implications of Tennessee's Judicial Selection Process, Tennessee Bar Association, Nashville, TN (Dec. 12, 2007)

PROFESSIONAL ASSOCIATIONS

Member, American Law Institute

Referee, Journal of Legal Studies

Referee, Journal of Law, Economics and Organization

Referee, Journal of Empirical Legal Studies

Referee, Supreme Court Economic Review

Reviewer, Aspen Publishing

Reviewer, Cambridge University Press

Reviewer, University Press of Kansas

Reviewer, Palgrave Macmillan

Reviewer, Oxford University Press

Reviewer, Routledge

Member, American Bar Association

Member, Tennessee Advisory Committee to the U.S. Commission on Civil Rights, 2009-2015

Board of Directors, Tennessee Stonewall Bar Association, 2012-2022

American Swiss Foundation Young Leaders' Conference, 2012

Bar Admission, District of Columbia & California (inactive)

COMMUNITY ACTIVITIES

Board of Directors, Beacon Center, 2018-present; Board of Directors, Nashville Ballet, 2011-2017 & 2019-2022; Nashville Talking Library for the Blind, 2008-2009

Exhibit 2

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An Empirical Study of Class Action Settlements and Their Fee Awards

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This article is a comprehensive empirical study of class action settlements in federal court. Although there have been prior empirical studies of federal class action settlements, these studies have either been confined to securities cases or have been based on samples of cases that were not intended to be representative of the whole (such as those settlements approved in published opinions). By contrast, in this article, I attempt to study every federal class action settlement from the years 2006 and 2007. As far as I am aware, this study is the first attempt to collect a complete set of federal class action settlements for any given year. I find that district court judges approved 688 class action settlements over this two-year period, involving nearly \$33 billion. Of this \$33 billion, roughly \$5 billion was awarded to class action lawyers, or about 15 percent of the total. Most judges chose to award fees by using the highly discretionary percentage-of-the-settlement method, and the fees awarded according to this method varied over a broad range, with a mean and median around 25 percent. Fee percentages were strongly and inversely associated with the size of the settlement. The age of the case at settlement was positively associated with fee percentages. There was some variation in fee percentages depending on the subject matter of the litigation and the geographic circuit in which the district court was located, with lower percentages in securities cases and in settlements from the Second and Ninth Circuits. There was no evidence that fee percentages were associated with whether the class action was certified as a settlement class or with the political affiliation of the judge who made the award.

I. Introduction

Class actions have been the source of great controversy in the United States. Corporations fear them.¹ Policymakers have tried to corral them.² Commentators and scholars have

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¹See, e.g., Robert W. Wood, Defining Employees and Independent Contractors, Bus. L. Today 45, 48 (May–June 2008).

²See Private Securities Litigation Reform Act (PSLRA) of 1995, Pub. L. No. 104-67, 109 Stat. 737 (codified as amended in scattered sections of 15 U.S.C.); Class Action Fairness Act of 2005, 28 U.S.C. §§ 1453, 1711–1715 (2006).

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suggested countless ways to reform them.³ Despite all the attention showered on class actions, and despite the excellent empirical work on class actions to date, the data that currently exist on how the class action system operates in the United States are limited. We do not know, for example, how much money changes hands in class action litigation every year. We do not know how much of this money goes to class action lawyers rather than class members. Indeed, we do not even know how many class action cases are resolved on an annual basis. To intelligently assess our class action system as well as whether and how it should be reformed, answers to all these questions are important. Answers to these questions are equally important to policymakers in other countries who are currently thinking about adopting U.S.-style class action devices.⁴

This article tries to answer these and other questions by reporting the results of an empirical study that attempted to gather all class action settlements approved by federal judges over a recent two-year period, 2006 and 2007. I use class action settlements as the basis of the study because, even more so than individual litigation, virtually all cases certified as class actions and not dismissed before trial end in settlement.⁵ I use federal settlements as the basis of the study for practical reasons: it was easier to identify and collect settlements approved by federal judges than those approved by state judges. Systematic study of class action settlements in state courts must await further study;⁶ these future studies are important because there may be more class action settlements in state courts than there are in federal court.⁷

This article attempts to make three contributions to the existing empirical literature on class action settlements. First, virtually all the prior empirical studies of federal class action settlements have either been confined to securities cases or have been based on samples of cases that were not intended to be representative of the whole (such as those settlements approved in published opinions). In this article, by contrast, I attempt to collect every federal class action settlement from the years 2006 and 2007. As far as I am aware, this study is the first to attempt to collect a complete set of federal class action settlements for

³See, e.g., Robert G. Bone, Agreeing to Fair Process: The Problem with Contractarian Theories of Procedural Fairness, 83 B.U.L. Rev. 485, 490–94 (2003); Allan Erbsen, From "Predominance" to "Resolvability": A New Approach to Regulating Class Actions, 58 Vand. L. Rev. 995, 1080–81 (2005).

⁴See, e.g., Samuel Issacharoff & Geoffrey Miller, Will Aggregate Litigation Come to Europe?, 62 Vand. L. Rev. 179 (2009).

⁵See, e.g., Emery Lee & Thomas E. Willing, Impact of the Class Action Fairness Act on the Federal Courts: Preliminary Findings from Phase Two's Pre-CAFA Sample of Diversity Class Actions 11 (Federal Judicial Center 2008); Tom Baker & Sean J. Griffith, How the Merits Matter: D&O Insurance and Securities Settlements, 157 U. Pa. L. Rev. 755 (2009).

⁶Empirical scholars have begun to study state court class actions in certain subject areas and in certain states. See, e.g., Robert B. Thompson & Randall S. Thomas, The Public and Private Faces of Derivative Suits, 57 Vand. L. Rev. 1747 (2004); Robert B. Thompson & Randall S. Thomas, The New Look of Shareholder Litigation: Acquisition-Oriented Class Actions, 57 Vand. L. Rev. 133 (2004); Findings of the Study of California Class Action Litigation (Administrative Office of the Courts) (First Interim Report, 2009).

⁷See Deborah R. Hensler et al., Class Action Dilemmas: Pursuing Public Goals for Private Gain 56 (2000).

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any given year. As such, this article allows us to see for the first time a complete picture of the cases that are settled in federal court. This includes aggregate annual statistics, such as how many class actions are settled every year, how much money is approved every year in these settlements, and how much of that money class action lawyers reap every year. It also includes how these settlements are distributed geographically as well as by litigation area, what sort of relief was provided in the settlements, how long the class actions took to reach settlement, and an analysis of what factors were associated with the fees awarded to class counsel by district court judges.

Second, because this article analyzes settlements that were approved in both published and unpublished opinions, it allows us to assess how well the few prior studies that looked beyond securities cases but relied only on published opinions capture the complete picture of class action settlements. To the extent these prior studies adequately capture the complete picture, it may be less imperative for courts, policymakers, and empirical scholars to spend the considerable resources needed to collect unpublished opinions in order to make sound decisions about how to design our class action system.

Third, this article studies factors that may influence district court judges when they award fees to class counsel that have not been studied before. For example, in light of the discretion district court judges have been delegated over fees under Rule 23, as well as the salience the issue of class action litigation has assumed in national politics, realist theories of judicial behavior would predict that Republican judges would award smaller fee percentages than Democratic judges. I study whether the political beliefs of district court judges are associated with the fees they award and, in doing so, contribute to the literature that attempts to assess the extent to which these beliefs influence the decisions of not just appellate judges, but trial judges as well. Moreover, the article contributes to the small but growing literature examining whether the ideological influences found in published judicial decisions persist when unpublished decisions are examined as well.

In Section II of this article, I briefly survey the existing empirical studies of class action settlements. In Section III, I describe the methodology I used to collect the 2006–2007 federal class action settlements and I report my findings regarding these settlements. District court judges approved 688 class action settlements over this two-year period, involving over \$33 billion. I report a number of descriptive statistics for these settlements, including the number of plaintiff versus defendant classes, the distribution of settlements by subject matter, the age of the case at settlement, the geographic distribution of settlements, the number of settlement classes, the distribution of relief across settlements, and various statistics on the amount of money involved in the settlements. It should be noted that despite the fact that the few prior studies that looked beyond securities settlements appeared to oversample larger settlements, much of the analysis set forth in this article is consistent with these prior studies. This suggests that scholars may not need to sample unpublished as well as published opinions in order to paint an adequate picture of class action settlements.

⁸Of course, I cannot be certain that I found every one of the class actions that settled in federal court over this period. Nonetheless, I am confident that if I did not find some, the number I did not find is small and would not contribute meaningfully to the data reported in this article.

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In Section IV, I perform an analysis of the fees judges awarded to class action lawyers in the 2006–2007 settlements. All told, judges awarded nearly \$5 billion over this two-year period in fees and expenses to class action lawyers, or about 15 percent of the total amount of the settlements. Most federal judges chose to award fees by using the highly discretionary percentage-of-the-settlement method and, unsurprisingly, the fees awarded according to this method varied over a broad range, with a mean and median around 25 percent. Using regression analysis, I confirm prior studies and find that fee percentages are strongly and inversely associated with the size of the settlement. Further, I find that the age of the case is positively associated with fee percentages but that the percentages were not associated with whether the class action was certified as a settlement class. There also appeared to be some variation in fee percentages depending on the subject matter of the litigation and the geographic circuit in which the district court was located. Fee percentages in securities cases were lower than the percentages in some but not all other areas, and district courts in some circuits—the Ninth and the Second (in securities cases)—awarded lower fee percentages than courts in many other circuits. Finally, the regression analysis did not confirm the realist hypothesis: there was no association between fee percentage and the political beliefs of the judge in any regression.

II. Prior Empirical Studies of Class Action Settlements

There are many existing empirical studies of federal securities class action settlements. Studies of securities settlements have been plentiful because for-profit organizations maintain lists of all federal securities class action settlements for the benefit of institutional investors that are entitled to file claims in these settlements. Using these data, studies have shown that since 2005, for example, there have been roughly 100 securities class action settlements in federal court each year, and these settlements have involved between \$7 billion and \$17 billion per year. Scholars have used these data to analyze many different aspects of these settlements, including the factors that are associated with the percentage of

⁹See, e.g., James D. Cox & Randall S. Thomas, Does the Plaintiff Matter? An Empirical Analysis of Lead Plaintiffs in Securities Class Actions, 106 Colum. L. Rev. 1587 (2006); James D. Cox, Randall S. Thomas & Lynn Bai, There are Plaintiffs and . . . there are Plaintiffs: An Empirical Analysis of Securities Class Action Settlements, 61 Vand. L. Rev. 355 (2008); Theodore Eisenberg, Geoffrey Miller & Michael A. Perino, A New Look at Judicial Impact: Attorneys' Fees in Securities Class Actions after Goldberger v. Integrated Resources, Inc., 29 Wash. U.J.L. & Pol'y 5 (2009); Michael A. Perino, Markets and Monitors: The Impact of Competition and Experience on Attorneys' Fees in Securities Class Actions (St. John's Legal Studies, Research Paper No. 06-0034, 2006), available at http://ssrn.com/abstract=870577> [hereinafter Perino, Markets and Monitors]; Michael A. Perino, The Milberg Weiss Prosecution: No Harm, No Foul? (St. John's Legal Studies, Research Paper No. 08-0135, 2008), available at https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1133995> [hereinafter Perino, Milberg Weiss].

¹⁰See, e.g., RiskMetrics Group, available at http://www.riskmetrics.com/scas.

¹¹See Cornerstone Research, Securities Class Action Settlements: 2007 Review and Analysis 1 (2008), available at http://securities.stanford.edu/Settlements/REVIEW_1995-2007/Settlements_Through_12_2007.pdf.

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the settlements that courts have awarded to class action lawyers. 12 These studies have found that the mean and median fees awarded by district court judges are between 20 percent and 30 percent of the settlement amount.¹³ These studies have also found that a number of factors are associated with the percentage of the settlement awarded as fees, including (inversely) the size of the settlement, the age of the case, whether a public pension fund was the lead plaintiff, and whether certain law firms were class counsel.¹⁴ None of these studies has examined whether the political affiliation of the federal district court judge awarding the fees was associated with the size of awards.

There are no comparable organizations that maintain lists of nonsecurities class action settlements. As such, studies of class action settlements beyond the securities area are much rarer and, when they have been done, rely on samples of settlements that were not intended to be representative of the whole. The two largest studies of class action settlements not limited to securities class actions are a 2004 study by Ted Eisenberg and Geoff Miller, 15 which was recently updated to include data through 2008, 16 and a 2003 study by Class Action Reports.¹⁷ The Eisenberg-Miller studies collected data from class action settlements in both state and federal courts found from court opinions published in the Westlaw and Lexis databases and checked against lists maintained by the CCH Federal Securities and Trade Regulation Reporters. Through 2008, their studies have now identified 689 settlements over a 16-year period, or less than 45 settlements per year. 18 Over this 16-year period, their studies found that the mean and median settlement amounts were, respectively, \$116 million and \$12.5 million (in 2008 dollars), and that the mean and median fees awarded by district courts were 23 percent and 24 percent of the settlement, respectively.¹⁹ Their studies also performed an analysis of fee percentages and fee awards. For the data through 2002, they found that the percentage of the settlement awarded as fees was associated with the size of the settlement (inversely), the age of the case, and whether the

¹²See, e.g., Eisenberg, Miller & Perino, supra note 9, at 17–24, 28–36; Perino, Markets and Monitors, supra note 9, at 12-28, 39-44; Perino, Milberg Weiss, supra note 9, at 32-33, 39-60.

¹³See, e.g., Eisenberg, Miller & Perino, supra note 9, at 17–18, 22, 28, 33; Perino, Markets and Monitors, supra note 9, at 20-21, 40; Perino, Milberg Weiss, supra note 9, at 32-33, 51-53.

¹⁴See, e.g., Eisenberg, Miller & Perino, supra note 9, at 14–24, 29–30, 33–34; Perino, Markets and Monitors, supra note 9, at 20-28, 41; Perino, Milberg Weiss, supra note 9, at 39-58.

¹⁵See Theodore Eisenberg & Geoffrey Miller, Attorney Fees in Class Action Settlements: An Empirical Study, 1 J. Empirical Legal Stud. 27 (2004).

¹⁶See Theodore Eisenberg & Geoffrey Miller, Attorneys' Fees and Expenses in Class Action Settlements: 1993–2008, 7 J. Empirical Legal Stud. 248 (2010) [hereinafter Eisenberg & Miller II].

¹⁷See Stuart J. Logan, Jack Moshman & Beverly C. Moore, Jr., Attorney Fee Awards in Common Fund Class Actions, 24 Class Action Rep. 169 (Mar.-Apr. 2003).

¹⁸See Eisenberg & Miller II, supra note 16, at 251.

¹⁹Id. at 258-59.

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district court went out of its way to comment on the level of risk that class counsel had assumed in pursuing the case.²⁰ For the data through 2008, they regressed only fee awards and found that the awards were inversely associated with the size of the settlement, that state courts gave lower awards than federal courts, and that the level of risk was still associated with larger awards.²¹ Their studies have not examined whether the political affiliations of the federal district court judges awarding fees were associated with the size of the awards.

The Class Action Reports study collected data on 1,120 state and federal settlements over a 30-year period, or less than 40 settlements per year. ²² Over the same 10-year period analyzed by the Eisenberg-Miller study, the Class Action Reports data found mean and median settlements of \$35.4 and \$7.6 million (in 2002 dollars), as well as mean and median fee percentages between 25 percent and 30 percent. ²³ Professors Eisenberg and Miller performed an analysis of the fee awards in the Class Action Reports study and found the percentage of the settlement awarded as fees was likewise associated with the size of the settlement (inversely) and the age of the case. ²⁴

III. Federal Class Action Settlements, 2006 and 2007

As far as I am aware, there has never been an empirical study of all federal class action settlements in a particular year. In this article, I attempt to make such a study for two recent years: 2006 and 2007. To compile a list of all federal class settlements in 2006 and 2007, I started with one of the aforementioned lists of securities settlements, the one maintained by RiskMetrics, and I supplemented this list with settlements that could be found through three other sources: (1) broad searches of district court opinions in the Westlaw and Lexis databases, ²⁵ (2) four reporters of class action settlements—*BNA Class Action Litigation Report, Mealey's Jury Verdicts and Settlements, Mealey's Litigation Report,* and the *Class Action World* website ²⁶—and (3) a list from the Administrative Office of Courts of all district court cases

²⁰See Eisenberg & Miller, supra note 15, at 61-62.

²¹See Eisenberg & Miller II, supra note 16, at 278.

²²See Eisenberg & Miller, supra note 15, at 34.

²³Id. at 47, 51.

²⁴Id. at 61-62.

 $^{^{25}}$ The searches consisted of the following terms: ("class action" & (settle! /s approv! /s (2006 2007))); (((counsel attorney) /s fee /s award!) & (settle! /s (2006 2007)) & "class action"); ("class action" /s settle! & da(aft 12/31/2005 & bef 1/1/2008)); ("class action" /s (fair reasonable adequate) & da(aft 12/31/2005 & bef 1/1/2008)).

²⁶See http://classactionworld.com/>.

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coded as class actions that terminated by settlement between 2005 and 2008.²⁷ I then removed any duplicate cases and examined the docket sheets and court orders of each of the remaining cases to determine whether the cases were in fact certified as class actions under either Rule 23, Rule 23.1, or Rule 23.2.²⁸ For each of the cases verified as such, I gathered the district court's order approving the settlement, the district court's order awarding attorney fees, and, in many cases, the settlement agreements and class counsel's motions for fees, from electronic databases (such as Westlaw or PACER) and, when necessary, from the clerk's offices of the various federal district courts. In this section, I report the characteristics of the settlements themselves; in the next section, I report the characteristics of the attorney fees awarded to class counsel by the district courts that approved the settlements.

A. Number of Settlements

I found 688 settlements approved by federal district courts during 2006 and 2007 using the methodology described above. This is almost the exact same number the Eisenberg-Miller study found over a 16-year period in both federal and state court. Indeed, the number of annual settlements identified in this study is several times the number of annual settlements that have been identified in any prior empirical study of class action settlements. Of the 688 settlements I found, 304 were approved in 2006 and 384 were approved in 2007.²⁹

B. Defendant Versus Plaintiff Classes

Although Rule 23 permits federal judges to certify either a class of plaintiffs or a class of defendants, it is widely assumed that it is extremely rare for courts to certify defendant classes.³⁰ My findings confirm this widely held assumption. Of the 688 class action settlements approved in 2006 and 2007, 685 involved plaintiff classes and only three involved

²⁷I examined the AO lists in the year before and after the two-year period under investigation because the termination date recorded by the AO was not necessarily the same date the district court approved the settlement.

²⁸See Fed. R. Civ. P. 23, 23.1, 23.2. I excluded from this analysis opt-in collective actions, such as those brought pursuant to the provisions of the Fair Labor Standards Act (see 29 U.S.C. § 216(b)), if such actions did not also include claims certified under the opt-out mechanism in Rule 23.

²⁹A settlement was assigned to a particular year if the district court judge's order approving the settlement was dated between January 1 and December 31 of that year. Cases involving multiple defendants sometimes settled over time because defendants would settle separately with the plaintiff class. All such partial settlements approved by the district court on the same date were treated as one settlement. Partial settlements approved by the district court on different dates were treated as different settlements.

³⁰See, e.g., Robert H. Klonoff, Edward K.M. Bilich & Suzette M. Malveaux, Class Actions and Other Multi-Party Litigation: Cases and Materials 1061 (2d ed. 2006).

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defendant classes. All three of the defendant-class settlements were in employment benefits cases, where companies sued classes of current or former employees.³¹

C. Settlement Subject Areas

Although courts are free to certify Rule 23 classes in almost any subject area, it is widely assumed that securities settlements dominate the federal class action docket. At least in terms of the number of settlements, my findings reject this conventional wisdom. As Table 1 shows, although securities settlements comprised a large percentage of the 2006 and 2007 settlements, they did not comprise a majority of those settlements. As one would have

Table 1: The Number of Class Action Settlements Approved by Federal Judges in 2006 and 2007 in Each Subject Area

	Number of Settlements		
Subject Matter	2006	2007	
Securities	122 (40%)	135 (35%)	
Labor and employment	41 (14%)	53 (14%)	
Consumer	40 (13%)	47 (12%)	
Employee benefits	23 (8%)	38 (10%)	
Civil rights	24 (8%)	37 (10%)	
Debt collection	19 (6%)	23 (6%)	
Antitrust	13 (4%)	17 (4%)	
Commercial	4 (1%)	9 (2%)	
Other	18 (6%)	25 (6%)	
Total	304	384	

Note: Securities: cases brought under federal and state securities laws. Labor and employment: workplace claims brought under either federal or state law, with the exception of ERISA cases. Consumer: cases brought under the Fair Credit Reporting Act as well as cases for consumer fraud and the like. Employee benefits: ERISA cases. Civil rights: cases brought under 42 U.S.C. § 1983 or cases brought under the Americans with Disabilities Act seeking nonworkplace accommodations. Debt collection: cases brought under the Fair Debt Collection Practices Act. Antitrust: cases brought under federal or state antitrust laws. Commercial: cases between businesses, excluding antitrust cases. Other: includes, among other things, derivative actions against corporate managers and directors, environmental suits, insurance suits, Medicare and Medicaid suits, product liability suits, and mass tort suits.

Sources: Westlaw, PACER, district court clerks' offices.

³¹See Halliburton Co. v. Graves, No. 04-00280 (S.D. Tex., Sept. 28, 2007); Rexam, Inc. v. United Steel Workers of Am., No. 03-2998 (D. Minn. Aug. 29, 2007); Rexam, Inc. v. United Steel Workers of Am., No. 03-2998 (D. Minn. Sept. 17, 2007).

³²See, e.g., John C. Coffee, Jr., Reforming the Security Class Action: An Essay on Deterrence and its Implementation, 106 Colum. L. Rev. 1534, 1539–40 (2006) (describing securities class actions as "the 800-pound gorilla that dominates and overshadows other forms of class actions").

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expected in light of Supreme Court precedent over the last two decades,³³ there were almost no mass tort class actions (included in the "Other" category) settled over the two-year period.

Although the Eisenberg-Miller study through 2008 is not directly comparable on the distribution of settlements across litigation subject areas—because its state and federal court data cannot be separated (more than 10 percent of the settlements were from state court³⁴) and because it excludes settlements in fee-shifting cases—their study through 2008 is the best existing point of comparison. Interestingly, despite the fact that state courts were included in their data, their study through 2008 found about the same percentage of securities cases (39 percent) as my 2006–2007 data set shows.³⁵ However, their study found many more consumer (18 percent) and antitrust (10 percent) cases, while finding many fewer labor and employment (8 percent), employee benefits (6 percent), and civil rights (3 percent) cases.³⁶ This is not unexpected given their reliance on published opinions and their exclusion of fee-shifting cases.

D. Settlement Classes

The Federal Rules of Civil Procedure permit parties to seek certification of a suit as a class action for settlement purposes only.³⁷ When the district court certifies a class in such circumstances, the court need not consider whether it would be manageable to try the litigation as a class.³⁸ So-called settlement classes have always been more controversial than classes certified for litigation because they raise the prospect that, at least where there are competing class actions filed against the same defendant, the defendant could play class counsel off one another to find the one willing to settle the case for the least amount of money.³⁹ Prior to the Supreme Court's 1997 opinion in Amchem Products, Inc. v. Windsor,⁴⁰ it was uncertain whether the Federal Rules even permitted settlement classes. It may therefore be a bit surprising to learn that 68 percent of the federal settlements in 2006 and 2007 were settlement classes. This percentage is higher than the percentage found in the Eisenberg-Miller studies, which found that only 57 percent of class action settlements in

³³See, e.g., Samuel Issacharoff, Private Claims, Aggregate Rights, 2008 Sup. Ct. Rev. 183, 208.

³⁴See Eisenberg & Miller II, supra note 16, at 257.

³⁵Id. at 262.

 $^{^{36}}$ Id.

³⁷See Martin H. Redish, Settlement Class Actions, The Case-or-Controversy Requirement, and the Nature of the Adjudicatory Process, 73 U. Chi. L. Rev. 545, 553 (2006).

³⁸See Amchem Prods., Inc v Windsor, 521 U.S. 591, 620 (1997).

³⁹See Redish, supra note 368, at 557-59.

⁴⁰⁵²¹ U.S. 591 (1997).

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state and federal court between 2003 and 2008 were settlement classes. ⁴¹ It should be noted that the distribution of litigation subject areas among the settlement classes in my 2006–2007 federal data set did not differ much from the distribution among nonsettlement classes, with two exceptions. One exception was consumer cases, which were nearly three times as prevalent among settlement classes (15.9 percent) as among nonsettlement classes (5.9 percent); the other was civil rights cases, which were four times as prevalent among nonsettlement classes (18.0 percent) as among settlements classes (4.5 percent). In light of the skepticism with which the courts had long treated settlement classes, one might have suspected that courts would award lower fee percentages in such settlements. Nonetheless, as I report in Section III, whether a case was certified as a settlement class was not associated with the fee percentages awarded by federal district court judges.

E. The Age at Settlement

One interesting question is how long class actions were litigated before they reached settlement. Unsurprisingly, cases reached settlement over a wide range of ages. ⁴² As shown in Table 2, the average time to settlement was a bit more than three years (1,196 days) and the median time was a bit under three years (1,068 days). The average and median ages here are similar to those found in the Eisenberg-Miller study through 2002, which found averages of 3.35 years in fee-shifting cases and 2.86 years in non-fee-shifting cases, and

Table 2: The Number of Days, 2006–2007, Federal Class Action Cases Took to Reach Settlement in Each Subject Area

Subject Matter	Average	Median	Minimum	Maximum
Securities	1,438	1,327	392	3,802
Labor and employment	928	786	105	2,497
Consumer	963	720	127	4,961
Employee benefits	1,162	1,161	164	3,157
Civil rights	1,373	1,360	181	3,354
Debt collection	738	673	223	1,973
Antitrust	1,140	1,167	237	2,480
Commercial	1,267	760	163	5,443
Other	1,065	962	185	3,620
All	1,196	1,068	105	5,443

SOURCE: PACER.

⁴¹See Eisenberg & Miller II, supra note 16, at 266.

⁴²The age of the case was calculated by subtracting the date the relevant complaint was filed from the date the settlement was approved by the district court judge. The dates were taken from PACER. For consolidated cases, I used the date of the earliest complaint. If the case had been transferred, consolidated, or removed, the date the complaint was filed was not always available from PACER. In such cases, I used the date the case was transferred, consolidated, or removed as the start date.

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medians of 4.01 years in fee-shifting cases and 3.0 years in non-fee-shifting cases.⁴³ Their study through 2008 did not report case ages.

The shortest time to settlement was 105 days in a labor and employment case.⁴⁴ The longest time to settlement was nearly 15 years (5,443 days) in a commercial case.⁴⁵ The average and median time to settlement varied significantly by litigation subject matter, with securities cases generally taking the longest time and debt collection cases taking the shortest time. Labor and employment cases and consumer cases also settled relatively early.

F. The Location of Settlements

The 2006–2007 federal class action settlements were not distributed across the country in the same way federal civil litigation is in general. As Figure 1 shows, some of the geographic circuits attracted much more class action attention than we would expect based on their docket size, and others attracted much less. In particular, district courts in the First, Second, Seventh, and Ninth Circuits approved a much larger share of class action settlements than the share of all civil litigation they resolved, with the First, Second, and Seventh Circuits approving nearly double the share and the Ninth Circuit approving one-and-one-half times the share. By contrast, the shares of class action settlements approved by district courts in the Fifth and Eighth Circuits were less than one-half of their share of all civil litigation, with the Third, Fourth, and Eleventh Circuits also exhibiting significant underrepresentation.

With respect to a comparison with the Eisenberg-Miller studies, their federal court data through 2008 can be separated from their state court data on the question of the geographic distribution of settlements, and there are some significant differences between their federal data and the numbers reflected in Figure 1. Their study reported considerably higher proportions of settlements than I found from the Second (23.8 percent), Third (19.7 percent), Eighth (4.8 percent), and D.C. (3.3 percent) Circuits, and considerably lower proportions from the Fourth (1.3 percent), Seventh (6.8 percent), and Ninth (16.6 percent) Circuits. 46

Figure 2 separates the class action settlement data in Figure 1 into securities and nonsecurities cases. Figure 2 suggests that the overrepresentation of settlements in the First and Second Circuits is largely attributable to securities cases, whereas the overrepresentation in the Seventh Circuit is attributable to nonsecurities cases, and the overrepresentation in the Ninth is attributable to both securities and nonsecurities cases.

It is interesting to ask why some circuits received more class action attention than others. One hypothesis is that class actions are filed in circuits where class action lawyers

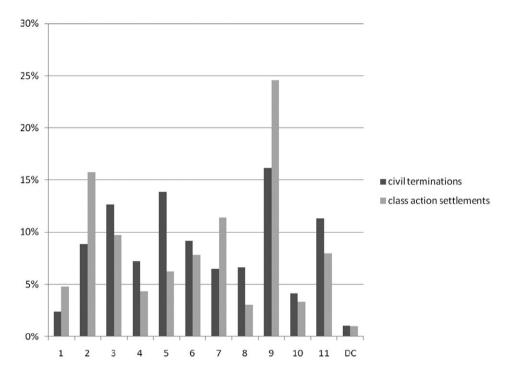
⁴³See Eisenberg & Miller, supra note 15, at 59-60.

⁴⁴See Clemmons v. Rent-a-Center W., Inc., No. 05-6307 (D. Or. Jan. 20, 2006).

⁴⁵See Allapattah Servs. Inc. v. Exxon Corp., No. 91-0986 (S.D. Fla. Apr. 7, 2006).

⁴⁶See Eisenberg & Miller II, supra note 16, at 260.

Figure 1: The percentage of 2006–2007 district court civil terminations and class action settlements in each federal circuit.



SOURCES: PACER, Statistical Tables for the Federal Judiciary 2006 & 2007 (available at http://www.uscourts.gov/stats/index.html).

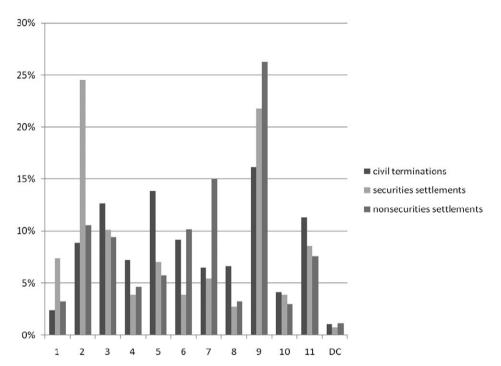
believe they can find favorable law or favorable judges. Federal class actions often involve class members spread across multiple states and, as such, class action lawyers may have a great deal of discretion over the district in which file suit.⁴⁷ One way law or judges may be favorable to class action attorneys is with regard to attorney fees. In Section III, I attempt to test whether district court judges in the circuits with the most over- and undersubscribed class action dockets award attorney fees that would attract or discourage filings there; I find no evidence that they do.

Another hypothesis is that class action suits are settled in jurisdictions where defendants are located. This might be the case because although class action lawyers may have discretion over where to file, venue restrictions might ultimately restrict cases to jurisdic-

 $^{^{47}\}mathrm{See}$ Samuel Issacharoff & Richard Nagareda, Class Settlements Under Attack, 156 U. Pa. L. Rev. 1649, 1662 (2008).

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Figure 2: The percentage of 2006–2007 district court civil terminations and class action settlements in each federal circuit.



Sources: PACER, Statistical Tables for the Federal Judiciary 2006 & 2007 (available at http://www.uscourts.gov/stats/index.html).

tions in which defendants have their corporate headquarters or other operations. ⁴⁸ This might explain why the Second Circuit, with the financial industry in New York, sees so many securities suits, and why other circuits with cities with a large corporate presence, such as the First (Boston), Seventh (Chicago), and Ninth (Los Angeles and San Francisco), see more settlements than one would expect based on the size of their civil dockets.

Another hypothesis might be that class action lawyers file cases wherever it is most convenient for them to litigate the cases—that is, in the cities in which their offices are located. This, too, might explain the Second Circuit's overrepresentation in securities settlements, with prominent securities firms located in New York, as well as the

⁴⁸See 28 U.S.C. §§ 1391, 1404, 1406, 1407. See also Foster v. Nationwide Mut. Ins. Co., No. 07-04928, 2007 U.S. Dist. LEXIS 95240 at *2–17 (N.D. Cal. Dec. 14, 2007) (transferring venue to jurisdiction where defendant's corporate headquarters were located). One prior empirical study of securities class action settlements found that 85 percent of such cases are filed in the home circuit of the defendant corporation. See James D. Cox, Randall S. Thomas & Lynn Bai, Do Differences in Pleading Standards Cause Forum Shopping in Securities Class Actions?: Doctrinal and Empirical Analyses, 2009 Wis. L. Rev. 421, 429, 440, 450–51 (2009).

overrepresentation of other settlements in some of the circuits in which major metropolitan areas with prominent plaintiffs' firms are found.

G. Type of Relief

Under Rule 23, district court judges can certify class actions for injunctive or declaratory relief, for money damages, or for a combination of the two.⁴⁹ In addition, settlements can provide money damages both in the form of cash as well as in the form of in-kind relief, such as coupons to purchase the defendant's products.⁵⁰

As shown in Table 3, the vast majority of class actions settled in 2006 and 2007 provided cash relief to the class (89 percent), but a substantial number also provided in-kind relief (6 percent) or injunctive or declaratory relief (23 percent). As would be

Table 3: The Percentage of 2006 and 2007 Class Action Settlements Providing Each Type of Relief in Each Subject Area

Subject Matter	Cash	In-Kind Relief	Injunctive or Declaratory Relief
Securities $(n = 257)$	100%	0%	2%
Labor and employment $(n = 94)$	95%	6%	29%
Consumer $(n = 87)$	74%	30%	37%
Employee benefits $(n = 61)$	90%	0%	34%
Civil rights $(n = 61)$	49%	2%	75%
Debt collection $(n = 42)$	98%	0%	12%
Antitrust $(n = 30)$	97%	13%	7%
Commercial $(n = 13)$	92%	0%	62%
Other $(n = 43)$	77%	7%	33%
All $(n = 688)$	89%	6%	23%

NOTE: Cash: cash, securities, refunds, charitable contributions, contributions to employee benefit plans, forgiven debt, relinquishment of liens or claims, and liquidated repairs to property. In-kind relief: vouchers, coupons, gift cards, warranty extensions, merchandise, services, and extended insurance policies. Injunctive or declaratory relief: modification of terms of employee benefit plans, modification of compensation practices, changes in business practices, capital improvements, research, and unliquidated repairs to property.

Sources: Westlaw, PACER, district court clerks' offices.

⁴⁹See Fed. R. Civ. P. 23(b).

⁵⁰These coupon settlements have become very controversial in recent years, and Congress discouraged them in the Class Action Fairness Act of 2005 by tying attorney fees to the value of coupons that were ultimately redeemed by class members as opposed to the value of coupons offered class members. See 28 U.S.C. § 1712.

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expected in light of the focus on consumer cases in the debate over the anti-coupon provision in the Class Action Fairness Act of 2005,⁵¹ consumer cases had the greatest percentage of settlements providing for in-kind relief (30 percent). Civil rights cases had the greatest percentage of settlements providing for injunctive or declaratory relief (75 percent), though almost half the civil rights cases also provided some cash relief (49 percent). The securities settlements were quite distinctive from the settlements in other areas in their singular focus on cash relief: every single securities settlement provided cash to the class and almost none provided in-kind, injunctive, or declaratory relief. This is but one example of how the focus on securities settlements in the prior empirical scholarship can lead to a distorted picture of class action litigation.

H. Settlement Money

Although securities settlements did not comprise the majority of federal class action settlements in 2006 and 2007, they did comprise the majority of the money—indeed, the *vast majority* of the money—involved in class action settlements. In Table 4, I report the total amount of ascertainable value involved in the 2006 and 2007 settlements. This amount

Table 4: The Total Amount of Money Involved in Federal Class Action Settlements in 2006 and 2007

Subject Matter	Tota		etary Value in Settlements Overall Annual Total)	
	2000 (n = 3)		2000 (n = 3	
Securities	\$16,728	76%	\$8,038	73%
Labor and employment	\$266.5	1%	\$547.7	5%
Consumer	\$517.3	2%	\$732.8	7%
Employee benefits	\$443.8	2%	\$280.8	3%
Civil rights	\$265.4	1%	\$81.7	1%
Debt collection	\$8.9	<1%	\$5.7	<1%
Antitrust	\$1,079	5%	\$660.5	6%
Commercial	\$1,217	6%	\$124.0	1%
Other	\$1,568	7%	\$592.5	5%
Total	\$22,093	100%	\$11,063	100%

NOTE: Dollar amounts are in millions. Includes all determinate payments in cash or cash equivalents (such as marketable securities), including attorney fees and expenses, as well as any in-kind relief (such as coupons) or injunctive relief that was valued by the district court.

Sources: Westlaw, PACER, district court clerks' offices.

⁵¹See, e.g., 151 Cong. Rec. H723 (2005) (statement of Rep. Sensenbrenner) (arguing that consumers are "seeing all of their gains go to attorneys and them just getting coupon settlements from the people who have allegedly done them wrong").

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includes all determinate⁵² payments in cash or cash equivalents (such as marketable securities), including attorney fees and expenses, as well as any in-kind relief (such as coupons) or injunctive relief that was valued by the district court.⁵³ I did not attempt to assign a value to any relief that was not valued by the district court (even if it may have been valued by class counsel). It should be noted that district courts did not often value in-kind or injunctive relief—they did so only 18 percent of the time—and very little of Table 4—only \$1.3 billion, or 4 percent—is based on these valuations. It should also be noted that the amounts in Table 4 reflect only what defendants *agreed to pay*; they do not reflect the amounts that defendants *actually paid* after the claims administration process concluded. Prior empirical research has found that, depending on how settlements are structured (e.g., whether they awarded a fixed amount of money to each class member who eventually files a valid claim or a pro rata amount of a fixed settlement to each class member), defendants can end up paying much less than they agreed.⁵⁴

Table 4 shows that in both years, around three-quarters of all the money involved in federal class action settlements came from securities cases. Thus, in this sense, the conventional wisdom about the dominance of securities cases in class action litigation is correct. Figure 3 is a graphical representation of the contribution each litigation area made to the total number and total amount of money involved in the 2006–2007 settlements.

Table 4 also shows that, in total, over \$33 billion was approved in the 2006–2007 settlements. Over \$22 billion was approved in 2006 and over \$11 billion in 2007. It should be emphasized again that the totals in Table 4 understate the amount of money defendants agreed to pay in class action settlements in 2006 and 2007 because they exclude the unascertainable value of those settlements. This understatement disproportionately affects litigation areas, such as civil rights, where much of the relief is injunctive because, as I noted, very little of such relief was valued by district courts. Nonetheless, these numbers are, as far as I am aware, the first attempt to calculate how much money is involved in federal class action settlements in a given year.

The significant discrepancy between the two years is largely attributable to the 2006 securities settlement related to the collapse of Enron, which totaled \$6.6 billion, as well as to the fact that seven of the eight 2006–2007 settlements for more than \$1 billion were approved in 2006.⁵⁵ Indeed, it is worth noting that the eight settlements for more than \$1

⁵²For example, I excluded awards of a fixed amount of money to each class member who eventually filed a valid claim (as opposed to settlements that awarded a pro rata amount of a fixed settlement to each class member) if the total amount of money set aside to pay the claims was not set forth in the settlement documents.

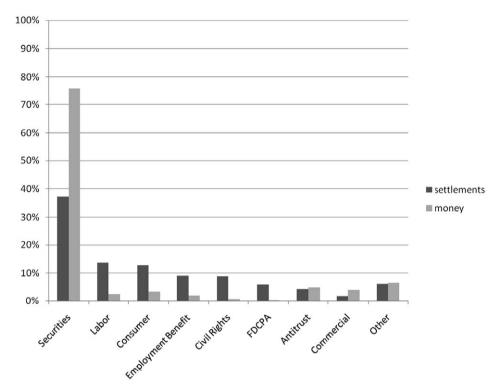
⁵³In some cases, the district court valued the relief in the settlement over a range. In these cases, I used the middle point in the range.

⁵⁴See Hensler et al., supra note 7, at 427-30.

⁵⁵See In re Enron Corp. Secs. Litig., MDL 1446 (S.D. Tex. May 24, 2006) (\$6,600,000,000); In re Tyco Int'l Ltd. Multidistrict Litig., MDL 02-1335 (D.N.H. Dec. 19, 2007) (\$3,200,000,000); In re AOL Time Warner, Inc. Secs. & "ERISA" Litig., MDL 1500 (S.D.N.Y. Apr. 6, 2006) (\$2,500,000,000); In re: Diet Drugs Prods. Liab. Litig., MDL 1203 (E.D. Pa. May 24, 2006) (\$1,275,000,000); In re Nortel Networks Corp. Secs. Litig. (Nortel I), No. 01-1855 (S.D.N.Y. Dec. 26, 2006) (\$1,142,780,000); In re Royal Ahold N.V. Secs. & ERISA Litig., 03-1539 (D. Md. Jun. 16, 2006)

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Figure 3: The percentage of 2006–2007 federal class action settlements and settlement money from each subject area.



Sources: Westlaw, PACER, district court clerks' offices.

billion accounted for almost \$18 billion of the \$33 billion that changed hands over the two-year period. That is, a mere 1 percent of the settlements comprised over 50 percent of the value involved in federal class action settlements in 2006 and 2007. To give some sense of the distribution of settlement size in the 2006–2007 data set, Table 5 sets forth the number of settlements with an ascertainable value beyond fee, expense, and class-representative incentive awards (605 out of the 688 settlements). Nearly two-thirds of all settlements fell below \$10 million.

Given the disproportionate influence exerted by securities settlements on the total amount of money involved in class actions, it is unsurprising that the average securities settlement involved more money than the average settlement in most of the other subject areas. These numbers are provided in Table 6, which includes, again, only the settlements

^{(\$1,100,000,000);} Allapattah Servs. Inc. v. Exxon Corp., No. 91-0986 (S.D. Fla. Apr. 7, 2006) (\$1,075,000,000); In re Nortel Networks Corp. Secs. Litig. (Nortel II), No. 05-1659 (S.D.N.Y. Dec. 26, 2006) (\$1,074,270,000).

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Table 5: The Distribution by Size of 2006–2007 Federal Class Action Settlements with Ascertainable Value

Settlement Size (in Millions)	Number of Settlements
[\$0 to \$1]	131
	(21.7%)
(\$1 to \$10]	261
	(43.1%)
(\$10 to \$50]	139
	(23.0%)
(\$50 to \$100]	33
	(5.45%)
(\$100 to \$500]	31
	(5.12%)
(\$500 to \$6,600]	10
	(1.65%)
Total	605

NOTE: Includes only settlements with ascertainable value beyond merely fee, expense, and class-representative incentive awards.

SOURCES: Westlaw, PACER, district court clerks' offices.

Table 6: The Average and Median Settlement Amounts in the 2006–2007 Federal Class Action Settlements with Ascertainable Value to the Class

Subject Matter	Average	Median	
Securities $(n = 257)$	\$96.4	\$8.0	
Labor and employment $(n = 88)$	\$9.2	\$1.8	
Consumer $(n = 65)$	\$18.8	\$2.9	
Employee benefits $(n = 52)$	\$13.9	\$5.3	
Civil rights $(n = 34)$	\$9.7	\$2.5	
Debt collection $(n = 40)$	\$0.37	\$0.088	
Antitrust $(n = 29)$	\$60.0	\$22.0	
Commercial $(n = 12)$	\$111.7	\$7.1	
Other $(n = 28)$	\$76.6	\$6.2	
All (N = 605)	\$54.7	\$5.1	

Note: Dollar amounts are in millions. Includes only settlements with ascertainable value beyond merely fee, expense, and class-representative incentive awards.

Sources: Westlaw, PACER, district court clerks' offices.

with an ascertainable value beyond fee, expense, and class-representative incentive awards. The average settlement over the entire two-year period for all types of cases was almost \$55 million, but the median was only \$5.1 million. (With the \$6.6 billion Enron settlement excluded, the average settlement for all ascertainable cases dropped to \$43.8 million and, for securities cases, dropped to \$71.0 million.) The average settlements varied widely by litigation area, with securities and commercial settlements at the high end of around \$100

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million, but the median settlements for nearly every area were bunched around a few million dollars. It should be noted that the high average for commercial cases is largely due to one settlement above \$1 billion;⁵⁶ when that settlement is removed, the average for commercial cases was only \$24.2 million.

Table 6 permits comparison with the two prior empirical studies of class action settlements that sought to include nonsecurities as well as securities cases in their purview. The Eisenberg-Miller study through 2002, which included both common-fund and feeshifting cases, found that the mean class action settlement was \$112 million and the median was \$12.9 million, both in 2006 dollars,⁵⁷ more than double the average and median I found for all settlements in 2006 and 2007. The Eisenberg-Miller update through 2008 included only common-fund cases and found mean and median settlements in federal court of \$115 million and \$11.7 million (both again in 2006 dollars), 58 respectively; this is still more than double the average and median I found. This suggests that the methodology used by the Eisenberg-Miller studies—looking at district court opinions that were published in Westlaw or Lexis—oversampled larger class actions (because opinions approving larger class actions are, presumably, more likely to be published than opinions approving smaller ones). It is also possible that the exclusion of fee-shifting cases from their data through 2008 contributed to this skew, although, given that their data through 2002 included fee-shifting cases and found an almost identical mean and median as their data through 2008, the primary explanation for the much larger mean and median in their study through 2008 is probably their reliance on published opinions. Over the same years examined by Professors Eisenberg and Miller, the Class Action Reports study found a smaller average settlement than I did (\$39.5 million in 2006 dollars), but a larger median (\$8.48 million in 2006 dollars). It is possible that the Class Action Reports methodology also oversampled larger class actions, explaining its larger median, but that there are more "mega" class actions today than there were before 2003, explaining its smaller mean.⁵⁹

It is interesting to ask how significant the \$16 billion that was involved annually in these 350 or so federal class action settlements is in the grand scheme of U.S. litigation. Unfortunately, we do not know how much money is transferred every year in U.S. litigation. The only studies of which I am aware that attempt even a partial answer to this question are the estimates of how much money is transferred in the U.S. "tort" system every year by a financial services consulting firm, Tillinghast-Towers Perrin. 60 These studies are not directly

⁵⁶See Allapattah Servs. Inc. v. Exxon Corp., No. 91-0986 (S.D. Fla. Apr. 7, 2006) (approving \$1,075,000,000 settlement).

⁵⁷See Eisenberg & Miller, supra note 15, at 47.

⁵⁸See Eisenberg & Miller II, supra note 16, at 262.

⁵⁹There were eight class action settlements during 2006 and 2007 of more than \$1 billion. See note 55 supra.

⁶⁰Some commentators have been critical of Tillinghast's reports, typically on the ground that the reports overestimate the cost of the tort system. See M. Martin Boyer, Three Insights from the Canadian D&O Insurance Market: Inertia, Information and Insiders, 14 Conn. Ins. L.J. 75, 84 (2007); John Fabian Witt, Form and Substance in the Law of

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comparable to the class action settlement numbers because, again, the number of tort class action settlements in 2006 and 2007 was very small. Nonetheless, as the tort system no doubt constitutes a large percentage of the money transferred in all litigation, these studies provide something of a point of reference to assess the significance of class action settlements. In 2006 and 2007, Tillinghast-Towers Perrin estimated that the U.S. tort system transferred \$160 billion and \$164 billion, respectively, to claimants and their lawyers. 61 The total amount of money involved in the 2006 and 2007 federal class action settlements reported in Table 4 was, therefore, roughly 10 percent of the Tillinghast-Towers Perrin estimate. This suggests that in merely 350 cases every year, federal class action settlements involve the same amount of wealth as 10 percent of the entire U.S. tort system. It would seem that this is a significant amount of money for so few cases.

IV. ATTORNEY FEES IN FEDERAL CLASS ACTION SETTLEMENTS, 2006 AND 2007

A. Total Amount of Fees and Expenses

As I demonstrated in Section III, federal class action settlements involved a great deal of money in 2006 and 2007, some \$16 billion a year. A perennial concern with class action litigation is whether class action lawyers are reaping an outsized portion of this money.⁶² The 2006–2007 federal class action data suggest that these concerns may be exaggerated. Although class counsel were awarded some \$5 billion in fees and expenses over this period, as shown in Table 7, only 13 percent of the settlement amount in 2006 and 20 percent of the amount in 2007 went to fee and expense awards.⁶³ The 2006 percentage is lower than the 2007 percentage in large part because the class action lawyers in the Enron securities settlement received less than 10 percent of the \$6.6 billion corpus. In any event, the percentages in both 2006 and 2007 are far lower than the portions of settlements that contingency-fee lawyers receive in individual litigation, which are usually at least 33 percent. 64 Lawyers received less than 33 percent of settlements in fees and expenses in virtually every subject area in both years.

Counterinsurgency Damages, 41 Loy. L.A.L. Rev. 1455, 1475 n.135 (2008). If these criticisms are valid, then class action settlements would appear even more significant as compared to the tort system.

⁶¹See Tillinghast-Towers Perrin, U.S. Tort Costs: 2008 Update 5 (2008). The report calculates \$252 billion in total tort "costs" in 2007 and \$246.9 billion in 2006, id., but only 65 percent of those costs represent payments made to claimants and their lawyers (the remainder represents insurance administration costs and legal costs to defendants). See Tillinghast-Towers Perrin, U.S. Tort Costs: 2003 Update 17 (2003).

⁶²See, e.g., Brian T. Fitzpatrick, Do Class Action Lawyers Make Too Little? 158 U. Pa. L. Rev. 2043, 2043–44 (2010).

 $^{^{63}}$ In some of the partial settlements, see note 29 supra, the district court awarded expenses for all the settlements at once and it was unclear what portion of the expenses was attributable to which settlement. In these instances, I assigned each settlement a pro rata portion of expenses. To the extent possible, all the fee and expense numbers in this article exclude any interest known to be awarded by the courts.

⁶⁴See, e.g., Herbert M. Kritzer, The Wages of Risk: The Returns of Contingency Fee Legal Practice, 47 DePaul L. Rev. 267, 284-86 (1998) (reporting results of a survey of Wisconsin lawyers).

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Table 7: The Total Amount of Fees and Expenses Awarded to Class Action Lawyers in Federal Class Action Settlements in 2006 and 2007

Subject Matter	Total Fees and Expenses Awarded in Settlements (and as Percentage of Total Settlement Amounts) in Each Subject Area		
	2006 (n = 292)	2007 (n = 363)	
Securities	\$1,899 (11%)	\$1,467 (20%)	
Labor and employment	\$75.1 (28%)	\$144.5 (26%)	
Consumer	\$126.4 (24%)	\$65.3 (9%)	
Employee benefits	\$57.1 (13%)	\$71.9 (26%)	
Civil rights	\$31.0 (12%)	\$32.2 (39%)	
Debt collection	\$2.5 (28%)	\$1.1 (19%)	
Antitrust	\$274.6 (26%)	\$157.3 (24%)	
Commercial	\$347.3 (29%)	\$18.2 (15%)	
Other	\$119.3 (8%)	\$103.3 (17%)	
Total	\$2,932 (13%)	\$2,063 (20%)	

Note: Dollar amounts are in millions. Excludes settlements in which fees were not (or at least not yet) sought (22 settlements), settlements in which fees have not yet been awarded (two settlements), and settlements in which fees could not be ascertained due to indefinite award amounts, missing documents, or nonpublic side agreements (nine settlements).

Sources: Westlaw, PACER, district court clerks' offices.

It should be noted that, in some respects, the percentages in Table 7 overstate the portion of settlements that were awarded to class action attorneys because, again, many of these settlements involved indefinite cash relief or noncash relief that could not be valued. ⁶⁵ If the value of all this relief could have been included, then the percentages in Table 7 would have been even lower. On the other hand, as noted above, not all the money defendants agree to pay in class action settlements is ultimately collected by the class. ⁶⁶ To the extent leftover money is returned to the defendant, the percentages in Table 7 understate the portion class action lawyers received relative to their clients.

B. Method of Awarding Fees

District court judges have a great deal of discretion in how they set fee awards in class action cases. Under Rule 23, federal judges are told only that the fees they award to class counsel

⁶⁵Indeed, the large year-to-year variation in the percentages in labor, consumer, and employee benefits cases arose because district courts made particularly large valuations of the equitable relief in a few settlements and used the lodestar method to calculate the fees in these settlements (and thereby did not consider their large valuations in calculating the fees).

⁶⁶See Hensler et al., supra note 7, at 427-30.

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must be "reasonable." 67 Courts often exercise this discretion by choosing between two approaches: the lodestar approach or the percentage-of-the-settlement approach.⁶⁸ The lodestar approach works much the way it does in individual litigation: the court calculates the fee based on the number of hours class counsel actually worked on the case multiplied by a reasonable hourly rate and a discretionary multiplier. ⁶⁹ The percentage-of-thesettlement approach bases the fee on the size of the settlement rather than on the hours class counsel actually worked: the district court picks a percentage of the settlement it thinks is reasonable based on a number of factors, one of which is often the fee lodestar (sometimes referred to as a "lodestar cross-check"). 70 My 2006–2007 data set shows that the percentage-of-the-settlement approach has become much more common than the lodestar approach. In 69 percent of the settlements reported in Table 7, district court judges employed the percentage-of-the-settlement method with or without the lodestar crosscheck. They employed the lodestar method in only 12 percent of settlements. In the other 20 percent of settlements, the court did not state the method it used or it used another method altogether.⁷¹ The pure lodestar method was used most often in consumer (29 percent) and debt collection (45 percent) cases. These numbers are fairly consistent with the Eisenberg-Miller data from 2003 to 2008. They found that the lodestar method was used in only 9.6 percent of settlements.⁷² Their number is no doubt lower than the 12 percent number found in my 2006-2007 data set because they excluded fee-shifting cases from their study.

C. Variation in Fees Awarded

Not only do district courts often have discretion to choose between the lodestar method and the percentage-of-the-settlement method, but each of these methods leaves district courts with a great deal of discretion in how the method is ultimately applied. The courts

⁶⁷Fed. R. Civ. P. 23(h).

⁶⁸The discretion to pick between these methods is most pronounced in settlements where the underlying claim was not found in a statute that would shift attorney fees to the defendant. See, e.g., In re Thirteen Appeals Arising out of San Juan DuPont Plaza Hotel Fire Litig., 56 F.3d 295, 307 (1st Cir. 1995) (permitting either percentage or lodestar method in common-fund cases); Goldberger v. Integrated Res. Inc., 209 F.3d 43, 50 (2d Cir. 2000) (same); Rawlings v. Prudential-Bache Props., Inc., 9 F.3d 513, 516 (6th Cir. 1993) (same). By contrast, courts typically used the lodestar approach in settlements arising from fee-shifting cases.

⁶⁹See Eisenberg & Miller, supra note 15, at 31.

⁷⁰Id. at 31–32.

⁷¹These numbers are based on the fee method described in the district court's order awarding fees, unless the order was silent, in which case the method, if any, described in class counsel's motion for fees (if it could be obtained) was used. If the court explicitly justified the fee award by reference to its percentage of the settlement, I counted it as the percentage method. If the court explicitly justified the award by reference to a lodestar calculation, I counted it as the lodestar method. If the court explicitly justified the award by reference to both, I counted it as the percentage method with a lodestar cross-check. If the court calculated neither a percentage nor the fee lodestar in its order, then I counted it as an "other" method.

⁷²See Eisenberg & Miller II, supra note 16, at 267.

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that use the percentage-of-the-settlement method usually rely on a multifactor test⁷³ and, like most multifactor tests, it can plausibly yield many results. It is true that in many of these cases, judges examine the fee percentages that other courts have awarded to guide their discretion.⁷⁴ In addition, the Ninth Circuit has adopted a presumption that 25 percent is the proper fee award percentage in class action cases.⁷⁵ Moreover, in securities cases, some courts presume that the proper fee award percentage is the one class counsel agreed to when it was hired by the large shareholder that is now usually selected as the lead plaintiff in such cases. ⁷⁶ Nonetheless, presumptions, of course, can be overcome and, as one court has put it, "[t]here is no hard and fast rule mandating a certain percentage . . . which may reasonably be awarded as a fee because the amount of any fee must be determined upon the facts of each case."⁷⁷ The court added: "[i]ndividualization in the exercise of a discretionary power [for fee awards] will alone retain equity as a living system and save it from sterility."78 It is therefore not surprising that district courts awarded fees over a broad range when they used the percentage-of-the-settlement method. Figure 4 is a graph of the distribution of fee awards as a percentage of the settlement in the 444 cases where district courts used the percentage method with or without a lodestar cross-check and the fee percentages were ascertainable. These fee awards are exclusive of awards for expenses whenever the awards could be separated by examining either the district court's order or counsel's motion for fees and expenses (which was 96 percent of the time). The awards ranged from 3 percent of the settlement to 47 percent of the settlement. The average award was 25.4 percent and the median was 25 percent. Most fee awards were between 25 percent and 35 percent, with almost no awards more than 35 percent. The Eisenberg-Miller study through 2008 found a slightly lower mean (24 percent) but the same median (25 percent) among its federal court settlements.79

It should be noted that in 218 of these 444 settlements (49 percent), district courts said they considered the lodestar calculation as a factor in assessing the reasonableness of the fee percentages awarded. In 204 of these settlements, the lodestar multiplier resulting

⁷³The Eleventh Circuit, for example, has identified a nonexclusive list of 15 factors that district courts might consider. See Camden I Condo. Ass'n, Inc. v. Dunkle, 946 F.2d 768, 772 n.3, 775 (11th Cir. 1991). See also In re Tyco Int'l, Ltd. Multidistrict Litig., 535 F. Supp. 2d 249, 265 (D.N.H. 2007) (five factors); Goldberger v. Integrated Res. Inc., 209 F.3d 43, 50 (2d Cir. 2000) (six factors); Gunter v. Ridgewood Energy Corp., 223 F.3d 190, 195 n.1 (3d Cir. 2000) (seven factors); In re Royal Ahold N.V. Sec. & ERISA Litig., 461 F. Supp. 2d 383, 385 (D. Md. 2006) (13 factors); Brown v. Phillips Petroleum Co., 838 F.2d 451, 454 (10th Cir. 1988) (12 factors); In re Baan Co. Sec. Litig., 288 F. Supp. 2d 14, 17 (D.D.C. 2003) (seven factors).

⁷⁴See Eisenberg & Miller, supra note 15, at 32.

⁷⁵See Staton v. Boeing Co., 327 F.3d 938, 968 (9th Cir. 2003).

⁷⁶See, e.g., In re Cendant Corp. Litig., 264 F.3d 201, 282 (3d Cir. 2001).

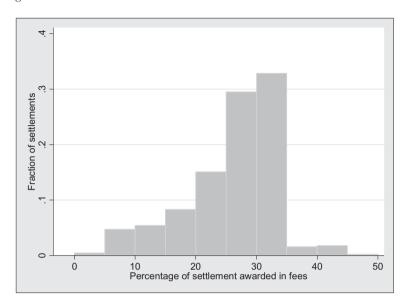
⁷⁷Camden I Condo. Ass'n, 946 F.2d at 774.

⁷⁸Camden I Condo. Ass'n, 946 F.2d at 774 (alterations in original and internal quotation marks omitted).

⁷⁹See Eisenberg & Miller II, supra note 16, at 259.

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Figure 4: The distribution of 2006–2007 federal class action fee awards using the percentage-of-the-settlement method with or without lodestar cross-check.



Sources: Westlaw, PACER, district court clerks' offices.

from the fee award could be ascertained. The lodestar multiplier in these cases ranged from 0.07 to 10.3, with a mean of 1.65 and a median of 1.34. Although there is always the possibility that class counsel are optimistic with their timesheets when they submit them for lodestar consideration, these lodestar numbers—only one multiplier above 6.0, with the bulk of the range not much above 1.0—strike me as fairly parsimonious for the risk that goes into any piece of litigation and cast doubt on the notion that the percentage-of-the-settlement method results in windfalls to class counsel.⁸⁰

Table 8 shows the mean and median fee percentages awarded in each litigation subject area. The fee percentages did not appear to vary greatly across litigation subject areas, with most mean and median awards between 25 percent and 30 percent. As I report later in this section, however, after controlling for other variables, there were statistically significant differences in the fee percentages awarded in some subject areas compared to others. The mean and median percentages for securities cases were 24.7 percent and 25.0 percent, respectively; for all nonsecurities cases, the mean and median were 26.1 percent and 26.0 percent, respectively. The Eisenberg-Miller study through 2008 found mean awards ranging from 21–27 percent and medians from 19–25 percent, ⁸¹ a bit lower than the ranges in my

⁸⁰It should be emphasized, of course, that these 204 settlements may not be representative of the settlements where the percentage-of-the-settlement method was used without the lodestar cross-check.

⁸¹See Eisenberg & Miller II, supra note 16, at 262.

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Table 8: Fee Awards in 2006-2007 Federal Class Action Settlements Using the Percentage-of-the-Method With or Without Settlement Cross-Check

	Percentage of Settlement Awarded as Fee			
Subject Matter	Mean	Median		
Securities $(n = 233)$	24.7	25.0		
Labor and employment $(n = 61)$	28.0	29.0		
Consumer $(n = 39)$	23.5	24.6		
Employee benefits $(n = 37)$	26.0	28.0		
Civil rights $(n = 20)$	29.0	30.3		
Debt collection $(n = 5)$	24.2	25.0		
Antitrust $(n = 23)$	25.4	25.0		
Commercial $(n = 7)$	23.3	25.0		
Other $(n = 19)$	24.9	26.0		
All $(N=444)$	25.7	25.0		

Sources: Westlaw, PACER, district court clerks' offices.

2006-2007 data set, which again, may be because they oversampled larger settlements (as I show below, district courts awarded smaller fee percentages in larger cases).

In light of the fact that, as I noted above, the distribution of class action settlements among the geographic circuits does not track their civil litigation dockets generally, it is interesting to ask whether one reason for the pattern in class action cases is that circuits oversubscribed with class actions award higher fee percentages. Although this question will be taken up with more sophistication in the regression analysis below, it is worth describing here the mean and median fee percentages in each of the circuits. Those data are presented in Table 9. Contrary to the hypothesis set forth in Section III, two of the circuits most oversubscribed with class actions, the Second and the Ninth, were the only circuits in which the mean fee awards were under 25 percent. As I explain below, these differences are statistically significant and remain so after controlling for other variables.

The lodestar method likewise permits district courts to exercise a great deal of leeway through the application of the discretionary multiplier. Figure 5 shows the distribution of lodestar multipliers in the 71 settlements in which district courts used the lodestar method and the multiplier could be ascertained. The average multiplier was 0.98 and the median was 0.92, which suggest that courts were not terribly prone to exercise their discretion to deviate from the amount of money encompassed in the lodestar calculation. These 71

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Table 9: Fee Awards in 2006–2007 Federal Class Action Settlements Using the Percentage-of-the-Settlement Method With or Without Lodestar Cross-Check

	Percentage of Settlement Awarded as Fee.		
Circuit	Mean	Median	
First	27.0	25.0	
(n = 27)			
Second	23.8	24.5	
(n = 72)			
Third	25.4	29.3	
(n = 50)			
Fourth	25.2	28.0	
(n = 19)			
Fifth	26.4	29.0	
(n = 27)			
Sixth	26.1	28.0	
(n = 25)			
Seventh	27.4	29.0	
(n = 39)			
Eighth	26.1	30.0	
(n = 15)			
Ninth	23.9	25.0	
(n = 111)			
Tenth	25.3	25.5	
(n = 18)			
Eleventh	28.1	30.0	
(n = 35)			
DC	26.9	26.0	
(n = 6)			

Sources: Westlaw, PACER, district court clerks' offices.

settlements were heavily concentrated within the consumer (median multiplier 1.13) and debt collection (0.66) subject areas. If cases in which district courts used the percentage-of-the-settlement method with a lodestar cross-check are combined with the lodestar cases, the average and median multipliers (in the 263 cases where the multipliers were ascertainable) were 1.45 and 1.19, respectively. Again—putting to one side the possibility that class counsel are optimistic with their timesheets—these multipliers appear fairly modest in light of the risk involved in any piece of litigation.

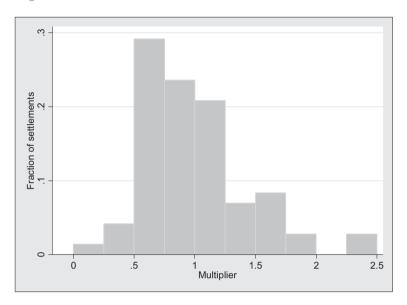
D. Factors Influencing Percentage Awards

Whether district courts are exercising their discretion over fee awards wisely is an important public policy question given the amount of money at stake in class action settlements. As shown above, district court judges awarded class action lawyers nearly \$5 billion in fees and expenses in 2006–2007. Based on the comparison to the tort system set forth in Section III, it is not difficult to surmise that in the 350 or so settlements every year, district court judges

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Figure 5: The distribution of lodestar multipliers in 2006–2007 federal class action fee awards using the lodestar method.



Sources: Westlaw, PACER, district court clerks' offices.

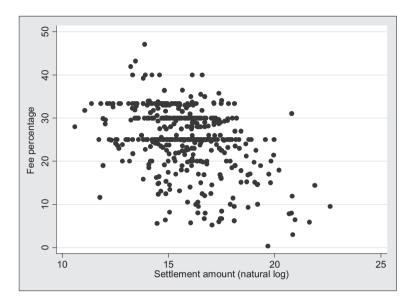
are awarding a significant portion of all the annual compensation received by contingency-fee lawyers in the United States. Moreover, contingency fees are arguably the engine that drives much of the noncriminal regulation in the United States; unlike many other nations, we regulate largely through the ex post, decentralized device of litigation. To the extent district courts could have exercised their discretion to award billions more or billions less to class action lawyers, district courts have been delegated a great deal of leeway over a big chunk of our regulatory horsepower. It is therefore worth examining how district courts exercise their discretion over fees. This examination is particularly important in cases where district courts use the percentage-of-the-settlement method to award fees: not only do such cases comprise the vast majority of settlements, but they comprise the vast majority of the money awarded as fees. As such, the analysis that follows will be confined to the 444 settlements where the district courts used the percentage-of-the-settlement method.

As I noted, prior empirical studies have shown that fee percentages are strongly and inversely related to the size of the settlement both in securities fraud and other cases. As shown in Figure 6, the 2006–2007 data are consistent with prior studies. Regression analysis, set forth in more detail below, confirms that after controlling for other variables, fee percentage is strongly and inversely associated with settlement size among all cases, among securities cases, and among all nonsecurities cases.

⁸²See, e.g., Samuel Issacharoff, Regulating after the Fact, 56 DePaul L. Rev. 375, 377 (2007).

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Figure 6: Fee awards as a function of settlement size in 2006–2007 class action cases using the percentage-of-the-settlement method with or without lodestar cross-check.



Sources: Westlaw, PACER, district court clerks' offices.

As noted above, courts often look to fee percentages in other cases as one factor they consider in deciding what percentage to award in a settlement at hand. In light of this practice, and in light of the fact that the size of the settlement has such a strong relationship to fee percentages, scholars have tried to help guide the practice by reporting the distribution of fee percentages across different settlement sizes. ⁸³ In Table 10, I follow the Eisenberg-Miller studies and attempt to contribute to this guidance by setting forth the mean and median fee percentages, as well as the standard deviation, for each decile of the 2006–2007 settlements in which courts used the percentage-of-the-settlement method to award fees. The mean percentages ranged from over 28 percent in the first decile to less than 19 percent in the last decile.

It should be noted that the last decile in Table 10 covers an especially wide range of settlements, those from \$72.5 million to the Enron settlement of \$6.6 billion. To give more meaningful data to courts that must award fees in the largest settlements, Table 11 shows the last decile broken into additional cut points. When both Tables 10 and 11 are examined together, it appears that fee percentages tended to drift lower at a fairly slow pace until a settlement size of \$100 million was reached, at which point the fee percentages plunged well below 20 percent, and by the time \$500 million was reached, they plunged well below 15 percent, with most awards at that level under even 10 percent.

⁸³See Eisenberg & Miller II, supra note 16, at 265.

Table 10: Mean, Median, and Standard Deviation of Fee Awards by Settlement Size in 2006-2007 Federal Class Action Settlements Using the Percentageof-the-Settlement Method With or Without Lodestar Cross-Check

Settlement Size			
(in Millions)	Mean	Median	SD
[\$0 to \$0.75] $(n = 45)$	28.8%	29.6%	6.1%
(\$0.75 to \$1.75] (n = 44)	28.7%	30.0%	6.2%
(\$1.75 to \$2.85] (n = 45)	26.5%	29.3%	7.9%
(\$2.85 to \$4.45] (n = 45)	26.0%	27.5%	6.3%
(\$4.45 to \$7.0] (n = 44)	27.4%	29.7%	5.1%
(\$7.0 to \$10.0] (n = 43)	26.4%	28.0%	6.6%
(\$10.0 to \$15.2] (n = 45)	24.8%	25.0%	6.4%
(\$15.2 to \$30.0] (n = 46)	24.4%	25.0%	7.5%
(\$30.0 to \$72.5] (n = 42)	22.3%	24.9%	8.4%
(\$72.5 to \$6,600] (n = 45)	18.4%	19.0%	7.9%

Sources: Westlaw, PACER, district court clerks' offices.

Table 11: Mean, Median, and Standard Deviation of Fee Awards of the Largest 2006-2007 Federal Class Action Settlements Using the Percentage-of-the-Settlement Method With or Without Lodestar Cross-Check

Settlement Size (in Millions)	Mean	Median	SD
(\$72.5 to \$100] (n = 12)	23.7%	24.3%	5.3%
(\$100 to \$250] (n = 14)	17.9%	16.9%	5.2%
(\$250 to \$500] (n = 8)	17.8%	19.5%	7.9%
(\$500 to \$1,000] (n = 2)	12.9%	12.9%	7.2%
(\$1,000 to \$6,600] (n = 9)	13.7%	9.5%	11%

Sources: Westlaw, PACER, district court clerks' offices.

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Prior empirical studies have not examined whether fee awards are associated with the political affiliation of the district court judges making the awards. This is surprising because realist theories of judicial behavior would predict that political affiliation would influence fee decisions. 84 It is true that as a general matter, political affiliation may influence district court judges to a lesser degree than it does appellate judges (who have been the focus of most of the prior empirical studies of realist theories): district court judges decide more routine cases and are subject to greater oversight on appeal than appellate judges. On the other hand, class action settlements are a bit different in these regards than many other decisions made by district court judges. To begin with, class action settlements are almost never appealed, and when they are, the appeals are usually settled before the appellate court hears the case. 85 Thus, district courts have much less reason to worry about the constraint of appellate review in fashioning fee awards. Moreover, one would think the potential for political affiliation to influence judicial decision making is greatest when legal sources lead to indeterminate outcomes and when judicial decisions touch on matters that are salient in national politics. (The more salient a matter is, the more likely presidents will select judges with views on the matter and the more likely those views will diverge between Republicans and Democrats.) Fee award decisions would seem to satisfy both these criteria. The law of fee awards, as explained above, is highly discretionary, and fee award decisions are wrapped up in highly salient political issues such as tort reform and the relative power of plaintiffs' lawyers and corporations. I would expect to find that judges appointed by Democratic presidents awarded higher fees in the 2006-2007 settlements than did judges appointed by Republican presidents.

The data, however, do not appear to bear this out. Of the 444 fee awards using the percentage-of-the-settlement approach, 52 percent were approved by Republican appointees, 45 percent were approved by Democratic appointees, and 4 percent were approved by non-Article III judges (usually magistrate judges). The mean fee percentage approved by Republican appointees (25.6 percent) was slightly *greater* than the mean approved by Democratic appointees (24.9 percent). The medians (25 percent) were the same.

To examine whether the realist hypothesis fared better after controlling for other variables, I performed regression analysis of the fee percentage data for the 427 settlements approved by Article III judges. I used ordinary least squares regression with the dependent variable the percentage of the settlement that was awarded in fees.⁸⁶ The independent

⁸⁴See generally C.K. Rowland & Robert A. Carp, Politics and Judgment in Federal District Courts (1996). See also Max M. Schanzenbach & Emerson H. Tiller, Reviewing the Sentencing Guidelines: Judicial Politics, Empirical Evidence, and Reform, 75 U. Chi. L. Rev. 715, 724–25 (2008).

⁸⁵See Brian T. Fitzpatrick, The End of Objector Blackmail? 62 Vand. L. Rev. 1623, 1640, 1634–38 (2009) (finding that less than 10 percent of class action settlements approved by federal courts in 2006 were appealed by class members).

⁸⁶Professors Eisenberg and Miller used a square root transformation of the fee percentages in some of their regressions. I ran all the regressions using this transformation as well and it did not appreciably change the results. I also ran the regressions using a natural log transformation of fee percentage and with the dependent variable natural log of the fee amount (as opposed to the fee percentage). None of these models changed the results

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variables were the natural log of the amount of the settlement, the natural log of the age of the case (in days), indicator variables for whether the class was certified as a settlement class, for litigation subject areas, and for circuits, as well as indicator variables for whether the judge was appointed by a Republican or Democratic president and for the judge's race and gender.⁸⁷

The results for five regressions are in Table 12. In the first regression (Column 1), only the settlement amount, case age, and judge's political affiliation, gender, and race were included as independent variables. In the second regression (Column 2), all the independent variables were included. In the third regression (Column 3), only securities cases were analyzed, and in the fourth regression (Column 4), only nonsecurities cases were analyzed.

In none of these regressions was the political affiliation of the district court judge associated with fee percentage in a statistically significant manner. References One possible explanation for the lack of evidence for the realist hypothesis is that district court judges elevate other preferences above their political and ideological ones. For example, district courts of both political stripes may succumb to docket-clearing pressures and largely rubber stamp whatever fee is requested by class counsel; after all, these requests are rarely challenged by defendants. Moreover, if judges award class counsel whatever they request, class counsel will not appeal and, given that, as noted above, class members rarely appeal settlements (and when they do, often settle them before the appeal is heard), by judges can thereby virtually guarantee there will be no appellate review of their settlement decisions. Indeed, scholars have found that in the vast majority of cases, the fees ultimately awarded by federal judges are little different than those sought by class counsel.

Another explanation for the lack of evidence for the realist hypothesis is that my data set includes both unpublished as well as published decisions. It is thought that realist theories of judicial behavior lose force in unpublished judicial decisions. This is the case because the kinds of questions for which realist theories would predict that judges have the most room to let their ideologies run are questions for which the law is ambiguous; it is

appreciably. The regressions were also run with and without the 2006 Enron settlement because it was such an outlier (\$6.6 billion); the case did not change the regression results appreciably. For every regression, the data and residuals were inspected to confirm the standard assumptions of linearity, homoscedasticity, and the normal distribution of errors.

⁸⁷Prior studies of judicial behavior have found that the race and sex of the judge can be associated with his or her decisions. See, e.g., Adam B. Cox & Thomas J. Miles, Judging the Voting Rights Act, 108 Colum. L. Rev. 1 (2008); Donald R. Songer et al., A Reappraisal of Diversification in the Federal Courts: Gender Effects in the Courts of Appeals, 56 J. Pol. 425 (1994).

⁸⁸ Although these coefficients are not reported in Table 8, the gender of the district court judge was never statistically significant. The race of the judge was only occasionally significant.

⁸⁹See Fitzpatrick, supra note 85, at 1640.

⁹⁰See Eisenberg & Miller II, supra note 16, at 270 (finding that state and federal judges awarded the fees requested by class counsel in 72.5 percent of settlements); Eisenberg, Miller & Perino, supra note 9, at 22 ("judges take a light touch when it comes to reviewing fee requests").

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Table 12: Regression of Fee Percentages in 2006–2007 Settlements Using Percentage-ofthe-Settlement Method With or Without Lodestar Cross-Check

	R	Regression Coeff	îcients (and Re	obust t Statistic	cs)
Independent Variable	1	2	3	4	5
Settlement amount (natural log)	-1.77	-1.76	-1.76	-1.41	-1.78
	(-5.43)**	(-8.52)**	(-7.16)**	(-4.00)**	(-8.67)**
Age of case (natural log days)	1.66	1.99	1.13	1.72	2.00
	(2.31)**	(2.71)**	(1.21)	(1.47)	(2.69)**
Judge's political affiliation (1 = Democrat)	-0.630	-0.345	0.657	-1.43	-0.232
	(-0.83)	(-0.49)	(0.76)	(-1.20)	(-0.34)
Settlement class		0.150	0.873	-1.62	0.124
1 61 1		(0.19)	(0.84)	(-1.00)	(0.15)
1st Circuit		3.30	4.41	0.031	0.579
0.1.01		(2.74)**	(3.32)**	(0.01)	(0.51)
2d Circuit		0.513	-0.813	2.93	-2.23
0.1.01		(0.44)	(-0.61)	(1.14)	(-1.98)**
3d Circuit		2.25	4.00	-1.11	_
41.0		(1.99)**	(3.85)**	(-0.50)	
4th Circuit		2.34	0.544	3.81	_
r.i. 6' '.		(1.22)	(0.19)	(1.35)	0.000
5th Circuit		2.98	1.09	6.11	0.230
64.65		(1.90)*	(0.65)	(1.97)**	(0.15)
6th Circuit		2.91	0.838	4.41	_
F1 0: 1		(2.28)**	(0.57)	(2.15)**	0.00=
7th Circuit		2.55	3.22	2.90	-0.227
0.1 6"		(2.23)**	(2.36)**	(1.46)	(-0.20)
8th Circuit		2.12	-0.759	3.73	-0.586
0.1 6: :		(0.97)	(-0.24)	(1.19)	(-0.28)
9th Circuit		_	_	_	-2.73
104 6' '		1.45	0.054	9.16	(-3.44)**
10th Circuit		1.45	-0.254	3.16	_
114 6' '		(0.94)	(-0.13)	(1.29)	
11th Circuit		4.05	3.85	4.14	_
DC C'		(3.44)**	(3.07)**	(1.88)*	
DC Circuit		2.76	2.60	2.41	_
Securities case		(1.10)	(0.80)	(0.64)	_
		0.00			0.07
Labor and employment case		2.93		_	2.85
		(3.00)**		4.00	(2.94)**
Consumer case		-1.65		-4.39	-1.62
E1		(-0.88)		(-2.20)**	(-0.88)
Employee benefits case		-0.306		-4.23	-0.325
Civil violet		(-0.23)		(-2.55)**	(-0.26)
Civil rights case		1.85		-2.05	1.76
Dobt collection case		(0.99)		(-0.97)	(0.95)
Debt collection case		-4.93 (1.71)*		-7.93	-5.04 (1.75)*
Antitmet cose		(-1.71)*		(-2.49)**	(-1.75)*
Antitrust case		3.06 (2.11)**		0.937	2.78 (1.98)**
		(4.11)		(0.47)	(1.90) ***

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Class Action Settlements and Fee Awards

Table 12 Continued

Independent Variable	Regression Coefficients (and Robust t Statistics)				
		2	3	4	5
Commercial case		-0.028		-2.65	0.178
		(-0.01)		(-0.73)	(0.05)
Other case		-0.340		-3.73	-0.221
		(-0.17)		(-1.65)	(-0.11)
Constant	42.1	37.2	43.0	38.2	40.1
	(7.29)**	(6.08)**	(6.72)**	(4.14)**	(7.62)**
N	427	427	232	195	427
R^2	.20	.26	.37	.26	.26
Root MSE	6.59	6.50	5.63	7.24	6.48

Note: **significant at the 5 percent level; *significant at the 10 percent level. Standard errors in Column 1 were clustered by circuit. Indicator variables for race and gender were included in each regression but not reported. Sources: Westlaw, PACER, district court clerks' offices, Federal Judicial Center.

thought that these kinds of questions are more often answered in published opinions. ⁹¹ Indeed, most of the studies finding an association between ideological beliefs and case outcomes were based on data sets that included only published opinions. ⁹² On the other hand, there is a small but growing number of studies that examine unpublished opinions as well, and some of these studies have shown that ideological effects persisted. ⁹³ Nonetheless, in light of the discretion that judges exercise with respect to fee award decisions, it hard to characterize *any* decision in this area as "unambiguous." Thus, even when unpublished, I would have expected the fee award decisions to exhibit an association with ideological beliefs. Thus, I am more persuaded by the explanation suggesting that judges are more concerned with clearing their dockets or insulating their decisions from appeal in these cases than with furthering their ideological beliefs.

In all the regressions, the size of the settlement was strongly and inversely associated with fee percentages. Whether the case was certified as a settlement class was not associated

⁹¹See, e.g., Ahmed E. Taha, Data and Selection Bias: A Case Study, 75 UMKC L. Rev. 171, 179 (2006).

⁹²Id. at 178-79.

⁹⁸See, e.g., David S. Law, Strategic Judicial Lawmaking: Ideology, Publication, and Asylum Law in the Ninth Circuit, 73 U. Cin. L. Rev. 817, 843 (2005); Deborah Jones Merritt & James J. Brudney, Stalking Secret Law: What Predicts Publication in the United States Courts of Appeals, 54 Vand. L. Rev. 71, 109 (2001); Donald R. Songer, Criteria for Publication of Opinions in the U.S. Courts of Appeals: Formal Rules Versus Empirical Reality, 73 Judicature 307, 312 (1990). At the trial court level, however, the studies of civil cases have found no ideological effects. See Laura Beth Nielsen, Robert L. Nelson & Ryon Lancaster, Individual Justice or Collective Legal Mobilization? Employment Discrimination Litigation in the Post Civil Rights United States, 7 J. Empirical Legal Stud. 175, 192–93 (2010); Denise M. Keele et al., An Analysis of Ideological Effects in Published Versus Unpublished Judicial Opinions, 6 J. Empirical Legal Stud. 213, 230 (2009); Orley Ashenfelter, Theodore Eisenberg & Stewart J. Schwab, Politics and the Judiciary: The Influence of Judicial Background on Case Outcomes, 24 J. Legal Stud. 257, 276–77 (1995). With respect to criminal cases, there is at least one study at the trial court level that has found ideological effects. See Schanzenbach & Tiller, supra note 81, at 734.

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with fee percentages in any of the regressions. The age of the case at settlement was associated with fee percentages in the first two regressions, and when the settlement class variable was removed in regressions 3 and 4, the age variable became positively associated with fee percentages in nonsecurities cases but remained insignificant in securities cases. Professors Eisenberg and Miller likewise found that the age of the case at settlement was positively associated with fee percentages in their 1993–2002 data set, 94 and that settlement classes were not associated with fee percentages in their 2003–2008 data set. 95

Although the structure of these regressions did not permit extensive comparisons of fee awards across different litigation subject areas, fee percentages appeared to vary somewhat depending on the type of case that settled. Securities cases were used as the baseline litigation subject area in the second and fifth regressions, permitting a comparison of fee awards in each nonsecurities area with the awards in securities cases. These regressions show that awards in a few areas, including labor/employment and antitrust, were more lucrative than those in securities cases. In the fourth regression, which included only nonsecurities cases, labor and employment cases were used as the baseline litigation subject area, permitting comparison between fee percentages in that area and the other nonsecurities areas. This regression shows that fee percentages in several areas, including consumer and employee benefits cases, were lower than the percentages in labor and employment cases.

In the fifth regression (Column 5 of Table 12), I attempted to discern whether the circuits identified in Section III as those with the most overrepresented (the First, Second, Seventh, and Ninth) and underrepresented (the Fifth and Eighth) class action dockets awarded attorney fees differently than the other circuits. That is, perhaps district court judges in the First, Second, Seventh, and Ninth Circuits award greater percentages of class action settlements as fees than do the other circuits, whereas district court judges in the Fifth and Eighth Circuits award smaller percentages. To test this hypothesis, in the fifth regression, I included indicator variables only for the six circuits with unusual dockets to measure their fee awards against the other six circuits combined. The regression showed statistically significant association with fee percentages for only two of the six unusual circuits: the Second and Ninth Circuits. In both cases, however, the direction of the association (i.e., the Second and Ninth Circuits awarded *smaller* fees than the baseline circuits) was opposite the hypothesized direction.⁹⁶

⁹⁴See Eisenberg & Miller, supra note 15, at 61.

 $^{^{95}\}mathrm{See}$ Eisenberg & Miller II, supra note 16, at 266.

⁹⁶This relationship persisted when the regressions were rerun among the securities and nonsecurities cases separately. I do not report these results, but, even though the First, Second, and Ninth Circuits were oversubscribed with securities class action settlements and the Fifth, Sixth, and Eighth were undersubscribed, there was no association between fee percentages and any of these unusual circuits except, again, the inverse association with the Second and Ninth Circuits. In nonsecurities cases, even though the Seventh and Ninth Circuits were oversubscribed and the Fifth and the Eighth undersubscribed, there was no association between fee percentages and any of these unusual circuits except again for the inverse association with the Ninth Circuit.

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The lack of the expected association with the unusual circuits might be explained by the fact that class action lawyers forum shop along dimensions other than their potential fee awards; they might, for example, put more emphasis on favorable class-certification law because there can be no fee award if the class is not certified. As noted above, it might also be the case that class action lawyers are unable to engage in forum shopping at all because defendants are able to transfer venue to the district in which they are headquartered or another district with a significant connection to the litigation.

It is unclear why the Second and Ninth Circuits were associated with lower fee awards despite their heavy class action dockets. Indeed, it should be noted that the Ninth Circuit was the baseline circuit in the second, third, and fourth regressions and, in all these regressions, district courts in the Ninth Circuit awarded smaller fees than courts in many of the other circuits. The lower fees in the Ninth Circuit may be attributable to the fact that it has adopted a presumption that the proper fee to be awarded in a class action settlement is 25 percent of the settlement.⁹⁷ This presumption may make it more difficult for district court judges to award larger fee percentages. The lower awards in the Second Circuit are more difficult to explain, but it should be noted that the difference between the Second Circuit and the baseline circuits went away when the fifth regression was rerun with only nonsecurities cases. 98 This suggests that the awards in the Second Circuit may be lower only in securities cases. In any event, it should be noted that the lower fee awards from the Second and Ninth Circuits contrast with the findings in the Eisenberg-Miller studies, which found no intercircuit differences in fee awards in common-fund cases in their data through 2008.99

V. Conclusion

This article has attempted to fill some of the gaps in our knowledge about class action litigation by reporting the results of an empirical study that attempted to collect all class action settlements approved by federal judges in 2006 and 2007. District court judges approved 688 class action settlements over this two-year period, involving more than \$33 billion. Of this \$33 billion, nearly \$5 billion was awarded to class action lawyers, or about 15 percent of the total. District courts typically awarded fees using the highly discretionary percentage-of-the-settlement method, and fee awards varied over a wide range under this method, with a mean and median around 25 percent. Fee awards using this method were strongly and inversely associated with the size of the settlement. Fee percentages were positively associated with the age of the case at settlement. Fee percentages were not associated with whether the class action was certified as a settlement class or with the

⁹⁷See note 75 supra. It should be noted that none of the results from the previous regressions were affected when the Ninth Circuit settlements were excluded from the data.

⁹⁸The Ninth Circuit's differences persisted.

⁹⁹See Eisenberg & Miller II, supra note 16, at 260.

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political affiliation of the judge who made the award. Finally, there appeared to be some variation in fee percentages depending on subject matter of the litigation and the geographic circuit in which the district court was located. Fee percentages in securities cases were lower than the percentages in some but not all of the other litigation areas, and district courts in the Ninth Circuit and in the Second Circuit (in securities cases) awarded lower fee percentages than district courts in several other circuits. The lower awards in the Ninth Circuit may be attributable to the fact that it is the only circuit that has adopted a presumptive fee percentage of 25 percent.

Exhibit 3

Documents reviewed:

- Case Management Order No. 3 (MDL document 72, filed 4/26/19)
- Order and Opinion (denying summary judgment) (MDL document 2601, filed 9/16/22)
- DuPont de Nemours, Inc. Quarterly Report on Form 10-Q (June 30, 2023)
- Memorandum of Law in Support of Plaintiffs' Motion for Preliminary Approval of Class Settlement, for Certification of Settlement Class and for Permission to Disseminate Class Notice (MDL document 3370-1, filed 7/3/23), and the exhibits attached thereto
- Memorandum of Law in Support of Plaintiffs' Motion for Preliminary Approval of Class Settlement, for Certification of Settlement Class, and for Permission to Disseminate Class Notice (DuPont document 4, filed 7/10/23), and the exhibits attached thereto, including Class Action Settlement Agreement (DuPont document 4-2, filed 7/10/23) ("Settlement Agreement")
- Class Action Complaint (DuPont document 7, filed 7/12/23)
- Class Action Complaint (3M document 2, filed 7/12/23)
- Consent Motion to Amend Exhibits to Motion for Preliminary Approval (DuPont document 30, filed 8/7/23)
- Order (granting preliminary approval) (MDL document 3603, filed 8/22/23)
- Consent Motion to Amend Exhibits to Motion for Preliminary Approval (MDL document 30, filed 8/28/23)
- Preliminary Approval Order for Settlement between Public Water Systems and 3M
 Company (MDL document 3626, filed 8/29/23)

- Joint Motion to Reconsider and Amend Preliminary Approval Order (DuPont document 35, filed 9/14/23)
- Order (modifying order granting preliminary approval) (DuPont document 36, filed 9/15/23)
- Consent Motion to Clarify Preliminarily Approved 3M Settlement Agreement (MDL document 3793, filed 10/13/23)
- Class Counsel's Motion for Attorneys' Fees and Costs and the exhibits attached thereto (filed herewith)

IN THE UNITED STATES DISTRICT COURT FOR THE DISTRICT OF SOUTH CAROLINA

PRODUCTS LIABILITY LITIGATION) Master Docket No.:) 2:18-mn-2873-RMG
CITY OF CAMDEN, et al., Plaintiffs,) Civil Action No.:) 2:23-cv-03230-RMG
- <i>VS</i> -)
E.I. DUPONT DE NEMOURS AND COMPANY (n/k/a EIDP, Inc.), et al.,)))
defendants.)

<u>DECLARATION OF MICHAEL A. LONDON, ESQ. IN SUPPORT OF CLASS</u> COUNSEL'S MOTION FOR ATTORNEYS' FEES AND COSTS

I, Michael A. London, Esq., pursuant to 28 U.S.C. §1746, hereby declare as follows:

- 1. This Declaration is based upon my personal knowledge, and if called as a witness, I could and would testify competently to its contents. I submit this Declaration in support of Class Counsel's Motion for Attorneys' Fees and Costs ("Motion for Attorneys' Fees").
- 2. I am a co-founding partner of the law firm Douglas & London, P.C. ("Douglas & London"). I am an attorney currently licensed in good standing to practice law in the States of New York and New Jersey. I am also admitted to practice law in the District of New Jersey, the Eastern and Southern Districts of New York and the United States Court of Federal Claims.
- 3. I was appointed by the Court to serve as Co-Lead Counsel in the *In Re: Aqueous Film-Forming Foams Prods. Liab. Litig.* MDL (MDL 2873), together with Scott Summy and Paul Napoli, by Case Management Order ("CMO") No. 2, dated March 20, 2019, and re-appointed

annually by this Honorable Court, and with Joe Rice also appointed, by Order on August 22, 2023.¹ In this capacity, I have served as the primary organizer of functions and work performed by the Plaintiffs' Executive Committee ("PEC"), negotiated the vast majority of CMOs, and overseen the coordination of the PEC's discovery efforts against the multiple defendants in this complex environmental products liability litigation.

4. I also serve as one of the Court-appointed negotiating counsel pursuant to CMO No. 2B and have been engaged in the significant negotiations with defendants DuPont, Chemours and Corteva since approximately June of 2020, as fully described in the Declaration of Scott Summy in Support of Motion for Attorneys' Fees ("Summy Decl.").

I. PROFESSIONAL EXPERIENCE

- 5. Douglas & London is a law firm devoted to representing consumers, private and public governmental entities, and injured individuals in complex litigation, including in the mass tort, environmental, and class action context.
- 6. I have devoted my entire legal career to representing consumers and injury victims, primarily in the context of complex litigation involving mass torts, product liability matters, environmental and class actions.
- 7. I have been appointed to, and have served on, numerous Plaintiffs' Steering Committees in national mass tort and complex litigation and have held court-appointed leadership positions in some of the largest mass torts over the past 25 years. Indeed, in addition to my appointment as Co-Lead Counsel by this Court in the AFFF MDL, federal courts and one state court have appointed your undersigned as Lead or Liaison Counsel, or as Chairperson of the Executive Committee twelve (12) other times. These include:
 - i. *Vice-Chair of Plaintiffs' Steering Committee* In re: Zyprexa Prods. Liab.

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¹ ECF No. 3602.

- <u>Litig.</u>, MDL- 1596, E.D.N.Y., Hon. Jack B. Weinstein (status: resolved, \$690 million settlement of approximately 8,000 claims);
- ii. Liaison Counsel and Plaintiffs' Executive Committee Member In re: Ortho Evra Prods. Liab. Litig., MDL 1742, N.D.O.H., Hon. David S. Katz (status: resolved, individual confidential settlements of approximately 3,000 claims in federal and state courts);
- iii. Co-Lead Counsel and Liaison Counsel In re: Bayer Corp. Combination Aspirin Prods. Mktg. and Sales Practice Litig., MDL 2023, E.D.N.Y., Hon. Brian M. Cogan (status: resolved, \$15 million class settlement);
- iv. Co-Lead Counsel In re: Yasmin and Yaz (Drospirenone) Mktg. Sales Practices and Prods. Liab. Litig., MDL 2100, S.D. Ill., Hon. David R. Herndon (status: resolved over 18,000 claims for over \$2 billion through individual and mass semi-confidential settlements in federal and state courts);
- v. Co-Lead Counsel In re: Pradaxa (Dabigatran Etexilate) Prods. Liab. Litig., MDL 2385, S.D. Ill, Hon. David R. Herndon (status: resolved, \$650 million settlement of approximately 4,000 claims);
- vi. *Co-Liaison Counsel* <u>In re: Levaquin Litig.</u>, Case No. 286, Hon. Carol E. Higbee, N.J. Super. (Atlantic Cnty.) (status: resolved, individual confidential settlements of hundreds of claims in federal and state courts);
- vii. *Co-Lead Counsel* <u>In re: E.I. du Pont de Nemours and Co. C-8 Pers. Injury Litig.</u>, MDL 2433, S.D. Ohio, Hon. Edmund A. Sargus, Jr. (status: resolved, \$671 million settlement of approximately 3,600 claims followed by additional \$70 million plus settlement of newly diagnosed claims);
- viii. Chair-person of Plaintiff Executive Committee, In re: Testosterone Replacement Therapy Prods. Liab. Litig., MDL 2545, N.D. Ill., Hon. Matthew F. Kennelly (status: resolved settlement of certain cases for over \$300 million);
- ix. Co-Lead Counsel <u>In re: Invokana (Canagliflozin) Prods. Liab. Litig.</u>, MDL 2750, D.N.J. Hon. Brian Martinotti (status: resolved, individual confidential settlements of thousands of claims);
- x. Co-Lead Counsel of the Plaintiff Steering Committee, In re: Eliquis (Apixaban) Prods. Liab. Litig., MDL 2754, S.D.N.Y., Hon. Denise L. Cote (status: resolved);
- xi. *Chair-person of Plaintiff Executive Committee*, In re: Davol, Inc./ C.R. Bard, Inc. Polypropylene Hernia Mesh Prods. Liab. Litig., MDL 2846, S.D.

Ohio, Hon. Edmund A. Sargus, Jr. (status: active); and

- xii. Co-Lead Counsel In re: Hair Relaxer Mktg. Sales Practices and Prods. Liab. Litig., MDL 3060, N.D. Ill., Hon. Mary Rowland (status: active).²
- 8. Perhaps most salient is my previous experience in MDL No. 2433, In re: E. I. du

 Pont de Nemours and Company C-8 Personal Injury Liti. ("C-8 MDL"), which involved one of
 the per- and polyfluoroalkyl substances ("PFAS") at issue here specifically, perfluorooctanoic
 acid ("PFOA"). There, the Honorable Edmund Sargus Jr. appointed me to serve as Co-Lead
 Counsel of the Plaintiffs' Steering Committee. I was heavily involved in not just the litigation
 process, but I was also the primary negotiator of a \$671 million global settlement reached for
 approximately 3,600 residents in Ohio and West Virginia. The same DuPont entities were
 involved in that case as are here, including some of the same settlement lawyers. The work
 performed in that MDL significantly benefited this MDL by providing from the beginning: (1) a
 large body of institutional knowledge; (2) previously produced documents and deposition
 testimony; (3) earlier retained experts who had provided reports, undergone discovery, overcome

 Daubert challenges and testified at trials; and (4) a well-developed history and liability story as
 well as a fate and transport and overall C-8 background.
- 9. Prior to the Judicial Panel on Multidistrict Litigation ("JPML") Transfer Order being entered in this case,³ I led Plaintiffs' counsel's organizational efforts in the earliest days of this litigation. Ultimately, and as set forth in more detail below, I was Court-appointed Co-Lead Counsel of this MDL on March 20, 2019. Because of my leadership roles, from the beginning and continuing to present day, I have direct personal knowledge of, and will provide an overview of, the substantial work performed by the various lawyers on the PEC and Plaintiff committees –

² Over the course of my career, I have also been appointed to Plaintiffs' Steering Committees in seven other MDLs.

³ MDL Transfer Order No. 2873 [ECF No. 1].

work that allowed us to achieve the historic results in the Public Water System Settlement with the DuPont defendants (the "DuPont PWS Settlement").

10. I will further address the establishment of the MDL and the appointment of leadership, describe the roles and responsibilities of Plaintiffs' Co-Lead Counsel, the PEC and the 25-plus committees under the PEC, as well as discuss the intensive case management, discovery, bellwether, and overall litigation efforts undertaken in the prosecution of this case.⁴

II. EXECUTIVE SUMMARY

11. The work performed by the plaintiffs' lawyers in this case (PEC members, committee members, and the team generally) was and continues to be ground-breaking — truly astonishing in both scope and depth. As noted above, I have overseen and served as Lead or Liaison Counsel (or Chair of the Executive Committee) in thirteen (13) different consolidated multi-plaintiff or class cases including this one, and have also served on many other plaintiff steering committees during my career. The MDLs I have been involved in have been some of the largest MDLs in history, with some of the finest plaintiffs' lawyers in the country. I can attest without equivocation that the work performed here was the best legal work I have had the privilege of being a part of or even observed. It was full throttled, non-stop, heavily layered due to many factors, and incredibly complex. Simply put: it was impressive. This is especially true considering that such work involved challenges and obstacles presented not only in this case, but also by circumstances outside of the case (namely, a global pandemic before the first deposition was even taken).

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⁴ In addition to your undersigned's Declaration, Declarations are also being submitted that address in more detail the following topics: (1) Settlement Process (Declaration of Scott Summy); (2) General Litigation, Government Contractor, Depositions and Trial (Declaration of Gary J. Douglas); (3) Experts and Science (Declaration of Wesley A. Bowden); (4) Law & Briefing (Declaration of Rebecca G. Newman); (5) U.S. Government Discovery (Declaration of Paul J. Napoli); and (6) Document Review and Management (Declaration of Staci Olsen).

- 12. This MDL required full-blown intensive discovery on over fifteen (15) defendants, discovery efforts against the United States of America, and included in its scope discovery going back to the 1950s and spanning decades. With this also came thousands of hours of document review, complex legal research, hundreds of depositions, the retention and work-up of fourteen (14) highly specialized experts, and extensive legal briefing, including with respect to efforts to overcome defendants' purported linchpin defense, i.e., government contractor immunity. The development of liability theories and the retention of expert witnesses in numerous disciplines was also set against a backdrop of evolving science and a shifting regulatory landscape. On top of these massive efforts, Plaintiffs likewise prepared multiple bellwether cases, which involved robust discovery, expert discovery and report preparation, and motions opposing summary judgment and *Daubert* challenges. All these interrelated efforts culminated in the herculean work of the Stuart trial team who relentlessly worked to make the City of Stuart trial-ready, right up to the moment the trial was continued less than 18 hours before trial was scheduled to begin. And, of course, concurrently, the separate Negotiation Team was hard at work with the Court-appointed mediator Judge Layn Phillips (ret.) and his incredible team on the DuPont PWS Settlement. The Settlement was the result of continuous and often contentious settlement negotiations that took place consistently from November 2022 until the initial announcement of the settlement, following execution of the Memorandum of Understanding on June 1, 2023.
- 13. All of this work and accomplishments were conducted and completed in a span of under 51 months after the PEC's formal appointment on March 20, 2019. The details of much of this work during these non-stop 51 months will be my honor to summarize.

III. PRE-MDL ACTIVITIES & JPML CONSOLIDATION (2016 to 2018)

14. In 2016, the U.S. Environmental Protection Agency ("EPA") issued the 2016

Lifetime Health Advisory Level ("HAL") for PFOA and PFOS of 70 ppt (parts per trillion) combined.⁵ The C-8 MDL delivered the first three (3) PFAS trials ever, each resulting in verdicts for the plaintiff, and two yielding punitive damages awards. See Gary J. Douglas Declaration in Support of Motion for Attorneys' Fees ("Douglas Decl.") at ¶ 14. In 2017, the settlement in the C-8 MDL, referenced above, was reached with DuPont defendants. All of this did not go unnoticed by the legal community. Following the EPA's issuance of the HAL, the successful C-8 trials and then the C-8 settlement, many more lawsuits were commenced across the country in various courts alleging damage from PFAS chemicals. By 2018, there were over 50 filed cases seeking to recover damages due to PFAS that polluted drinking water largely from the discharge of aqueous filmforming foam ("AFFF") (the single greatest known source of PFAS contamination).

- 15. Many of these lawsuits were brought by clients of now Court-appointed Plaintiffs' Co-Lead Counsel, Class Counsel, the PEC and other common benefit attorneys. Various counsel's familiarity with one another, knowledge of the types of PFAS cases that were pending nationwide, and understanding of the PFAS framework for claims and damages enabled us to efficiently and expeditiously self-organize to argue before the JPML for the transfer and consolidation of PFASrelated cases, on the basis that the establishment of a MDL would provide the most efficient judicial mechanism for the prosecution of claims involving PFAS nationwide.
- 16. As a result of my extensive experience in managing complex litigation, many counsel reached out to me and our firm regarding consolidation and strategy. I was directly involved in spearheading Plaintiffs' counsel efforts to argue before the JPML. These efforts included numerous conference calls with interested counsel from around the country. I also

05/documents/drinkingwaterhealthadvisories pfoa pfos 5 19 16.final .1.pdf.

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⁵ EPA's website, FACT SHEET, PFOA & PFOS Drinking Water Health Advisories, available at: https://www.epa.gov/sites/default/files/2016-

organized an in-person meeting for interested counsel in downtown New York City on November 28, 2018. This meeting was attended by many different law firms.

- 17. These counsel shared information and discussed strategy regarding the best litigation path forward for the cases that were subject to the motion for centralization, including whether the AFFF MDL should be limited only to AFFF cases, or whether a broader-scope MDL was instead warranted.
- 18. Following oral argument on November 29, 2018, in which your undersigned argued before the JPML and advocated for the creation of this MDL, the JPML consolidated the matters to the "AFFF MDL" and transferred them to your Honor and the District of South Carolina on December 7, 2018, limiting the MDL to include only those claims alleging exposure to PFAS through AFFF.⁶
- 19. The totality of the work and collaboration garnered from these pre-MDL strategy sessions and meetings were part of the overall efforts to promote consensus and team building, which momentum still propels the AFFF MDL forward to this day.

IV. <u>ESTABLISHMENT OF THE PEC AND EARLY MDL MANAGEMENT</u> (January 2019 to Spring 2019)

- 20. Throughout the month of January of 2019, your undersigned, along with Scott Summy and Paul Napoli, undertook efforts to establish the MDL leadership and steering committee structure. Despite formal appointment still being several months away, there was significant effort and work entailed in the early organizational efforts of the nascent MDL.
- 21. Numerous discussions and in-person meetings were held to ascertain what initial committees would be necessary, what committees were unnecessary and/or duplicative, and which lawyers could serve in what roles on a steering committee, as well as which lawyers could/should

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⁶ MDL Transfer Order No. 2873 [ECF No. 1].

serve as chairpersons of various committees. In addition, discussion and debate on the committees' tasks and responsibilities took place, and the path forward for disparate types of cases was negotiated. Further, there was much discussion about prospective PEC members' ability to commit the financial resources required to sustain such a litigation as long as necessary.

- 22. As the Honorable Eldon Fallon of the Eastern District of Louisiana often says, in sum and substance: establishing a steering committee is like starting and staffing a law firm. One needs brief writers, trial lawyers, document reviewers, researchers, negotiators, deposition takers, science thinkers, combinations of the above, and more. And in addition to all this, the committee members need to express a willingness to work on contingency against some of the largest corporations in the world, represented by some of the best lawyers in the country in an extremely complex case. Thus, I worked with Mr. Summy and Mr. Napoli to establish this "MDL law firm."
- 23. Further complicating matters was that this case required the creation of a PEC that would manage five different types of cases/claims:
 - (1) Water provider claims;⁷
 - (2) Personal injury claims;
 - (3) Property damage claims;
 - (4) Medical monitoring claims; and
 - (5) Claims by states/sovereigns.

On top of this, there was not just one defendant, but many.

24. The MDL had just started, yet this framework and coordination of the various interests and claims involved was extremely complex to design, manage and assign. Agreement

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⁷ Initially we viewed these as public water provider claims and private water claims and, thus, created two separate committees for each. That obviously evolved.

on steering committee appointments is never a small feat, but after significant effort, an agreed-upon slate of lawyers was submitted to the Court as the proposed PEC. This was the first of the PEC's many accomplishments – accomplishments that eventually resulted in the settlement agreement with the DuPont defendants, first via the Memorandum of Understanding executed on June 1, 2023, followed by the execution of the full Settlement Agreement on June 30, 2023.

- 25. Many of us knew this was a massive undertaking, and laying the foundational groundwork for the PEC and committees was no small task. Again, having been court-appointed to lead 13 steering committees and having recently assisted two of my partners, Stephanie O'Connor and Virginia Anello, in their roles as Lead Counsel in two other large MDLs,⁹ this was by far the most complicated organizational structure I have ever had to develop and organize (or have ever seen developed and organized) in all my experience to date.
- 26. The putative PEC drafted a proposed Order to submit to the Court outlining the leadership structure described above, delineating roles and responsibilities, and appointing certain individuals to leadership positions, consistent with best practices.¹⁰
- 27. The first Status Conference in the AFFF MDL was held on February 23, 2019,¹¹ and following this initial conference, the Court entered CMOs appointing as Plaintiffs' Co-Lead Counsel myself, Scott Summy and Paul Napoli; as Liaison Counsel, Fred Thompson III from Motley Rice; and further appointing the first slate of Plaintiffs' Executive Committee members and Advisory Counsel to the PEC ("Leadership Counsel").¹²

⁸ Of course, the 3M PWS settlement was the next accomplishment that resulted from all of this hard work, with that PWS settlement executed July 3, 2023.

⁹ Namely, <u>In re. Proton-Pump Inhibitor Prods. Liab. Litig.</u> (MDL 2789), currently pending before the Honorable Claire C. Cecchi, D.N.J., and <u>In re: Elmiron (Pentosan Polysulfate Sodium) Prods. Liab. Litig.</u> (MDL 2973), currently pending before the Honorable Brian Martinotti, D.N.J., respectively.

¹⁰ MANUAL FOR COMPLEX LITIGATION, (FOURTH) § 10.221 (2004). Co-Lead Counsel further coordinated the collection and submission of proposed appointees' declarations to the Court.

¹¹ CMO No. 1 [ECF No. 3].

¹² CMO Nos. 2 and 3 [ECF Nos. 28 & 72]. CMO No. 3 added four (4) additional firms to the initial slate of PEC firms.

- 28. These initial CMOs establishing Plaintiffs' Leadership Counsel included twenty-five (25) firms.¹³ As the MDL progressed, additional firms were added, while other law firms elected to withdraw. The current total of PEC members for the 2022-2023 Term (and extended) is 28, and since the inception of the case, the PEC has had up to thirty (30) firms as PEC members.¹⁴
- 29. Pursuant to CMO No. 2, Leadership Counsel was collectively charged with managing the litigation for the benefit of all Plaintiffs. This included, *inter alia*, initiating, coordinating, and conducting all pretrial discovery, initiating proposals and joint briefs in matters pertaining to pretrial proceedings, acting as the spokespeople at pretrial proceedings and in response to inquiries by the Court, submitting and arguing motions, negotiating CMOs and entering into Stipulations, and performing any other tasks necessary for the PEC to accomplish its responsibilities, including organizing and overseeing committees and subcommittees.
- 30. To carry out the responsibilities set forth in CMO No. 2, throughout the month of March 2019, Co-Lead Counsel enlisted various PEC attorneys and/or staff at their respective law firms to assist. This involved assigning the PEC and other common benefit attorneys to various committees tasked with the oversight, coordination, and leadership of various aspects of the prosecution of the case 15 decisions that, even before the question of selecting the right committee

¹³ *Id*.

¹⁴ CMO No. 24 [ECF No. 2259]. Of note, some lawyers resigned from the PEC over the years and other lawyers were added to the PEC over the years of this MDL.

¹⁵ The initial committees formed included: (1) Law & Briefing Committee; (2) Science Committee; (3) Public Water Provider Committee; (4) Private Water Provider Committee; (5) Medical Monitoring Committee; (6) Property Damage Committee; (7) State/Sovereign Claims Committee; (8) Personal Injury Committee; (9) Discovery Committee; (10) Privilege Challenge Committee; (11) Redactions/De-Designations Committee; (12) Fact Sheet Committee; (13) Third-Party Discovery Committee; (14) Defendant Identification/Dossier Committee; (15) Government Contractor Committee; (16) Document Review Management Committee ("DRMT"); (17) DuPont Fraudulent Conveyance Committee; (18) Market Share Committee; (19) Legislative Committee. Over the course of the MDL, additional committees, including the Personal Injury Bellwether Trial Team, the Turn Out Gear Plaintiff Injury Committee, the Communications Committee, the Kidde Bankruptcy Committee, the Water Provider Bellwether Selection Team, the Tier 1 Water Provider Bellwether Team, the Tier 2 Water Provider Bellwether Team, the City of Stuart Trial Team, the Telomer Water Provider Bellwether Team, the Telomer Water Provider Trial Team, and the Resolution and Negotiation Teams – which together effectively became the Settlement Team.

members could be reached, required work to organize into appropriate thematic groupings.

- 31. There were also *ad hoc* committees formed, none more outsized in importance than the self-titled "Strike Force," a committee co-chaired by Scott Summy, Gary Douglas and Philip Cossich, established for the purpose of coordinating the efforts of *all* essential committees and PEC work, with a singularity of purpose, to allow for the nimble prosecution of the litigation, and efficient, coordinated and effective communication across all aspects of the MDL. *See* Douglas Decl. Later into the case, on a separate but dual track, the PEC, by and through its Resolution and Negotiation Teams began the arduous and complicated task of putting together what would ultimately become one of the most complex and sophisticated settlements in the history of water contamination cases. *See* Summy Decl.
- 32. The number and diversity of committees was necessitated by many factors, including but not limited to: (a) the sixty-plus year history of discovery; (b) the vast number of defendants named in Plaintiffs' various lawsuits; (c) the five different types of cases and causes of actions asserted; (d) the various defenses raised by defendants (some common, some defendant-specific); (e) the involvement of the United States and various of its agencies, including the Department of Defense ("DoD"); and (f) the significant number of third parties whose evidence would be needed.
- 33. My role, alongside my Co-Lead Counsel, involved not only ensuring that the committees were on time and on task, but also that there was proper communication and information-sharing across many multiple workstreams. As the committees' work grew and evolved as the Plaintiffs' case took shape and the litigation intensified, our roles became ever-more challenging and time-consuming, but even more crucial.

V. <u>LEADERSHIP'S COORDINATION OF LITIGATION EFFORTS</u> 2019 to Early 2020

- 34. Throughout this MDL, Co-Lead Counsel, in coordination with members of the PEC and notably the aforementioned Strike Force, were responsible for and did oversee the litigation efforts, which were massive in scope by any metric. Co-Lead Counsel organized the committees; coordinated their activities; advanced PEC objectives and arguments (at each case management conference ("CMC"), as well as in many other less formal contexts); negotiated and drafted all CMOs; acted as primary contact for liaison with defense counsel; kept all relevant parties apprised of the status of the litigation and its many, often fast-moving developments; made final and difficult decisions when necessary; and continuously pushed all those involved forward in a strategic and concerted way. There were numerous committee calls that occurred weekly, as well as bi-weekly standing calls, and other calls that occurred monthly. There were generally no less than eight calls for various committees that were recurring every week for the duration of the case; this does not include the monthly committee calls or calls with defendants on meet and confer or other issues.
- 35. In March of 2019, after the issuance of CMO No. 2, the PEC wasted no time advancing multiple seminal workstreams. Leadership set about reviewing and collecting scientific publications concerning PFAS contamination and toxicity to provide to the Court, drawing on the knowledge gained from Co-Lead Counsel's collective previous experience. In April of 2019, the PEC and specifically, the Science Committee began drafting an expert retention protocol and retainer for use with all experts across the MDL to ensure a uniform process. That same month, the PEC met and conferred with opposing counsel to begin negotiating numerous foundational Orders that helped form the basis of this highly efficient MDL. These included: a time/expense and common benefit holdback Order, a Protective Order and an ESI protocol, which work would

eventually ripen into CMO Nos. 3 and 4, issued in April and May of 2019, respectively. Work by the Law & Briefing and GCD Committees to research the GCD also began in April of 2019, as this was a "silver-bullet" defense¹⁶ defendants championed essentially from day one.

- 36. In May of 2019 the following efforts began:
- The PEC began drafting Master Discovery Demands. This was a massive, herculean task at the time. This initial set of discovery demands included 61 interrogatories, and 104 requests for product of documents on 18 defendants.
- The DRMT was also newly formed and hard at work crafting a plan for the massive document productions ahead, including downloading the files, organizing the files and documents, developing a coding methodology (i.e. hot document, super-hot document, duplicate document, etc.), allowing multiple reviewers to have access and code as well as make notes on documents, maintaining audit capabilities, and ensuring the ability to check and confirm document production errors and/or discrepancies by defendants many of which became the subject of the Joint Status Reports ("JSRs") submitted to the Court; and
- The Science Committee (and its sub-committee on expert retention) began its work to identify and retain subject matter experts with a great deal of knowledge, as well as already-retained experts available already from the prior C-8 MDL, and hosted its first in-person meeting in Cincinnati, Ohio. The process of working up experts for Science Day also began.

In June, July, August and September of 2019, among other tasks, the PEC drafted numerous internal memoranda addressing significant legal issues facing Plaintiffs; revised Master Discovery Demands; met and conferred extensively on PFSs and DFSs; submitted position papers and memoranda in support of Plaintiffs' proposed management Orders; and continued preparing for Science Day, which was scheduled for October 2019. This early discovery work continued throughout the summer and into the fall of 2019, and all contributed to or culminated in the issuance of subsequent CMOs, including but not limited to CMO No. 3.C (tolling of statutes of limitations and additional parties), CMO No. 5 (Fact Sheets), CMO No. 6 (alternative service of

¹⁶ The GCD loomed for Plaintiffs, in that, if Defendants proved correct, the defense would serve to provide immunity to the Defendants for the contamination they caused. This was the dark cloud hanging over Plaintiffs, and a constant reminder of the serious risk faced by the PEC and Plaintiffs in this case from its very inception.

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process), CMO No. 8 (privilege protocol) and CMO No. 9 (protocol for document requests and productions pursuant to subpoena).

- 37. While the above list attempts to summarize months of work, the amount of time, effort, meeting and conferring, and briefing that went into these CMOs and resolution of the issues cannot be overstated or properly summarized with a bullet point. For example, with respect to the PFS (which ultimately became CMO No. 5), this document was negotiated over the span of 16 weeks. Over 16 meet and confers were conducted, and 22 drafts of the document were exchanged. The PFS process was specifically addressed and argued at multiple CMCs. ¹⁷ Ultimately briefing on the subject was required, and the Court held a hearing and argument on the form, specific questions and schedule for the PFS. ¹⁸ In addition, the issue of the corresponding DFS was also a hotly contested issue, one on which the PEC ultimately did not prevail, but which also involved significant meeting and conferring, drafting, briefing, and oral argument. ¹⁹
- 38. The PEC also embarked on the launching of a website, www.AFFF-MDL.com, to provide relevant information to plaintiff counsel, the public and anyone who sought access to such information. Of particular interest at the time was mapping the process of gathering and disseminating information about specific PFAS-related sites as well as information about the DFS process, which the website provided. Of current relevance, this website has now turned into a tremendously effective tool for the PEC and interested plaintiff counsel to access settlement-

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¹⁷ See e.g., Tr. of June 21, 2019 CMC, at 4-10 and Tr. of July 26, 2019 CMC, at 12-24. Beginning in July 2019, additional PEC efforts were undertaken to analyze the data received as a result of completed PFSs and DFSs. The analysis of the fact sheets by the Fact Sheet Committee included reviewing the DFS for deficiencies, identifying third parties from which to seek further discovery and identifying certain products used at the various sites. The sites identified as being at issue were then exchanged with defendants in the course of negotiating the DFS process.

¹⁸ ECF No. 205.

¹⁹ The Fact Sheet Committee created and maintained a portal where Plaintiffs' counsel could access master spreadsheets containing DFS information. This portal continues to exist to this day. ²⁰ Tr. of May 1, 2020 CMC, at 40.

related materials.

- 39. In October 2019,²¹ just six months after leadership appointment, Science Day was held at which the PEC's Science Committee presented three experts to the Court. Preparation for Science Day spanned months and was only possible in such a short time frame following the PEC's appointment because of the institutional knowledge and already-acquired expert base gained from the C-8 MDL. *See* Declaration of Wes Bowden ("Bowden Decl.") at ¶¶ 10-14. As the Court will recall, Science Day was a large event, with many lawyers and other guests attending on behalf of the parties, and additional spill-over courtrooms needed.
- 40. Additionally, by the fall of 2019, the DRMT was well under way on document review, having selected EverLaw for its document management needs and spending hundreds of hours training the PEC and designated document review attorneys on the platform and the critically important document coding protocol.
- 41. Throughout October, November and December 2019, PEC efforts also became focused on the following:
 - Third-party subpoenas and meet and confers with various third-party subpoena recipients;
 - The Law & Briefing Committee's efforts as they drafted multiple legal memos on various discovery-related topics;
 - The Discovery Committee was now meeting weekly and engaging in nearly round-the-clock meet and confers with certain defendants.
- 42. Meanwhile, the various committees, including specifically the Discovery Committee (and its sub-committees), were continuously generating work product on foam manufacturing, flourosurfactant defendants and all telomer defendant issues, as well as on overall

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²¹ Science Day was initially scheduled for September 6, 2019, but was adjourned because of Hurricane Dorian.

defendant liability. In addition, there was ongoing work and document production from the United States government through its counsel at the Department of Justice (*see* Declaration of Paul J. Napoli in Support of Motion for Attorneys' Fees ("Napoli Decl.")). Throughout December of 2019, and January and February of 2020, Leadership helped coordinate the efforts of multiple committees as well as informal ad hoc working groups, including with the service of twenty-two (22) third-party subpoenas in February of 2020 alone. That same month, the PEC – through the Science Committee – met with and retained Dr. Linda Birnbaum, whose expert testimony has been critical to the case at large.

- As the Court will recall, in advance of each month's status conference, the parties submitted a JSR to the Court. Far from being simply administrative, these JSRs were drafted to both give a litigation update and frame substantive issues in dispute thereby making them often contentious in nature, and requiring the input from many different defendants, the Department of Justice ("DOJ") on behalf of the United States, as well as different types of plaintiff groups and various PEC committees. Likely known to the Court given the usually late hours in which these were submitted, the back-and-forth drafting often took most of the entire week the JSR was due and usually went late into the evenings on the deadline date.
- 44. There were eight JSRs submitted during the calendar year of 2019 for eight CMCs held February 25th, March 15th, April 5th, May 17th, June 21st, July 26th, October 4th, November 1st, and December 13th. In 2019, the JSRs ranged in length from 5 to 14 pages, with an average length of 10 pages.

VI. <u>CONTINUED LITIGATION, PEC WORK AND MANAGEMENT</u> (2020)

A. General Discovery Overview

45. In 2020, what was already becoming one of the most wide-ranging MDLs ever

faced the unprecedented challenge presented by the global Covid-19 pandemic. On top of the already complex nature of this MDL, innovative thinking was then required to continue to prosecute this case without significant delay – especially given that at this point the PEC was just beginning to contemplate noticing depositions. To meet the unique and emergent challenges of the day, and in order to stay on schedule with deposition discovery, it was critical to develop an agreement to conduct depositions remotely. To this end, CMO No. 11, a Remote Deposition Protocol, was entered by the Court in June 2020, at the height of the pandemic. This CMO was entered "to enable the parties to proceed with discovery efficiently and with due regard for the health and safety of witnesses, court reporters/videographers, counsel, and parties during the ongoing Covid-19 pandemic "²²

46. CMO No. 11 was one of the earliest remote deposition protocols, and the result of a lengthy negotiation between the parties; it would also ultimately become a model in other MDLs. There were obviously many concerns: the relative newness of video platforms, the security of same (given the confidential documents, as well as concerns by the DOJ over certain of its documents), the issue of witness technology, the issues of delays, the issue of inadequate Wi-Fi, the issue of presenting and displaying documents, the lack of an ability to see the witness in person, the requirement of the local rule to provide documents to be used at a deposition in advance of the deposition, the exception to the local rule that new documents could still be used (and these new documents would be those shared/reviewed by a counsel and the witness), the ability to receive unused documents back (without one's adversary reviewing unused work-product), the ability of counsel to appear with a witness, the ability to monitor remote attendance, the necessity to manage the number of examiners (on both sides), and myriad other issues. The concerns, obstacles, and

²² CMO No. 11, at ¶1.

what-ifs were nearly endless. Ultimately, a proposed CMO was submitted jointly by the parties and, as noted in the preceding paragraph, entered by the Court on June 19, 2020.

- To address the issue of using deposition exhibits virtually, and the challenges that could have ensued, CMO No. 11 required parties to exchange potential deposition exhibits in advance to allow the witness to access hard copies. 24 Importantly, the CMO mandated that deponents, as well as attorneys, undergo training on the Zoom platform to ensure a level of proficiency necessary for participants to feel just as comfortable as they would in a more traditional in-person setting. To date, all but five of the non-bellwether case-specific depositions occurred remotely. The use of remote depositions has also had the added benefit of saving many thousands of dollars of attorney time, travel, and expenses for this MDL. The attorney and support staff time, as well as the costs, required for depositions teams to travel would have been very large. Of note, these significant savings of time and costs are a benefit to all Class Members; where other past MDLs likely included these fees and cost in their fee applications, this MDL provided these savings by virtue of the continued use of the remote deposition format of CMO No. 11.
- 48. Notwithstanding the wholly novel challenges presented by the pandemic, the PEC and its leadership's goals were to zealously advance the litigation and push forward. Far from shutting down, the PEC held monthly calls and its work picked up speed. For example:
 - In March of 2020, seventy-one (71) third-party subpoenas were served.
 - The Science Committee were now holding weekly calls with a vast array of different experts. *See* Bowden Decl.
 - Meet and confers over discovery demands and Plaintiffs' Notices of Depositions were occurring daily.

²³ *Id.* at ¶ 5.

 $^{^{24}}$ *Id.* at ¶ 8.

- The Law & Briefing Committee continued addressing and briefing on a variety of legal issues.
- Defendant-specific discovery committee teams were busy at work developing the case against each defendant.
- 49. In May of 2020, the PEC drafted and filed a Motion to Compel Discovery from the DuPont defendants (E. I. du Pont de Nemours and Company, the Chemours Company FC LLC, Corteva, Inc., and DuPont de Nemours, Inc.). They also drafted various legal memos on several topics, including the liability of component part manufacturers. *See* Infra, ¶ 96.
- 50. In June of 2020, depositions began, for which the PEC and its various committees had been preparing for months. *See* Douglas Decl. at ¶¶ 21. At this same time, the Legislative Committee was monitoring and consulting with the PEC and others on the rapidly evolving regulatory landscape; relatedly, the Science Committee submitted a letter to the Court regarding recently enacted PFAS regulations in the State of New Jersey.
- 51. In July of 2020, depositions continued, including the pivotal deposition of 3M fact witness John Butenhoff, which took place over the course of two days. Discovery efforts continued and complexified based on the results of the Discovery Committee's tireless efforts to request, receive, review, and code millions of pages of documents.
- 52. It is worth noting that managing the discovery efforts against multiple defendants in a products liability case that spans decades was, and remains, extremely complex and time-consuming. As noted, I have significant personal experience in leadership roles, several in cases which included multiple defendants. I have served as the primary organizer and taskmaster in all such roles. The complexity of this case was like no other not even close. First, it has more

defendants against whom we were, and still are, actively litigating than any other case. Second, it has more different types of cases than is typical. Generally, products liability cases have no more than two types of claims – personal injury claims and consumer marketing class claims – whereas this MDL had five: (1) water provider claims; (2) personal injury claims; (3) property damage claims; (4) medical monitoring claims; and (5) claims by states/sovereigns. Third, this case has cross-cutting issues, including primarily the GCD. Other complexities exist, and your undersigned can unequivocally attest that all aspects of the development, discovery, and litigation of this case were more complex and multi-faceted than any prior MDL I had run as Lead Counsel or Chairperson of the PEC. I can also attest that the work by the various committees, including the DRMT, Strike Force, Science/Expert Committee, and Law & Briefing, was by far the best work-product that I have been fortunate enough to be part of in any MDL I have overseen.

53. Throughout August and fall of 2020, depositions continued, as did additional discovery demands, document disclosures, document review and coding, meet and confers with respect to various issues, and other active workstreams. Indeed, since the first deposition on June 12, 2020, through December 2020, thirty (30) depositions were taken – all remotely. The PEC averaged six (6) depositions per month from July, 2020 through December, 2020.

B. Beginning of Bellwether Process

54. Beginning in May of 2020, Co-Lead Counsel began to advance the need for a bellwether process. The Defense Coordinating Committee ("DCC") took the position that it was

²⁵ While there are certainly "smaller player" defendants, the discovery efforts and litigation were focused on both big and medium-sized and even some smaller defendants, to name a few: 3M, DuPont, BASF, Tyco/Ansul/Chemguard, Kidde, National Foam, Buckeye, all of whom were regularly part of issues being addressed in JSRs.

²⁶ The Science Committee, in total, submitted nine separate relevant update reports to the Court regarding various science based and regulatory issues throughout the course of the litigation, and will continue to so as warranted. They were submitted on June 2, 2020; February 9, 2021; July 16, 2021; December 9, 2021; March 3, 2022; June 22, 2022; October 25, 2022; March 14, 2023; and August 21, 2023.

premature in the litigation to start the bellwether process.²⁷

55. On June 30, 2020, Co-Lead Counsel began the meet and confer process on developing a plan for the bellwether process. Shortly thereafter, in July of 2020 the Bellwether Water Provider Committee, in conjunction with Co-Lead Counsel and Law & Briefing Committee, drafted and exchanged a proposed bellwether program for the water provider cases.²⁸

- 56. In August of 2020, the PEC and DCC Co-Leads met and conferred on multiple occasions and made substantial progress on agreeing to general terms of a bellwether process such as waves of cases with general discovery, followed by a pared down set of cases to work into trial cases.²⁹
- 57. Additional negotiations on the specifics of the water provider bellwether case protocol continued through the fall of 2020, while the parties also continued discussing the PEC's desire to include a process for additional and future types of bellwether cases. In November of 2020, the DCC attempted to torpedo the bellwether protocol for water providers, by insisting at the tail end of discussions about the water provider bellwether process that personal injury and property damage cases be teed up for a following bellwether wave an attempt to distract from the water provider bellwether process.³⁰ The Court agreed with the PEC on this critical point.
- 58. After the November 13, 2020 CMC, the PEC and DCC completed final negotiations and wordsmithing on a proposed CMO to address the selection of and discovery for the water provider cases. On November 25, 2020, this CMO was submitted jointly for the Court's consideration.
 - 59. On December 1, 2020, the Court issued a text order stating that it was informed

²⁷ JSR for June 5, 2020 CMC.

²⁸ JSR for Aug. 7, 2020 CMC; see also, JSR for Aug. 7, 2020 CMC.

²⁹ JSR for Sept. 11, 2020 CMC.

³⁰ JSR for Nov. 13, 2020 CMC.

that some parties may have concerns or objections to the proposed CMO and instructed that any party with such concerns should submit a letter brief on or before December 7, 2020, with any responses due December 10, 2020.³¹

- 60. On December 7, 2020, a group of nine defendants, led by the DuPont defendants and calling themselves the Non-Manufacturing Group ("NMG"), submitted a letter brief objecting to the proposed CMO, essentially arguing that bellwether selection was premature, as well as unfair to them specifically because they were not defendants when the negotiations began. They sought a five-month delay in the deadlines set forth in the proposed CMO.³²
- 61. On December 10, 2020, the PEC filed its response to DuPont and the other NMG defendants, noting that: (a) DuPont and the NMG defendants were part of the CMO negotiating process; (b) there was significant negotiation and compromise on the timing and deadlines set forth in the proposed CMO; (c) DuPont and the NMG defendants did not understand that the proposed CMO pertained only to water provider cases, of which only fifty-seven (57) were eligible for bellwether selection; and (d) that the DCC leadership was also in support of this highly-negotiated and agreed-upon proposed CMO.³³
- 62. During the December 11, 2020 CMC, the proposed CMO was discussed. I advocated for the entry of the proposed CMO, and with some minor additional language requested by the Court the water provider bellwether CMO was finally completed.³⁴
- 63. All of the foregoing efforts culminated in the issuance of CMO No. 13 on December 28, 2020, which governed the initial bellwether selection and protocol for the water provider cases. This protocol provided for a two-tier approach, beginning with a first tier of

³¹ ECF No. 991.

³² ECF No. 1001.

³³ ECF No. 1010.

³⁴ Tr. of Dec. 11, 2020 CMC, at 28:25-43:9.

discovery cases to be selected by the parties to undergo additional discovery beyond the PFS process. I highlight the process by which the bellwether CMO came into existence because of its protracted and hotly contested nature: indeed, even when the PEC believed the CMO was completed, additional obstacles would manifest and negotiations would begin again. This two-tiered approach is just one example of the hard-fought nature and complexity surrounding the CMO, which would otherwise have been a straight-forward CMO in most MDLs. The substantial work performed in the water provider bellwether cases is discussed further below.

C. Additional Activities in 2020

- 64. In 2020, a total of 2,472,973 documents were produced to the PEC.
- Despite being impacted by the Covid-19 pandemic, there were twelve JSRs submitted during the calendar year of 2020 and ten CMCs held on the following dates:³⁵ January 10th, February 7th, April 3rd, May 1st, June 5th, August 7th, September 11th, October 9th, November 13th and December 11th. These JSRs were extremely detailed, and as the discovery and related litigation issues intensified, these JSRs increased in their complexity, arguments and length. The average JSR submitted in 2020 was now 21 pages.

VII. CONTINUED LITIGATION, PEC WORK AND MANAGEMENT (2021 to 2022)

A. Continued Discovery Efforts

- 66. In addition to the above, general liability depositions and fact discovery of all the defendants continued, with a total of sixty-four (64) depositions taken in 2021: forty-four (44) defense witness general liability depositions and twenty (20) bellwether fact witness depositions.
- 67. The PEC served additional discovery demands, including second and third sets of interrogatories and requests for admissions. In addition, document production continued. In 2021,

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³⁵ The March 2020 and July 2020 CMCs were adjourned.

defendants produced 1,324,548 (approximately 9,000,000 pages) documents, all of which were uploaded, audited, reviewed and coded by the PEC's document review teams.

68. And of course, the JSRs and CMCs continued, with twelve (12) JSRs submitted during the calendar year of 2021 and twelve (12) CMCs held on the following dates: January 15th, February 19th, March 19th, April 16th, May 14th, June 17th, July 15th, August 13th, September 10th, October 7th, November 19th and December 17th. The average JSR page length was now over 38 pages in 2021, as the complexity and scope of the issues and litigation continued to grow.

B. Gearing up for Government Contractor Defense

- 69. As noted above, from the outset of this litigation, defendants touted their government contactor immunity defense as the "silver bullet" to Plaintiffs' actions. It was clear that until there was a decision on this issue, there would be no trial, and certainly no settlements.
- 70. In the spring of 2021, after two years of non-stop discovery (much of it, including every deposition done to date, conducted throughout the pandemic), Co-Lead Counsel pushed for and negotiated a briefing schedule for the defendants' GCD dispositive motions. On April 15, 2021, CMO No. 16 was entered by the Court, setting forth the protocol and briefing schedule for defendants' dispositive motions on this threshold issue. As the Court will recall, there was much back-and-forth over the process, protocols, extent and breadth, page numbers, and more related to this CMO.
- 71. Ultimately, CMO No. 16 was amended and supplemented three times to adjust the briefing deadlines, limit page lengths, clarify which defendants could file joint or lone briefs, and eventually narrow the dispositive issue to the first factor as provided by *Boyle v. United Techs*. *Corp.*, 487 U.S. 500 (1988) and its progeny. Related CMO Nos. 16A, 16B, and 16C were all the result of extensive negotiations between Co-Lead Counsel and the DCC.

- 72. What followed was a massive research, evidentiary gathering, and writing effort to defeat Prong One of the GCD. The work was non-stop, and was being done in conjunction with bellwether work, the advancement of the general discovery being sought against defendants and discovery against third parties, like the United States, and the attendant case management and other litigation-related issues being raised monthly in the JSRs.
- 73. As the PEC was preparing for oral argument on the first *Boyle* prong in March 2022, a Covid-19 diagnosis required adjournment of the hearing. Indeed, the adjournment was announced on an emergency call convened with the Court at or shortly after 5 p.m. the day before the hearing. Shortly thereafter, CMO No. 16D was entered wherein the Court requested and the parties scheduled a supplemental round of briefing on the second and third factors of Boyle. Oral argument was conducted on the GCD on August 19, 2022, with strict time parameters from the Court. The Court issued its Order denying defendants' motion less than a month later, on September 16, 2022.³⁶

C. Advancement of Bellwether Water Provider Cases

- 74. As noted above, both leading into and following the entry of CMO No. 13, the Bellwether Water Provider Committee worked hundreds of hours to first assess the various Plaintiff candidate cases to determine representative cases, and then to review the cases proposed by the DCC.
- After significant meeting and conferring between Co-Lead Counsel and the DCC, 75. ten water provider bellwether cases were submitted to the Court for Core Discovery under CMO No. 13.³⁷

³⁶ ECF No. 2601. For additional details on Defendants' government contractor immunity motions, see Douglas Decl. and Declaration of Law & Briefing, filed concurrently herewith.

³⁷ JSR for March 19, 2021 CMC.

- 76. Once selected, discovery in the ten Tier 1 bellwether water provider cases ensued. During the Tier 1 discovery period (between March 1, 2021, and October 5, 2021), bellwether plaintiffs produced 3,535,038 documents. Furthermore, sixteen (16) Fed. R Civ. P. 30(b)(6) depositions of bellwether plaintiffs occurred during Tier 1 discovery.
- 77. In May of 2021, as Tier 1 discovery was underway, Co-Lead Counsel commenced efforts to develop a Tier 2 bellwether plan. On May 18, 2021, Co-Lead Counsel exchanged an initial draft of a Tier 2 bellwether plan with Counsel for DCC Co-Leads. The meet and confer process started that day. As announced at the June 17, 2021 CMC,³⁸ the parties were able to reach agreement that Tier 2 would consist of three cases from the Tier 1 bellwether pool of cases. The meet and confer process continued through June and July of 2021 with counsel exchanging numerous drafts and edits.
- 78. The parties reached an impasse by the end of July 2021 as to the Tier 2 Schedule and, crucially, also could not agree on a trial date for the first bellwether case. Cognizant of the fact that setting a trial date was critically important to advance the litigation, Co-Lead Counsel immediately sought Court intervention to oppose the DCC's continued efforts for delay. Co-Lead Counsel, on behalf of the PEC, submitted a letter brief on August 5, 2021, informing the Court of the impasse and the DCC's latest efforts to delay ahead of the CMC on August 13, 2021.³⁹
- 79. Six days later, the Court entered CMO No. 19 setting a Trial Date for the first water provider bellwether Trial of January 1, 2023.⁴⁰
- 80. At or about the beginning of September 2021, the Bellwether Committee began its more detailed assessment of the cases in the Tier 1 discovery pool to determine which would

³⁸ Tr. of June 17, 2021 CMC, at 17.

³⁹ ECF No. 1819.

⁴⁰ ECF No. 1844.

be most representative and should advance to the Tier 2 stage. Extensive work went into reviewing and assessing the now nine⁴¹ eligible cases, continuing through October of 2021.

- 81. The selection process included seemingly endless meet and confers between Co-Lead Counsel and members of the Bellwether Committee, and defendant's Co-Lead Counsel, as the parties worked to develop a Joint Submission to the Court indicating the parties' selection of bellwether trial cases and the sequence of the trials, as well as a comprehensive Tier 2 discovery schedule. Once again, this was another process that required significant time and efforts, including preparation on the case facts as well as negotiations to reach agreement with the DCC.
- 82. On October 13, 2021, the parties submitted to the Court a "Joint Submission Regarding Proposed Tier 2 Water Provider Bellwether Trial Pool Selections." The Court entered the Order Selecting Tier 2 Water Provider Bellwether Trial Pool Cases that day. The Tier 2 Water Provider Case selections were as follows:
 - City of Sioux Falls v. 3M Company, No. 2:19-cv-1806-RMG
 - City of Stuart Florida v. 3M Company, et al. No. 2:18-cv-03487-RMG
 - Town of Aver v. 3M Company, et al. No. 2:19-cv-03120-RMG
- 83. The parties continued to negotiate a water provider bellwether CMO governing scheduling and discovery for the Tier 2 water provider bellwether trial. The Court entered CMO No. 19-A outlining the Tier 2 water provider schedule on November 30, 2021.

VIII. <u>CONTINUED LITIGATION, PEC WORK AND MANAGEMENT</u> (2022)

84. In addition to the bellwether work noted above, the discovery and overall litigation continued full speed ahead. There were numerous discovery disputes based upon objections

⁴¹ The case of *Dayton* v. 3M Company et al. 2018-cv-00331 (S.D. Ohio) became ineligible because counsel filed suit against the United States while it was a Tier 1 case and having the U.S as a defendant precluded a case from being eligible in the water provider bellwether process.

⁴² ECF. No. 1930.

⁴³ ECF. No. 1931.

defendants were asserting. There were multiple motions to compel filed against various defendants. In addition, the discovery disputes related to Plaintiffs' fraudulent conveyance claims against DuPont were now being raised and addressed. See e.g. ¶ 105, below, and accompanying chart of sample disputes.

- 85. In 2022, over forty (40) depositions took place, including 35 bellwether plaintiff depositions.
- 86. During 2022, there were ten JSRs and ten CMCs held on the following dates: January 28th, February 24th, April 18th, June 10th, July 8th, August 19th, September 23rd, October 21st, November 16th and December 22nd. The average JSR page length was now up to almost 45 pages.

IX. <u>CONTINUED LITIGATION, PEC WORK AND MANAGEMENT</u> (End of 2022 to 2023)

- 87. The water provider bellwether work discussed above eventually culminated in the selection of the *Stuart* case on September 23, 2022, to proceed as the first water provider bellwether trial. The efforts preparing the *Stuart* case for trial that took place in late 2022 and throughout the first half of 2023 were incredible and impressive. *See* Douglas Decl. at ¶¶ 7, 37-50. While I was not a member of the trial team, I observed firsthand that their effort and work was having a significant impact on the advancement of the settlement negotiations, which I participated in on a non-stop schedule (in 2023) with my Co-Lead Counsel and the Court-appointed mediator and his team, as discussed below.
- 88. It was in the process of preparing for the *Stuart* trial that: the decision to pursue a coordinated approach to discovery across all MDL defendants, and the advancement of the crosscutting claim of GCD, was vindicated. The *Stuart* trial team was extremely well-prepared as a result of such approach over the course of the MDL; they were ready and eager to open.

89. Prior to the Preliminary Approval Order for the DuPont PWS Settlement on August 22, 2023, there were five JSRs in 2023, and five CMCs held on the following dates: January 20th, March 3rd, April 7th, May 26th, and July 14th. The JSRs had an average length of 46 pages.

X. DEFENDANTS' LIABILITY IS INEXTRICABLY INTERTWINED

A. The Settlements are the Direct Result of the PEC's Coordinated Approach

- 90. As noted above, throughout the discovery and litigation process, the PEC's efforts were not simply focused on one case type or one defendant. Instead, the general liability, science and overall case development in this MDL were all inextricably intertwined and concurrently advanced as against virtually all defendants. Although the responses may have varied for different defendants, the issue of the state of PFAS science and knowledge within the community of the harms posed by PFAS was applicable to all. Similarly, regulatory issues were not typically defendant-specific.
- 91. Given the interconnection between the defendants' respective liability stories, discovery to advance these general liability stories, including on the issue of what was known and when, focused on all of the defendants, and discovery from each assisted in the prosecution of others.
- 92. As the Court may recall, an example of this intertwined relationship between defendants and the necessity that all of the work be related and intertwined was set forth in one of the PEC's earliest motions to compel filed against Dynax, which set forth the interconnected relationships and roles of all telomer defendants together.⁴⁴ This early motion clearly showed the relatedness of the defendants and of so many of the issues in this case.
 - 93. This interwoven liability story, uncovered through painstaking efforts by the PEC

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⁴⁴ Plaintiffs' Motion to Compel Discovery from Defendant Dynax Corporation [ECF No. 1150].

and its committees, is the reason that the DuPont and 3M PWS Settlements that have been preliminarily approved by the Court were able to be negotiated. The efforts to achieve those results were wholly intertwined, and the PEC teams' – in particular, the *Stuart* trial team's – readiness to tell a unified story was a large part of what helped drive discussions with defendants. Not only were the defendants all connected through their conduct; so too were the hours and costs spent to establish their collective liability.

B. The PEC's Coordinated Approach Advanced All MDL Case Types

- 94. In addition, discovery with respect to the Fire-Fighting Foam Coalition ("FFFC"), a group of AFFF industry leaders, was relevant to many defendants and case types, as well as to the omnibus opposition for summary judgment based upon the GCD. Other examples of crosscutting issues include the already addressed GCD and the Master Discovery Demands (which were served on behalf of all claim types and prepared with the help of the Personal Injury Committee, the State/Sovereign Claims Committee, the Medical Monitoring Committee, the Property Damage Committee and others). The PEC's robust discovery efforts focused on all defendants while never losing sight of the big picture. This tactical approach was critical.⁴⁵
- 95. Of course, there are issues that are necessarily germane to non-water provider cases, such as specific causation in a personal injury case, or issues surrounding soil remediation in a property damage case, or even various state statutes or other laws that impact a state's natural resource damages claims. However, the unprecedented work that was done (and continues to be done) by the PEC was beneficial to all types of cases and as against most defendants, and ultimately resulted in the successful negotiation of the Settlements currently before the Court. Simply put, even though ultimately only a water provider case was selected as the first bellwether trial case

⁴⁵ Additional and at times targeted discovery demands were served beyond the initial Master sets.

that underwent substantial trial work-up, the totality of the general liability case as against each defendant can be used in any type of Plaintiff case. In particular, favorable liability testimony that was secured by PEC attorneys from witnesses from DuPont, 3M, Tyco, Kidde, National Foam, Buckeye, and Dynax is as equally usable in the various case types. Indeed, historically, the PEC always wanted to advance all case types, while also being mindful that "if you try to swallow the whole elephant at one time, you'll never succeed."

- 96. Starting with Science Day, the PEC argued that the presentations should cover multiple topics that would advance all cases. While the DCC wanted Science Day to center around epidemiology and toxicology alone, the PEC sought a broader range of topics to include PFAS fate and transport, the multiple PFAS receptors, PFAS health effects, medical monitoring, ecological effects, governmental and public authorities' response to PFAS, remedies for PFAS contamination, and the extent of PFAS contamination in drinking water. Following the June 21, 2019 Status Conference, the Court adopted the PEC's proposal for Science Day to encapsulate all of these topics, which would benefit all case types.
- 97. The Court ultimately elected to pursue the water provider cases first, stating, "I think the water districts are the first place we should focus, because to the extent that the water districts cannot make out a case, I think it's going to be very hard for anybody to make out a case because of the nature of what they would have to prove."⁴⁷
- 98. In short, despite the bellwether focus being on the water provider cases, general liability discovery undoubtedly benefitted all case types, and the discovery and expert work that took place as against all defendants are inextricably linked.
 - 99. Notably, throughout the litigation the PEC and the Co-Leads continually pushed to

⁴⁶ Tr. of July 14, 2023 CMC, at 41.

⁴⁷ Tr. of Dec. 13, 2019 CMC, at 55:2-12.

advance cases beyond water providers. Examples include the PEC's JSR report in September 2020 that stated:

The PEC submits that these cases should be cases that will be the most instructive of the overall litigation and shed the most light on larger cross-cutting issues. Moreover, when the time comes to assessing these future waves, the PEC submits that the most prudent and efficient cases to be selected might be various types of class action cases, state/sovereign cases, larger scale property damage cases. Addressing claims for individuals alleging personal injury or property value diminution claims might not be the most efficient way to manage the overall litigation at this time.⁴⁸

Then at the September 11, 2020, CMC the PEC advocated that:

The PEC and Defense Co-Leads met and conferred on multiple occasions and have made good progress on agreeing on terms of proposed bellwether plan that would generally divide the cases into buckets or waves, with certain categories of cases proceeding first (i.e., to include water provider cases) and other categories of cases in later bellwether waves.⁴⁹

- 100. On March 11, 2022, the PEC proposed to the DCC a bellwether process to advance the non-water provider cases (i.e. the other categories of cases, including personal injury cases, class actions, state/sovereign cases, and property damage cases). After eight months of meeting and conferring and exchanging proposals, raising the issue in JSRs and at CMCs, the parties submitted competing proposals and briefing for the bellwethers.⁵⁰
- 101. While a formal bellwether process had still not been established for the other categories of cases, the effort of Co-Lead Counsel, with the aid of the Personal Injury Bellwether Committee, culminated in the entry of CMO No. 26 on May 5, 2023. This CMO governs the second round of bellwether cases, this time those alleging personal injuries. This heavily negotiated CMO advances only those cases alleging kidney cancer, testicular cancer,

⁴⁸ JSR for Oct. 9, 2020 CMC, at 21.

⁴⁹ JSR for Sept. 11, 2020 CMC, at 20-21.

⁵⁰ ECF Nos. 2721 and 2722; *see also* JSRs for CMCs dated April 22, 2022, June 10, 2022, July 8, 2022, Aug. 19, 2022, Sept. 23, 2022, and Dec. 22, 2022.

hypothyroidism/thyroid disease, and ulcerative colitis, where the exposure occurred from two sites: the Peterson Air Force Base/Colorado Springs and the Naval Air Station Joint Reserve Base Willow Grove/Warminster.⁵¹

102. Additionally, following the announcement of the DuPont and 3M PWS Settlements, the Court suggested that the parties also develop a next round of non-3M water provider bellwether cases. The Court made its intention to avoid delay known after the parties sought an initial extension. This second water provider bellwether process was developed between Co-Lead Counsel, members of the *Stuart* trial team, and the Telomer Water Provider Bellwether Team. *See* CMO No. 27.

XI. <u>SETTLEMENT</u>

103. Very preliminary and ultimately unsuccessful attempts at negotiating a settlement with the DuPont defendants began in May of 2020. The Negotiation Team initially had informal discussions only (*see* Summy Decl.). These discussions progressed, in part due to my relationship with DuPont's counsel from the C-8 MDL, which seemed to provide more momentum to the talks in the fall of 2020. Ongoing discussions continued, at times sporadically, and in spurts, sometimes with several intervening months between discussions. There were a number of issues that appeared at times insurmountable, including Class definition, scope of release, various legal defenses, allocation procedures and dismissal mechanisms, to name but a few. *See* Summy Decl.

104. Leadership's role in coordinating pre-trial proceedings across various workstreams and litigation against multiple defendants not only continued as Co-Lead Counsel undertook its negotiation duties, but complexified. We were speaking – again intermittently from 2020 onward – with the DuPont defendants, but also beginning in early 2021 with 3M. These

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⁵¹ ECF No. 3080.

concurrent discussions, which picked up pace in early 2022, got turbo-charged when Judge Layn Phillips (ret.) of Phillips ADR was appointed mediator by the Court on October 26, 2022, to help oversee settlement negotiations. ⁵² Leadership's role now included not only the ongoing oversight of the litigation writ large, but also the coordination between increasingly targeted committees; in particular, the *Stuart* Trial Team, the Strike Force, and the Resolution and Negotiation Teams, as described in greater detail in the Summy Declaration.

105. Like all of the litigation efforts of this MDL, the settlement negotiations and related work was oftentimes conducted around the clock for days and on end. This process required hammering out negotiated language, consulting with experts on definitional terms, exchanging and disputing drafts of contested provisions, and meeting almost daily beginning in the spring of 2023, both with and without Judge Phillips (and his team), to keep momentum going. This effort culminated in the DuPont Memorandum of Understanding being finalized on June 1, 2023, with final execution of the Master Settlement Agreement with DuPont on June 30, 2023 (see Summy Decl.). Shortly thereafter, and due in large part to negotiation efforts pursued in tandem and addressing many of the same issues, the settlement with 3M was reached and announced. With no rest for the weary, leadership efforts to disseminate information about the settlements and educate interested parties have continued ever since. See Summy Decl. at ¶ 33.

106. Of significance, while the Resolution and Negotiation Teams were engaging on a settlement track, separately the *Stuart* trial team was full speed ahead, adhering to the deadlines and requirements of CMO No. 19 et seq., but more critically preparing for the first-ever water provider bellwether case. *See* Douglas Decl. This effort was gargantuan, and the work product and preparedness nothing short of spectacular. My firm has been a part of numerous bellwether

⁵² CMO No. 2B [ECF No. 2658].

trials; however, no past effort compares to the incredible effort that the *Stuart* trial team put forth to prepare the case. Ultimately, the trial was stayed by agreement of the parties to advance settlement discussions.⁵³

XII. SUMMARY OF OVERALL CASE MANAGEMENT THROUGHOUT THE MDL (March 2019 to present)

107. The massive litigation efforts described herein always required careful and forward thinking, as well as sophisticated case management throughout. To assist the Court in administering this MDL, leadership had to not only coordinate amongst itself to litigate against defendants and advance its own case, but also had to keep the Court informed and properly apprised of the myriad issues that regularly arose, as well as provide a report on the pace of the case generally (a critical hallmark, in your undersigned's opinion, of a successfully managed and well-run MDL). To that end, Co-Lead Counsel advocated on behalf of the PEC at forty-five (45) CMCs, and prepared monthly JSRs in advance of each conference. These JSRs were massive efforts that summarized and distilled the vast amounts of work being done by the parties. Prior to each CMC, counsel prepared for the hearing, met to discuss any anticipated issues with various PEC and relevant committee members, and frequently conferred with the DCC or its defense counsel designees to attempt to resolve issues in advance of every CMC.

108. The monthly JSRs proved to be an invaluable source of information for both the Court and litigants. They provided an update on the general status of the litigation, including tallies of documents produced (from both defendants and third parties), number of depositions taken, total PFAS-related cases pending outside the MDL, deposition updates, status of Fact Sheet submissions, and other statistics. The JSRs were also an opportunity for both parties to frame their positions when it came to disputes, and so often included substantive arguments on disputed

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⁵³ ECF No. 3256.

matters. While this meant the JSRs were no small or merely administrative task – and indeed, many were drafted over the course of contentious conversations with defense counsel – it also resulted in great benefit.

- 109. Many issues between the PEC and defendants were successfully resolved through meet and confers during the drafting of the JSRs. Others were addressed and argued at CMCs primarily by your undersigned.
- 110. Co-Lead Counsel also organized and led PEC meetings in advance of scheduled CMCs throughout the course of the litigation, whether in-person or by Zoom and conference call.
- 111. Furthermore, in total, Co-Lead Counsel oversaw the entry of sixty-six (66) CMOs. These CMOs governed administrative protocols, discovery issues, scheduling, bellwether matters, and legal issues, all of which Co-Lead Counsel negotiated and/or oversaw the implementation of with the assistance of various committees.
- 112. As noted throughout this Declaration, at all times throughout the prosecution of the case, I not only took a lead role in the negotiation of CMOs and representing the PEC at the CMCs referred to herein; I also and at all times, along with my Co-Lead Counsel, organized, coordinated, and oversaw the various committees discussed here. Many of the committees would meet every week, with sub-committees of each committee meeting more often indeed, during certain periods daily, and not infrequently multiple times per day. This work has not stopped as a result of the DuPont Settlement; it is ongoing through to the present date, as various committees are continuing their work.
- 113. While so many of the committees (and sub-committees) collectively answered the call to assist at various times during this MDL, there was no more important committee in this case than the Strike Force. *See* Douglas Decl. Once the Strike Force came together, it exercised a

sustained and full-time engagement with every phase and aspect of the case. This committee was critical at so many junctures, both openly and publicly through work product provided to the Court, defendants and third parties, but also – and perhaps even more impressively – through their absolutely critical work product behind the curtain, with litigation strategy and decisions. Their contribution cannot be overstated.

XIII. KIDDE BANKRUPTCY

114. As the Court is aware, on May 14, 2023, in the throes of trial preparation and deep into settlement discussions with DuPont and 3M, as well as after having already engaged in discussions with Kidde-Fenwal, Inc.'s ("Kidde") counsel and Judge Phillips on mediation and settlement options, Kidde filed a Chapter 11 petition for bankruptcy in the United States Bankruptcy Court for the District of Delaware. Consistent with this litigation, which never took a day off, notice was served on Mother's Day.

bankruptcy counsel, as well as the formation of a specific Bankruptcy Committee so as to stay abreast of the bankruptcy process and to aid in the efforts to ensure that the debtor Kidde would compensate the claims it sought bankruptcy protection from.⁵⁴ Kidde is not a small player in this case. As the Court is likely aware, its liability spans over 30 years, and the liability story is not good (for Kidde).

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⁵⁴ The primary liability that faces Kidde is its AFFF liability. This is a liability that was determined due to the work of this PEC and the various committees. Indeed, in its first day motions in the bankruptcy proceeding, Kidde stated: "[t]he Debtor's primary liabilities are contingent and disputed liabilities related to the AFFF Litigation (as defined below). Other liabilities of the Debtor include trade accounts payable and accrued expenses, which collectively totaled approximately \$29 million as of December 31, 2022." Decl. of James A. Mesterharm in Support of Chapter 11 Petition and First Day Pleadings, ¶40 (ECF No. 31), *In re: Kidde-Fenwal, Inc.*, 23-10638 (Bankr. D. Del.). In this Declaration, the debtor (Kidde) went on to state, "[b]ased on the number and nature of AFFF claims and recent, confidential settlement demands, KFI believes the alleged AFFF liability substantially exceeds the capacity of KFI to pay." *Id.* at ¶56. While it appears Kidde has limited funds, it also has related entities that will have to assist through (or outside) the bankruptcy process to ensure that the billions of dollars that Kidde owes for its role in a massive PFAS contamination in this country is not forgiven with a pennies-on-the-dollar payout.

116. This bankruptcy had an immediate impact on the case against DuPont since DuPont was the flourosurfactant supplier to Kidde with respect to the specific AFFFs used by Stuart. As such, following significant discussion and deliberation by the *Stuart* team in consultation with Co-Lead Counsel, the claims by Stuart against DuPont were severed from the *Stuart* trial.

XIV. CONCLUSION

- defendants, with over a dozen undergoing highly scrutinized discovery, and five type of claims: (1) water provider claims; (2) personal injury claims; (3) property damage claims; (4) medical monitoring claims; and (5) claims by states/sovereigns. There has never been a result achieved like this, especially under the challenges of a global pandemic. Indeed, from the appointment of the PEC by this Court through the announcement of the DuPont settlement followed one week later by the 3M settlement, less than 51 months had passed, an impressively speedy timeframe. In those less than 51 months, the following was accomplished:
 - Over 37 million pages of documents reviewed and coded;
 - 168 depositions taken;
 - Over 170 non-party witness subpoenas;
 - Over 10.2 million pages of documents from the United States and 7 depositions of the United States witnesses;
 - Ten bellwether cases worked up, including three through expert discovery, and one, the *Stuart* case, until literally the evening before trial;
 - Extensive and sophisticated briefing on the government contractor defense;
 - Summary judgment briefing;
 - Briefing on *Daubert* challenges to eleven (11) experts;
 - Retention of over thirty (30) experts by the PEC;
 - Management and oversight of an ever-changing regulatory landscape;

- Management, coordination and inclusion of a diverse PEC with lawyers with different clients, different interest, different motivations, etc;
- Forty-five (45) monthly JSRs provided to the Court (with often contentious and highly contested discovery and other disputed for the Court's attention). Indeed, the complexity and breadth is shown by virtue of the average length of the monthly JSRs going from 10 pages in 2019 to upwards of 45 pages in 2022.
- Digestion and understanding of millions of pages of defendant and third-party internal documents and often times highly technical scientific documents;
- Development of liability theories, hot documents, assessment of deposition testimony;
- Trial preparation, including exhibit list exchanges (with over 15,000 documents between the parties), exhibit and evidentiary challenges, briefing on motions *in limine*, witness preparation (direct examinations and cross-examinations), voir dire, jury charges, and opening statements preparedness;
- Intense and highly complex settlement discussion that spanned many, many months and required the assistance of a court-appointed mediator and team of mediators;
- A preliminary approval process that faced initial objections that were swiftly addressed;
- A historic result that will benefit hundreds of millions of Americans;
- A PEC that stayed unified, committed, focused, and dedicated, contributing hundreds of thousands of non-recourse dollars and funding;
- A legal team that set aside all other commitments including, for many stretches of time throughout this case, their personal lives and family commitments, as well as other cases and business opportunities to work around the clock through difficult circumstances against some of the finest lawyers and largest law firms in the world, at significant risk of never being compensated for their work if the defendants were to prevail in their "silver bullet" defense, all of which helped to deliver the largest settlements on behalf of water providers ever achieved.

I declare under penalty of perjury that the foregoing is true and correct. Executed on this 13th day of October, 2023.

Michael A. London, Esq. Douglas & London, P.C. 59 Maiden Lane, 6th Floor New York, New York 10038

EXHIBIT D

IN THE UNITED STATES DISTRICT COURT FOR THE DISTRICT OF SOUTH CAROLINA

IN RE: AQUEOUS FILM-FORMING FOAMS PRODUCTS LIABILITY LITIGATION)	Master Docket No.: 2:18-mn-2873-RMG
CITY OF CAMDEN, et al., Plaintiffs,)	Civil Action No.: 2:23-cv-03230-RMG
- <i>VS</i> -)	
E.I. DUPONT DE NEMOURS AND COMPANY (n/k/a EIDP, Inc.), et al.,)	
Defendants.)	

<u>DECLARATION OF SCOTT SUMMY, ESQ. IN SUPPORT OF CLASS COUNSEL'S</u> <u>MOTION FOR ATTORNEYS' FEES AND COSTS</u>

I, Scott Summy, declare as follows:

- 1. I am an attorney licensed to practice in all courts in the States of Texas, North Carolina, and New York, and admitted to this Court *pro hac vice*. I make this Declaration in support of Class Counsel's Motion for Attorneys' Fees and Costs.
- 2. This Declaration specifically describes the scope of work that went into Plaintiffs' negotiations and ultimate settlement for Public Water Systems ("PWS") with The Chemours Company, The Chemours Company FC, LLC ("Chemours"), DuPont de Nemours, Inc., Corteva, Inc. ("Corteva") and E.I. DuPont de Nemours and Company n/k/a EIDP, Inc. ("Dupont") (collectively "the DuPont Entities" or "Defendants"), as well as the work that was involved in securing Preliminary Approval and other post-settlement tasks. I have personal knowledge of the following facts, and if called as a witness, I could and would testify competently to them.

PROFESSIONAL EXPERIENCE

- 3. I am a Shareholder in the law firm of Baron & Budd, P.C. I have led my Firm's Environmental Litigation Practice Group ("ELG" or "Group") since 2002.
- 4. At Baron & Budd, my Group primarily represents public water suppliers whose Water Sources are contaminated with chemical substances. We have represented water suppliers of all sizes, including large water suppliers who operate hundreds of groundwater wells and surface water systems that draw water from large open bodies of water. Through our work for water suppliers for over twenty years, we have developed a sophisticated understanding of their operations, and we have worked with engineering and scientific experts to understand how contaminants affect Public Water Systems and what kinds of equipment and techniques are necessary to reduce or remove those contaminants from Public Water Systems ("PWS").
- 5. I have a significant amount of experience in serving as lead counsel and/or class counsel in complex environmental litigation cases. For more than 20 years, I have represented numerous public entities and individuals in environmental tort cases that are substantively similar to the Class Action that has been settled. Rather than rely on statutory environmental claims that seek compensation from the entity that used or released the product regardless of that entity's knowledge of the harm, many of our cases have invoked traditional products liability and other tort causes of action against manufacturers of chemicals that have contaminated public and private water supplies, property, or other natural resources that belong to public entities and/or individuals. Few other firms had implemented this strategy to impose liability on the ultimate tortfeasor who knew of its products' dangers and never told the downstream handlers, customers, and users. This type of litigation has resulted in billions of dollars in recoveries for my clients. Some of the most significant cases, in which I had a leadership role, include the following:

- a. City of Long Beach v. Monsanto Co., No. 16-3493 (C.D.Cal. 2022). I am currently serving as Lead Class Counsel for a nationwide class of approximately 2,500 public entities who discharge stormwater into waterbodies declared "impaired" due to high levels of PCBs. We stated products liability and negligence claims against Monsanto as the primary manufacturer of PCBs in the United States for selling those products with knowledge of their dangers. I negotiated a class settlement after almost seven years of individually litigating several cities' cases against Monsanto in five federal courts in four states. Under the terms of the settlement, Monsanto agreed to pay \$550,000,000 in class benefits to be distributed among class members and to pay separately \$98,000,000 in costs and attorneys' fees.
- b. *In re:* Oil Spill by the Oil Rig "Deepwater Horizon" in Gulf of Mexico on April 20, 2010, MDL 2179, (E.D. La.). I oversaw the representation of 36 public entities and over 1,000 commercial businesses and individuals impacted by the oil spill in direct representation by ELG. I was appointed by the MDL Court to the Plaintiffs' Executive Committee and the Plaintiffs' Steering Committee. I was also appointed by the Court as Co-Class Counsel as part of the massive resolution of these cases. ELG's direct representation clients recovered over \$100 million. Also, the Class benefits paid to date exceed \$14 billion. The BP Class Settlement has been recognized as one of the largest, successful, and multi-faceted settlements in American history. The Class included all persons in a four-state area that were impacted by the spill.

- c. *In re: Methyl Tertiary Butyl Ether ("MTBE") Prods. Liab. Litig.*, MDL 1358, (S.D.N.Y.). Over the last two decades, I have represented approximately 200 public entities and hundreds of individuals across the country in litigation against the major oil companies who made the decision to add MTBE to gasoline. Many of these cases were transferred to the MDL, while others were litigated in state courts across the country. I was appointed by the MDL Court as Co-Lead Counsel and served in that function. I also was appointed by the MDL Court to serve on the Plaintiffs' Steering Committee. I was also Lead Counsel in many state court actions where I represented both public entities and individuals. These environmental cases brought product liability allegations against the oil companies. These cases were successfully resolved, and hundreds of millions were recovered for our clients.
- d. City of Greenville, et al. v. Syngenta Crop Protection, et al., No. 10-cv-188-JPG-PMF, (S.D. Ill.). I served as Co-Lead Counsel representing 36 public entities in products liability litigation against the maker of Atrazine, a popular weedkiller, for extensive contamination of public drinking water wells. We originally filed the cases in Illinois, but after several years of litigation, we resolved the cases in a nationwide class settlement, and I was appointed Co-Lead Class Counsel. The Settlement paid \$105 million to over 1,000 public entities.
- e. *California North Bay Fire Cases*, JCCP No. 4955, Superior Court of the State of California, County of San Francisco; Southern California Fire Cases, JCCP No. 4965, Superior Court of the State of California, County of Los Angeles;

Woolsey Fire Cases, JCCP No. 5000, Superior Court of the State of California, County of Los Angeles. ELG has represented over 20 public entities in litigation against California Utilities for the devastating wildfires in 2015, 2017, and 2018. Our team has alleged that the fires were caused by the utilities' failure to recognize the new normal caused by Climate Change. These are very complex environmental cases. I was appointed as Co-Lead Counsel for the public entities in several state consolidated JCCPs. I was heavily involved in settlement negotiations. We reached a tentative settlement for \$1 billion for the Northern California entities, which is pending in Bankruptcy Court. We reached a settlement of \$360 million on behalf of the Southern California entities.

f. *TCP Cases*, JCCP No. 4435, Superior Court of the State of California, County of San Bernardino. I served as Co-Lead Counsel in representing nearly a dozen public entities in a California JCCP in products liability actions against the manufacturers of agricultural chemical 1,2,3-TCP, which caused environmental contamination to public drinking water wells. These cases have been litigated over the last 8 years and have resulted in settlements totaling over \$200 million.

MY PARTICIPATION IN THIS PFAS LITIGATION

6. In the 2017-2018 period, several of our public water clients became concerned about new per- and poly-fluorinated chemicals ("PFAS") including PFOA and PFOS that were detected in their water systems. Given our experience with these cases, and our litigation of a PFOA case in 2009-10, our firm agreed to investigate the potential sources of PFAS contamination and research potential legal remedies that could provide relief to these clients. Based on that

investigation, the firm believed it was viable to bring tort claims (products liability, negligence, nuisance, and trespass) against the manufacturers of aqueous film-forming foam ("AFFF") made with PFAS.

- 7. The firm initially filed cases on behalf of clients in Florida and Massachusetts, but they were then transferred to this Court following the Judicial Panel of Multidistrict Litigation's establishment of MDL 2873 for coordinated and consolidated pretrial proceedings pursuant to 28 U.S.C. § 1407. *In re Aqueous Film-Forming Foams Prods. Liab. Litig.*, 357 F.Supp.3d 1391, 1392 (JPML 2018). Since that time, the firm has filed nearly 200 similar PFAS cases that have been transferred to MDL 2873.
- 8. On March 20, 2019, the Court appointed me as Co-Lead Counsel for MDL 2873 along with Michael A. London and Paul Napoli. See CMO 2. I have also recently been appointed Class Counsel for the DuPont Entities settlement. Given my leadership positions, I have personally participated in nearly every aspect of the litigation in this MDL.

ESTABLISHMENT OF SETTLEMENT TEAM AND NEGOTIATION TEAM

9. In the Spring of 2020, I began to devote a substantial amount of my time to preparations for settlement negotiations. Based on my experience settling similarly complex cases, there was a lot of foundational work that had to be done in preparation of anticipated settlement negotiations. While there was little interest in settlement discussions at this time, the Co-Leads were hopeful that settlement discussions would one day ensue and wanted to be prepared. The first thing I did was enlist the assistance of PEC member Christina Cossich and her partner Phil Cossich (the "Resolution Team"). The three of us began to do the background work to lay the foundation for anticipated settlement negotiations. All the actual negotiations would be conducted by myself and the other two Co-Leads (the "Negotiation Team").

10. At the outset, it was critical to understand the DuPont Entities' potential liabilities before beginning settlement negotiations. Although the DuPont Entities were believed to be major players in the PFAS market, discovery revealed them to occupy only a small portion of the AFFF market. The work to define DuPont's "share of the market" or "liability share" began in the Summer of 2020, and was refined over the subsequent 20 months with assistance from members of the Market Share Committee in connection with other litigation committees, as well as the Negotiation Team. This analysis formed the basis of the Negotiation Team's conclusion that DuPont bore a liability share of 3%-7%. The DuPont Entities made only the component parts used by other manufacturers to produce AFFF, raising proof challenges at trial, including product identification and proximate causation. Settlement expectations were also tempered by the facts that certain of DuPont's products were relatively less harmful to the environment using short-chain chemistries, and, unlike 3M's "signature" branched PFOA, DuPont's linear PFOA is indistinguishable in the environment from that produced by any other manufacturer, making product identification and causation, not impossible, but more difficult. These litigation risks favored settlement because DuPont could have deployed these facts to support legal defenses and jury verdicts that could have eliminated or limited their liability.

COLLECTION OF PFAS DETECTION DATA NATIONWIDE

11. Because the MDL Court set its primary focus on a Bellwether process for PWS, the Resolution Team focused its efforts on the impacts of PFAS to PWS nationwide. It was important to collect as much data as possible to establish a Damages Model to be used in negotiations, define the Class that would likely be required by a settling defendant(s), identify Class Members, and assist with an eventual allocation of settlement funds.

¹ See ECF 3393-2 (as amended); ECF 3393 at 5-7.

12. To assist in the task of collecting nationwide PFAS data, the Resolution Team retained Mr. Rob Hesse of Soil Water Air Protection Enterprise ("SWAPE"), an expert in environmental site assessments and remedial investigations, as well as data acquisition, environmental database management and geographic information systems used in complex environmental cases. Mr. Hesse first collected the federal PFAS data generated through UCMR 3.2 Because the detection limits required by UCMR 3 were significantly higher than today's testing analytical technology, the Resolution Team understood that UCMR 3 likely did not capture a majority of the PWS with PFAS contamination. As a result, the Resolution Team designed a strategy to supplement the limited federal data by capturing all publicly available state PFAS data. Mr. Hesse and the Resolution Team researched and identified each state agency that collected PWS' testing data for PFAS and then developed a strategy to obtain the PFAS data from each identified state agency. Some states had PFAS data available online, but most required formal requests for production of the data. The Resolution Team spent numerous hours working with Mr. Hesse to request records, follow up on requests for records, and request updates to datasets. Datasets arrived in different formats, contained varying amounts of information, and reported varied numbers of PFAS analytes. Hundreds of hours were spent compiling and assimilating the datasets into one uniform Master PFAS Detection Dataset that contained a row for each PWS' Impacted Water Sources --- i.e., each individual groundwater well, surface water system, and/or treatment plant with a PFAS detection. Once the data was compiled into the Master PFAS

² "UCMR 3" refers to the Third Unregulated Contaminants Monitoring Rule, which required PWS to test for six PFAS compounds in 2012 to determine how broadly these contaminants appeared in PWS. See EPA, Third Unregulated Contaminant Monitoring Rule, Fact Sheet for Assessment Monitoring (List 1 Contaminants), available at https://www.epa.gov/sites/default/files/2016-05/documents/ucmr3-factsheet-list1.pdf (last accessed September 30, 2023).

Detection Dataset, the Team used EPA's SDWIS database³ to populate additional information about each PWS, including Population Served, Activity Status, PWS Classification (Community Water System, Non-Transient Non-Community Water System, Transient Non-Community Water System), and Owner Type (federal government, state government, local government, private, etc.). This enormous undertaking began in February 2021 and continued through May 2023 as more datasets were generated across the country and existing data was continuously supplemented. This Master PFAS Detection Dataset is the most robust collection of PFAS detections in PWS in existence. Not even the EPA has assembled this type of dataset for PFAS contamination.

USE OF DATASET TO CREATE DAMAGES MODEL AND PRESENTATIONS

13. The Resolution Team spent hundreds of hours working with experts to craft the damages model and numerous presentations detailing the damage model that were used in negotiations. The Team and experts held numerous in-person and remote meetings to study the Master PFAS Detection Dataset and evaluate how it should shape and inform the settlement discussions. Through these sessions, the Resolution Team worked with Mr. Hesse's colleague at SWAPE, Dr. Paul Rosenfeld,⁴ to determine the likely extent of PFAS in PWS across the country, estimate the likely range of rates of PFAS detections in PWS that would be required to test in the future under UCMR 5,⁵ and estimate the total range of costs to treat these identified and estimated

³ EPA maintains information regarding PWS in its Safe Drinking Water Information System (or "SDWIS"). See EPA, Safe Drinking Water Information System (SDWIS) Federal Reporting Services, available at https://www.epa.gov/ground-water-and-drinking-water/safe-drinking-water-information-system-sdwis-federal-reporting (last accessed October 1, 2023).

⁴ Dr. Rosenfeld is a consulting-only expert.

⁵ "UCMR 5" refers to EPA's Fifth Unregulated Contaminant Monitoring Rule, published on December 27, 2021. *See* EPA, *Fifth Unregulated Contaminant Monitoring Rule*, available at https://www.epa.gov/dwucmr/fifth-unregulated-contaminant-monitoring-rule (last accessed September 30, 2023).

Impacted Water Sources. These estimated damages were crucial in creating an extensive damage model for use in the initial settlement discussions with the DuPont Entities.

14. The Resolution Team used the Master PFAS Detection Dataset to create presentations for the Negotiation Team throughout the course of the negotiations. These presentations were particularly effective because they provided statistics of likely numbers of PFAS impacted PWS and the populations and classifications of the PFAS Impacted PWS.

USE OF MASTER DATASET TO CREATE CLASS DEFINITION

15. Analysis of the Master PFAS Detection Dataset allowed the Resolution Team to fully understand the various owners, water source types and classifications that would need to be addressed in a Class Definition. The Resolution Team and experts understood that the Class of affected PWS would include those who had already detected PFAS and those who would soon be required to test for PFAS; because the Dataset contained information about various sizes and types of PWS, it shaped the ultimate Class Definition agreed upon with the DuPont Entities.

CREATION OF ALLOCATION PROCEDURES

16. The Resolution Team then took on the Herculean task of developing the Allocation Procedures to equitably divide settlement funds among Class Members. The Resolution Team drafted its first version of Allocation Procedures in early 2021, but it continued to be analyzed and refined until July 2023. After each refinement, the Resolution Team met for weeks at a time over a two-year period to critique, test, simulate, and continuously improve its fairness and objectivity. This process required numerous conference calls, virtual calls, and in-person meetings in New York, Texas, Florida, Louisiana, and California. The Resolution Team also had numerous conversations with the settlement counsel representing the DuPont Entities to ensure that all parties agreed that the Allocation Procedures were fair and objective.

17. The Resolution Team decided that the formulas in the Allocation Procedures must be objective and based on the two real-world factors considered by engineers to design PFAS treatment systems: flow rates and PFAS levels, which drive both capital costs and operation and maintenance costs for treatment systems. To assist in understanding how these factors relate to each other and how to incorporate them into a mathematical formula, the Resolution Team retained Dr. Michael Trapp and Dr. Prithviraj Chavan, both of Atkins Global, an engineering firm that designs water supply infrastructure including contamination treatment systems. The Resolution Team worked with Dr. Trapp and Dr. Raj for months developing mathematical formulas that would be used in the Allocation Procedures to score each Impacted Water relative to all others. These experts and the Resolution Team utilized EPA's PFAS-cost curves, scientific publications, and their own professional experiences to draft and refine these formulas. The Resolution Team also incorporated various "bumps" into the Allocation Procedures to increase an Impacted Water Source's score if it met certain criteria.

CREATION OF CONCEPTUAL MODEL FOR ALLOCATION

18. As the Resolution Team was developing the Allocation Procedures, it was important that each rule or revision was able to be properly vetted, so the Resolution Team worked with Mr. Hesse and Dr. Trapp to repurpose the Master PFAS Detection Dataset into a Conceptual Model. The Master PFAS Detection Dataset already contained the Impacted Water Sources' PFAS levels, however it lacked flow rate data. The Resolution Team worked with the experts to come up with reasonable estimates for flow rates based on the population data already in the Master PFAS Detection Dataset. Once the Conceptual Model was in working form, the Resolution Team utilized it constantly to run simulations as it developed the Allocation Procedures. The Conceptual Model was critical in the development of the Allocation Procedures and allowed the Resolution

Team the ability to demonstrate proof of concept as it was developed. The Resolution Team also met virtually and in-person on occasion with the Negotiation Team to keep the negotiators up to date on its activities, strategy, work and results.

BASELINE TESTING

- Baseline Testing. The concept of Baseline Testing was pivotal in settlement negotiations because it solved the problem presented by PWS with some Water Sources that had detected PFAS and other Water Sources that had not. This concept was particularly significant as it allows Class Members to maintain their future claims for water sources that do not currently have a PFAS detection. The Negotiation Team worked with the DuPont Entities to draft the specific Baseline Testing language that appears in the DuPont Settlement Agreement. Once Baseline Testing became part of the Settlement Agreement, the Resolution Team met with various PFAS laboratories to determine which would be best suited to take on large-scale PFAS water analysis on behalf of Class Members required to perform Baseline Testing. The Resolution Team negotiated with the laboratory so that Class Members would receive reduced prices and expedited sample analysis. The Resolution Team also worked with the laboratory to create a website and hotline dedicated to assisting Class Members with Baseline Testing.
- 20. Resolution Team work alone, as described above to prepare for the eventual negotiations, involved hundreds of conference calls, virtual calls, and in-person meetings over a period of three and a half years, all conducted during a global pandemic. The work of the Resolution Team was highly technical, comprehensive, and critical to the success of the settlement with the DuPont Entities.

EARLY DISCUSSIONS WITH DUPONT

21. In the Spring of 2020, the Negotiation Team began to have preliminary settlement discussions with DuPont company representatives. It was made clear at this time that any settlement would include not only DuPont, but also Chemours and Corteva. At the outset, the discussions centered on resolving most of the types of Plaintiffs in the MDL. While various Term Sheets were exchanged, an agreement never materialized. Later in 2020 and at the beginning of 2021, the Negotiation Team began having discussions with DuPont's national settlement counsel. Shortly after those discussions began, it was clear that the DuPont Entities wanted to focus settlement discussions on resolving the PWS and that a class resolution would be needed to provide as much finality as possible.

ADVANCED DISCUSSIONS WITH THE DUPONT ENTITIES

22. In the Winter to Spring of 2022, the DuPont Entities expanded their active negotiation team to also include different national settlement counsel for each of the companies -- DuPont, Chemours, and Corteva, rather than allowing counsel for DuPont, Kirkland & Ellis, to maintain the only outwardly facing rile with the Negotiation Team. The participation of three different lawyers and law firms, representing three different boards of directors, complicated negotiations. Over the next year, the Negotiation Team (individually and as a group) had continuous calls and a number of in-person meetings in New York with the DuPont Entities' counsel. These discussions centered on the scope of the class, class definition, amount of consideration, scope of the release and many other terms contained in the Draft Master Settlement Agreement. These discussions were contentious, but professional, with each side aggressively protecting their clients' interests. There were times when the negotiations would break down and

pause for several months. Despite these intense negotiations spanning over two years, the Negotiation Team was unable to reach a comprehensive settlement with the DuPont Entities.

23. During the course of these discussions, PFAS was the subject of several major EPA actions. These actions affected negotiations in real time. For example, during one of the mediation sessions, EPA announced its new, lower health advisory levels ("HAL"s) ⁶. for PFOA and PFOS, exponentially reducing the levels of these compounds considered acceptable for exposure via drinking water.⁷ Shortly thereafter, the EPA announced in UCMR5 that it would require PWS serving over 3,300 people to test for 29 PFAS analytes at extremely low detection levels between the years of 2023-2025. This would undoubtedly increase the number of PWS that would detect PFAS. Additionally, in the Spring of 2023, EPA announced proposed new drinking water standards for both PFOS and PFOA and a Hazard Index for 4 other PFAS chemicals.⁸ It became clear these actions would have to be accounted for in both the size of the negotiated class, the class definition and the allocation. After these actions, additional settlement funds were needed to address the scope of the PWS that would be impacted by PFAS and the fact that PWS with very low detections which were thought to be benign were now required to be removed from drinking water. The ever-changing regulatory landscape added to the complexity of the negotiations.

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⁶ EPA, *Technical Fact Sheet: Drinking Water Health Advisories for Four PFAS (PFOA, PFOS, GenX chemicals, and PFBS)*, available at https://www.epa.gov/system/files/documents/2022-06/technical-factsheet-four-PFAS.pdf (last accessed October 7, 2023).

⁷ The parties were actually in mediation when the HALs were announced. The Negotiation Team had warned that if the HALs adopted extremely low levels as anticipated, the scope of the negotiations would be altered. Sure enough that occurred, and the settlement discussions were halted until the parties could re-group.

⁸ EPA, *Per- and Polyfluoroalkl Substances (PFAS), Proposed PFAS National Primary Drinking Water Regulation*, available at https://www.epa.gov/sdwa/and-polyfluoroalkyl-substances-pfas (last accessed September 29, 2023).

CHALLENGES OF RESOLVING PWS CLAIMS AGAINST DUPONT

- 24. The particular circumstances of the DuPont Entities' participation in the PFAS market further complicated negotiations. Importantly, the DuPont Entities never manufactured AFFF itself; rather, they made component parts used by other manufacturers to produce AFFF, raising proof challenges at trial, including identifying which AFFF products contained their components and demonstrating that the DuPont Entities failed to adequately warn on the proper use and/or disposal of their fluorosurfactants given that they have no privity with AFFF end users. Some of DuPont's products were also relatively less harmful to the environment: one component only moderately degraded to PFOA, while another was a safer C6-based product. And the DuPont Entities did not sell products to the Department of Defense ("DOD") which used AFFF at military bases and led to much of the PFAS groundwater contamination at issue in this MDL. Moreover, unlike 3M's "signature" branched chemistry, DuPont's linear PFOA is indistinguishable in the environment from that produced by any other manufacturer, making product identification and causation difficult. DuPont could have deployed these facts to effectively support legal defenses and jury verdicts that would have eliminated or limited their liability.
- 25. The complicated transactional history of the DuPont Entities also presented concerns about the companies' solvency. Most plaintiffs alleged that DuPont created Chemours and improperly shifted PFAS liabilities to Chemours, which was undercapitalized to bear those liabilities. Until the fraudulent transfer issue is resolved, Chemours' bankruptcy remains a risk of unknown magnitude.
- 26. Balanced against those factual and legal uncertainties were known problems facing PWS. If we were forced to litigate each of the 12,000+ PWS cases on an individual basis, recovery for each would be delayed in litigation for years, and possibly denied altogether. And at the same

time, PWS would be subject to impending and increasingly-strict drinking water standards as signaled by federal and state agencies. Timely resolution was particularly important and would be impossible but for a class resolution.

FORMAL MEDIATION

- On October 26, 2022, the Court appointed Judge Layn Phillips (ret) as Mediator to oversee the settlement discussions. The appointment of Judge Phillips also preceded the start of the first PWS Bellwether trial involving the City of Stuart scheduled to start on June 5, 2023. Under the oversight of Judge Phillips and his staff, the Parties met numerous times in person in New York, attended numerous virtual mediations, and participated in phone conferences. Additionally, each party met separately with Judge Phillips numerous times. The Parties also met without Judge Phillips on a number of occasions, in person, by Zoom, and by phone. Both with and without Judge Phillips, sessions were conducted on weekdays, weekends, and holidays. From March through May of 2023, these sessions were ongoing and continuous, occupying substantial time. The Negotiation Team spent hundreds of hours preparing for and attending these sessions as well as significant follow-up work and research responding to issues raised during these sessions.
- 28. During the course of the mediation, the parties worked incredibly hard to agree on a structure that would not only compensate those PWS that had already detected PFAS but also those that had not detected it yet but were required to test under either federal or state law. This is set forth in the establishment of both Phase One and Two as part of the Class Definition. Additionally, the Parties negotiated exclusions from the Class Definition. The Parties also worked on a complex structure that addresses which PWS water sources are impacted now and those that are not impacted as of yet. This is set forth in the Baseline Testing requirements. The Settlement

also provides circumstances in which Impacted Water Sources can receive additional monies from the Supplemental Fund for higher detections and/or new or lower state or federal standards that may occur through 2030. The Negotiation Team also spent significant time negotiating claims that are carved out of the Release. Many PWS are facing or will face damages associated with airports, wastewater, and/or stormwater. These claims that are unrelated to drinking water are preserved. It should be noted that the DuPont and 3M settlements involved overlapping and intertwined work. It became clear that both defendants wanted finality for water sources that had current detections of PFAS and those that did not yet have detections but were required to test. Preparation delineating the scope of national PFAS contamination and estimating the costs of testing and treating all PWS benefited the presentations to and discussions with both 3M and DuPont. Hours spent working with the experts to understand the Master Dataset and to refine Allocation Procedures served both negotiations. Analysis of the types and sizes of PWS and consideration of the bounds of the Class Definition and its exclusions informed both settlement structures. The Allocation Procedures for both settlements are nearly identical even though the negotiations were entirely separate. This work and these hours are inextricably intertwined and cannot be allocated to one settlement or the other.

29. Starting in November of 2022 up until the Stuart Trial date in the Spring of 2023, the negotiations with both the Dupont Entities and 3M were intense, highly focused and happening at the same time. This required both the Resolution Team and the Negotiation Team to work day and night and weekends to keep up with the pace of simultaneous negotiations, The Negotiation Team would literally move from mediation to mediation. This further underlines the fact that the work to accomplish these settlements at the same time was inextricably intertwined.

SETTLEMENT AND MOTION FOR PRELIMINARY APPROVAL

- 30. On June 1, 2023, the Parties signed a Memorandum of Understanding that included certain material terms of the proposed Settlement, though other issues remained unresolved. Thereafter, Judge Philipps and his team continued to moderate multiple discussions with Counsel for the Parties to resolve the outstanding issues. With the help of Judge Phillips, the Parties reached agreement on the remaining issues and executed the Settlement Agreement on June 30, 2023.
- 31. The City of Camden class action complaint was filed in June 2023, and the Law & Briefing Committee prepared the motion for preliminary approval working around the clock over the summer and through the July 4th holiday and under incredibly short deadlines because of the seven day requirement of the motion to be filed from the date of the MSA, which was negotiated in order to ensure that the settlement funds could be tendered to the Class sooner, and therefore available to earn interest to benefit the class. Contemporaneously with much of the final negotiations in the mid-spring 2023, the Law & Briefing Committee researched Fourth Circuit law and drafted the necessary pleadings. The Co-Leads embarked on the daunting task of hiring administrative service providers. After interviewing several candidates for each position, we hired a Notice Administrator, a Special Master, a Claims Administrator, and an Escrow Agent.
- 32. Members of the PEC have worked closely with the Notice Administrator to ensure timely and sufficient notice to Class Members pursuant to the Court's Preliminary Approval Order and FRCP 23. The PEC has also worked with the Special Master and the Claims Administrator to set up a comprehensive, user-friendly Claims Process that includes a website, Claims Forms, user portal, and instructional information guiding Class Members in the use of each. PEC members are

preparing to make joint webinars with the Claims Administrators to further explain the Claims process. The PEC has also worked with the Escrow Agent and the Special Master to establish a QSF Settlement Fund and investment criteria for held funds.

WORK WITH STATES TO RESOLVE CONCERNS

33. Shortly after the Motion for Preliminary Approval was filed, a group of more than twenty States filed formal objections to various provisions of the settlement. In July and August 2023, the Negotiation Team spent hours nearly every day negotiating with the States and DuPont to resolve the States' objections. After intense negotiations, the parties agreed to make several changes to the Master Settlement Agreement to satisfy the States' collective concerns. Shortly after filing a Joint Consent Motion outlining the changes and signifying the States withdrawal of their objections, the MDL Court granted Preliminary Approval on August 22, 2023.

OUTREACH AND COMMUNICATIONS WITH CLASS MEMBERS

34. After the Court granted Preliminary Approval, the work of the PEC in support of the settlement continued. Hundreds of hours have been spent preparing informational and educational materials describing the settlement to both lawyers and Class Members. Resolution Team in conjunction with the Communications Committee worked with consulting experts to use the Conceptual Model to generate the Estimated Allocation Range Tables to assist Class Members in estimating their allocated awards for each impacted water source. The PEC has prepared and presented PowerPoint lectures, recorded and posted video webinars, hosted PEC meetings, written "white papers," and posted information to two websites, www.PFASWaterSettlement.com, and www.AFFF-mdl.com. These websites contain a link where Class members and their counsel can set up appointments to discuss any questions they may

⁹ ECF 3620.

have about any aspect of the settlement. Additionally, a number of PEC members have or will present at both legal and water industry sponsored seminars outlining the significant benefits of the settlement. Many PEC members field calls from lawyers across the country who ask about the details of the settlement and how to evaluate its benefit to class members. PEC members are assigned to meet with individual counsel who seek to better understand the allocation procedures and potential recovery. I expect this work to continue throughout the Claims Periods.

WORK WITH EXPERTS ON FEE STRUCTURE

35. Over the last year, the Negotiation Team/Co-Leads have worked closely with renowned fee experts to design a fee structure that fairly treats the multitude of lawyers that have devoted their lives to these cases and these Class Members. Many hours of calls were conducted with the fee experts describing the settlement in detail. It is only after many hours of consultation that the fee structure being proposed was developed with the assistance of the legal experts.¹⁰

PEC APPROVAL OF THE FEE STRUCTURE

36. On September 21, 2023, the PEC convened an in-person meeting in Miami. During that meeting, I presented the proposed Fee Structure to all members of the PEC. After a comprehensive discussion, the PEC members supported the fee structure and expressed that it was a reasonable request.

CONCLUSION

37. The DuPont Entities' PWS settlement is one of the most comprehensive and complex drinking water settlements in American history. Such an achievement is possible only because of the confluence of work by highly-skilled attorneys on the Resolution Team, Negotiation

¹⁰ See Declaration of Brian Fitzpatrick, submitted in support of Class Counsel's Motion for Attorneys' Fees and Costs.

Team, and Trial Team. It is the result of thousands of hours of work by many, including the PEC and many of its related Committees. 11 The skill, dedication and sacrifice of many lawyers who worked on this settlement cannot be overstated. Many lawyers sacrificed their time away from other cases and their families to accomplish an historical result that will provide much needed funds to Class Members who in turn will provide safe drinking water to millions of Americans. The DuPont Settlement in combination with the 3M Settlement have been hailed as two of the most important settlements in American history. Clean drinking water benefits young and old, in this generation and in those to come.

I declare under penalty of perjury under the law that the foregoing is true and correct.

Executed this 13th day of October 2023, at Dallas, Texas.

Scott Summy

Baron & Budd, P.C.

3102 Oak Lawn Avenue, Suite 1100

Dallas, Texas 75219

¹¹ See Declaration of Michael London, submitted in support Class Counsel's Motion for Attorneys' Fees and Costs.

EXHIBIT E

UNITED STATES DISTRICT COURT FOR THE DISTRICT OF SOUTH CAROLINA CHARLESTON DIVISION

MDL No. 2:18-mn-2873-RMG

IN RE: AQUEOUS FILM-FORMING FOAMS PRODUCTS LIABILITY LITIGATION

This Document relates to: ALL CASES

DECLARATION OF GARY J. DOUGLAS IN SUPPORT OF CLASS COUNSEL'S MOTION FOR ATTORNEYS' FEES AND COSTS

I, the undersigned, GARY J. DOUGLAS, respectfully declare, under penalty of perjury, that the following are true and correct, to the best of my knowledge, information, recollection and belief:

Declarant's Professional Background

- 1. I am a co-founding partner of the law firm Douglas & London, P.C. ("Douglas & London") with primary offices located at 59 Maiden Lane, 6th Floor, New York, New York 10038.
- 2. I am licensed to practice law in the State of New York, in the United States District Courts for the Southern and Eastern Districts of New York, and the State of Pennsylvania.
- 3. Over the course of my three-plus decades as an attorney, I have tried hundreds of cases, including as lead trial counsel in some of the most significant mass tort litigation over the last several decades, the results of which have assisted in the recovery of billions of dollars in settlements. Some of the more notable cases I have tried include individual product liability cases,

such as one of the very first cases to be successfully tried against the tobacco industry (at the time it was only the third such plaintiffs' verdict in the nation and the first in the State of New York) (Frankson, et al., v. Brown & Williamson Tobacco Corp., et al., Case No. 24915/00 (N.Y.S.), and the trials of many other mass tort cases including both pharmaceutical and medical device MDL bellwethers, such as the first successful plaintiffs' verdict in the Fosamax litigation (In re Fosamax Prods. Liab. Litig., MDL No. 1789); the first successful plaintiffs' verdict in the Xarelto litigation (In Re: Xarelto Prods. Liab. Litig., Case No. 160503416); the first successful plaintiffs' verdict in the nation against an automobile manufacturer for a defective airbag (Lyzetto Crespo, et al. v. DaimlerChrystler Corp., Case No. 97-cv-8246 (S.D.N.Y); and, more recently, serving as Co-lead trial counsel in the first three PFAS cases ever to go successfully to verdict on behalf of individual plaintiffs (In re: E. I. du Pont de Nemours & Co. C-8 Personal Injury Litig., MDL No. 2433).

- 4. Your declarant was also appointed Class Counsel by Judge Edmond A. Sargus to the PFAS medical monitoring class action case currently pending in the United States District Court for the Southern District of Ohio (*Kevin Hardwick v. 3M Co., et, al.*, Case No.2:18-cv-1185).
- 5. Given my years of experience as a trial lawyer and success in PFAS litigation particularly, ¹ I was appointed Co-Chair of the Science Committee by the Plaintiffs' Executive Committee ("PEC") in MDL No. 2873, along with Scott Summy of Baron & Budd, P.C., Christina Cossich of Cossich, Sumich, Parsiola & Taylor, and Robert Bilott of Taft, Stettinius & Hollister,

¹ Despite the prior PFAS experience of both myself and my firm generally, which provided significant institutional knowledge concerning PFAS as a result of the tens of thousands of hours our firm committed to prior PFAS litigation, the time and cost savings to the MDL by virtue of our familiarity with documents previously produced in prior PFAS litigation, and despite utilization of multiple experts already retained and familiar with the subject matter overall, I wish to be clear

that neither myself nor my firm is submitting any time/hours for any of that prior MDL work.

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and ultimately also was selected to serve as Lead Trial Counsel for the *City of Stuart, Florida v.* 3M Co., et al. bellwether trial.

- 6. From virtually the inception of this MDL, I, along with a core team of lawyers referred to colloquially and internally as the "Strike Force," were tasked with the responsibility of developing the complex science indispensable to the prosecution of the case and the liability case against *each* of the primary defendants. Having been so directly involved in the prosecution of the aforementioned liability case, your declarant can therefore attest to the work described herein from *personal* knowledge and as a result of my direct participation and/or supervision of those efforts.
- 7. In order to carry out my charge, I, along with the Strike Force (the "core team") and others, held regularly scheduled calls and/or meetings, often on a daily basis (sometimes several a day), or at a minimum on a weekly basis. Our efforts in this regard began at the inception of the MDL with preparation for the PEC's Science Day presentation originally scheduled for September 2019, and continued for over four years, up to and including the preparation of the first bellwether case for trial. As the Court knows, preparation for the *Stuart* trial continued until literally the eve of that trial when counsel was advised to stand down at approximately 8:00 pm on Sunday June 4, 2023, the evening before jury selection was scheduled to begin, in order to allow settlement discussions to proceed. However, up until that point, the Strike Force's work encompassed countless meetings with witnesses, experts, and consulting scientists; preparation and review of expert reports; depositions; trial preparation; dispositive motion practice for the first bellwether

² This core team, a/k/a the Strike Force, was made up of members of other PEC- appointed committees such as the Science Committee and Law & Briefing Committee, and included (and

committees such as the Science Committee and Law & Briefing Committee, and included (and continues to include), your declarant, Scott Summy, Neil McWilliams, Wesley Bowden, Christina Cossich, Philip Cossich, Rebecca Newman, Frederick Longer, Carla Burke Pickrel, Tate Kunkle,

trial case; bellwether selection and discovery; extensive government contractor defense discovery and briefing in which I personally participated and ultimately served as co-lead for the oral argument; and oversight of every aspect of the entire trial preparation process for *Stuart* until the very eve of jury selection.³

- 8. Long before Science Day itself, the Strike Force began what became regularly scheduled weekly tutorial sessions with our experts wherein we were taught the relevant science and medicine necessary to effectively prosecute the case. These sessions were long and arduous, akin to perhaps graduate courses in environmental science, chemistry, chemical engineering, biology, and public health wrapped into one. Hours upon hours were devoted by all who attended these sessions as a resource and knowledge base to be utilized throughout the course of the litigation and to this day. While a great many of these tutorial sessions took place remotely by Zoom, when necessary the Strike Force would also meet in person with experts in New York, Boston, Miami, North Carolina, Columbus, San Diego, Oregon, Colorado, and in international cities including Amsterdam and Stockholm, to name a few.⁴
- 9. As the Court is well aware, MDLs and mass tort ligation require attorneys and professionals from law firms across the country to work together in concert towards one goal: to form, in essence, a law firm comprised of lawyers from across the nation, many of whom have never worked together before, but are dedicated to serving a common goal or benefit. With respect

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³ The work of the Strike Force in no way encompasses the entirety or magnitude of the work performed by the dozens of other common benefit lawyers who committed hundreds of thousands of combined hours indispensable to the prosecution of the case. These efforts include the Tier One document reviewers who poured through millions of pages of documents up through and including the work of leadership, the PEC members, and Co-Lead Counsel themselves.

⁴ It should not go unnoticed that much of this group's important work took place during a once in a century pandemic and carried out its charge despite extraordinary challenges.

to this core team, with whom I have worked closely over the last four-plus years, I can emphatically state that in all my years of experience, which is considerable, I have never worked with a more dedicated, competent, professional, or more talented group; one that has worked together with a remarkable cohesiveness, camaraderie, and singularity of purpose *rarely* seen in mass tort litigation (and I have been involved in many). This group of 14 people alone, in terms of total hours, together represent approximately 1/5 of *all* hours of work performed on behalf of the PEC between October 1, 2018 and August 22, 2023, 5 carrying out some of the PEC's most important work overall. In regard to their efforts, the group's sheer ability to work so well together cannot be understated, and in the view of your declarant, was of the highest quality, indispensable to the results obtained, and helped to significantly advance the benefit of the MDL's overall common good.

- 10. This declaration is therefore made from my personal knowledge and participation in some of the most important activities and work performed on behalf of the PEC, and is respectfully submitted in support of the Class Counsel's Motion for Attorneys' Fees and Costs ("Fee Application"). While it is impossible to completely summarize in one declaration the totality of the work performed by this core team and/or the PEC as a whole, I have attempted to describe below the critical highlights of our work over these last years based on my personal knowledge of same.
- 11. Finally, it is important to emphasize that all of the efforts with respect to each defendant were so inextricably intertwined that it is virtually impossible to parse out specific

⁵ Your declarant personally, along with the Court-appointed Special Master's office, totaled the hours submitted by each of the 14 members of the Strike Force, all of which were submitted in accordance with CMO 3. The total number of hours of these members represents roughly 1/5 of

the total 414,900.90 hours submitted by the PEC as a whole.

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efforts related to each defendant. The testimony and evidence with respect to the liability of any one defendant will almost always relate in some way to the liability of another. Documents and other evidence produced by one defendant often helped to buttress the liability as against another. For example, in one e-mail correspondence between DuPont witness Dr. Steven Korzeniowski and his DuPont colleague Charles K Taylor, they discuss their perspective that 3M's market withdrawal from C8 chemistries was not voluntary but rather "staged" (see Dep. Tr. of Stephen Korzeniowski, dated Sept. 11, 2020, at 341:18-348:10, discussing Ex. DL262, attached to Fee Application as Ex. M). This evidence helped plaintiffs build and establish the liability theme that 3M's withdrawal from the market was not as voluntary as they claimed and thus undermine 3M's contention that it was a good corporate steward for electing to phaseout of C8 chemistries. Congressional testimony from another DuPont witness, Daryl Roberts, confirmed in his deposition in this litigation, helped to establish the PEC's broader claim against 3M, when he stated that, "...the vast majority of PFAS contamination in the United States is caused by the discharge of firefighting foam containing PFOS," thereby implicating 3M as it was well-established that 3M was the principal manufacturer of PFOS worldwide (see Testimony of Daryl Roberts, Hearing before the House Oversight and Reform Committee Subcommittee on Environment, dated Sept. 10, 2019, attached to Fee Application as Ex. N).

12. Conversely, testimony of 3M witnesses often helped to establish liability against DuPont. For example, Dr. John Butenhoff, 3M's chief toxicologist for decades, testified that he would often share 3M's internal animal studies and toxicology data with DuPont, thereby implicating DuPont's knowledge of PFOA toxicity (*see* ECF 2597-6, Dep. Tr. of John Butenhoff, dated July 23, 2020, at 155:2-156:2). Similarly, Anne Regina, testifying on behalf of Kidde/National Foam, acknowledged in her deposition that she had access to all of 3M's decades

worth of toxicology data (*see* ECF 2597-17, Dep. Tr. of Anne Regina, dated Dec. 1, 2020, at 191:11-193:9), arguably establishing therefore that Kidde/National Foam had notice of the potential harms of PFOA and other C8s in *their* foams. Furthermore, with respect to Kidde/National Foam, their liability was clearly intertwined with DuPont, from whom they purchased the C8 surfactant used in their AFFF.

- 13. More generally, the liability of *any* foam manufacturer (e.g., Tyco, Chemguard, National Foam, Buckeye, etc.) who purchased C8-containing surfactants from any surfactant manufacturer (e.g., Dynax or DuPont), who in turn purchased their raw ingredients to make C8-based surfactants from any raw materials supplier (e.g., Clariant), are all inextricably intertwined.
- 14. In fact, your undersigned can provide the Court with a real-world example demonstrating the inextricable nature of the liability between defendants from past personal experience. As mentioned above, your undersigned tried several C8 MDL cases to verdict, where the only defendant was DuPont. Nonetheless in those cases we presented a plethora of evidence from 3M's files in order to establish our case against DuPont, including, for example, the several 3M monkey and rat studies conducted by 3M in the 1970's, 80's and 90's that the Court no doubt recalls seeing in this MDL as offered against 3M, and a 1997 3M MSDS noting that PFOA causes cancer to successfully prove our case against *DuPont*.
- 15. As demonstrated by just these few examples, and based on my knowledge of this litigation as a whole, I can broadly state that the evidence with respect to one defendant is too often so patently intertwined with another that the work of the PEC cannot and should not be disaggregated, defendant by defendant.

Depositions and Expert Witness Discovery

- 16. Over the course of this litigation, the PEC conducted 82 depositions of corporate witnesses, 7 government witness depositions, and 12 defense expert witness depositions, and defended 14 plaintiff expert witnesses in their depositions and 56 depositions of bellwether plaintiff witnesses, many of them lasting two to three days. As part of your undersigned's role as Co-Chair of the Science Committee, I, along with the core group, oversaw and coordinated strategy for virtually the entire deposition process pertaining to science and liability, by participating in those depositions as either first or second chair examiners, and/or participating in the preparation process. In addition to the preparation leading up to a deposition, regardless of who was examining, the core group, along with the examining attorneys, would continue to meet during breaks in the deposition, in a virtual breakout room, to discuss confidential strategy. Therefore, your declarant has first-hand knowledge of the enormous effort undertaken by the *entire* team.
- 17. Your declarant alone, with the assistance of my firm's Senior Associates, Rebecca G. Newman, Lara J. Say, and Tate J. Kunkle, and Junior Associate Anne Accettella, served as principal or second examiner in over 30 depositions of corporate witnesses, four (4) government witness depositions, and two (2) defense expert witness depositions, defended six (6) plaintiff expert witnesses in their depositions and defended 13 bellwether plaintiff witness depositions. Your undersigned was also integrally involved in the strategy of 22 depositions of corporate witnesses, two (2) government witness depositions, the depositions of eight (8) plaintiff expert witnesses, three (3) defense expert witness depositions, and 17 bellwether plaintiff depositions.
- 18. It is also important to note that none of the aforementioned 82 depositions of corporate witnesses and seven (7) depositions of government witnesses were conducted as independent isolated events, but rather as part of the core team's well-coordinated, thoughtful

strategy designed to develop the case with the larger picture in mind. Accordingly, much planning went into not only preparation for each individual deposition but where each deposition we chose to take fit into the larger liability picture. Together, our core team worked to coordinate themes and subjects necessary to make our case, identify the important documents to be utilized, the witnesses to be deposed, and the order of such depositions, no matter who the witness, no matter who the primary examiner.

- 19. The core team spent hundreds of hours gathering the relevant information and documents for each witness, including determining the witness's role and relevant subject areas to cover, formulating outlines and areas of questioning, and organizing the documents into themes and subthemes to be utilized with each witness. There were often thousands of hot documents culled initially for us by first tier document reviewers from the millions of pages produced, which the core team then further reviewed and pared down to include only the most pertinent, relevant, and probative documents to be utilized at depositions. This process would often spur further searches conducted by core team members themselves based on word and subject matter terms in order to flesh out certain facts or themes of particular interest.
- 20. The team would then take on the laborious task of marshalling those documents into streamlined, comprehensive themes and subthemes that pertained to general liability, defendant-specific liability, underlying science, affirmative defenses (e.g., government contractor, as discussed further below), specific witnesses, specific bellwether sites, and/or damages. For your undersigned's depositions alone, the team created 40 core subject matter folders with multiple

⁶ While the PEC had the *opportunity* to take more depositions, the core team credo, unlike in too many MDLs where attorneys will take as many depositions as possible merely to pile up hours, was *quality over quantity*, and to make thoughtful, deliberate choices that served *only* the common benefit. Ergo the self-titled name "Strike Force" itself, which is intended to reflect our core

principles: precision, unwastefulness, efficiency, and results.

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subparts, in addition to hundreds more across dozens of witnesses. From there, the examiners, with assistance from members of the core and deposition teams, would create outlines for witnesses and topics based on strategy discussed with the larger deposition team, core team, and Science Committee as a whole.

21. The knowledge and testimony garnered and elicited from these dozens of depositions served as underlying support for the plaintiffs' extensive expert reports and briefing on multiple topics. Plaintiffs initially served nine (9) general reports and twelve (12) case-specific reports, and one (1) report with a general sub-part and three (3) case-specific sub-parts, as well as multiple supplemental reports as the regulatory landscape changed and trial approached. Defendants also identified 50 experts, and served nearly 80 expert reports and supplemental and/or rebuttal reports in total, all of which were carefully reviewed, summarized, and vetted. In addition, expert witness dossiers were prepared with respect to each defense expert. After the parties negotiated a fast-paced protocol for expert depositions, the parties conducted depositions of 26 expert witnesses, many of them lasting two to three days. In short, these reports and depositions required a vast effort and hundreds of hours combined from the expert team, of which I was a part, meeting with multiple experts, preparing and drafting comprehensive expert reports for 14 experts (some with multiple reports each), reviewing nearly 80 defense expert reports which itself required dozens of hours of intense research and serving additional discovery demands (e.g., regarding their total compensation from certain defendants), preparing experts for their depositions and defending them, and preparing and taking the depositions of defendants' experts. See Decl. of Wesley Bowden in Support of Class Counsel's Motion for Attorneys' Fees and Costs ("Bowden Decl.") for further detail.

The Government Contractor Affirmative Defense

- 22. As the Court is well aware, a large portion of the discovery in this case was devoted to the ever-looming issue of the government contractor affirmative defense. From the beginning of discovery, defendants made clear that they viewed the government contractor defense as a linchpin in their strategy that would potentially herald the dismissal of the entire litigation. Therefore, a significant portion of the PEC's discovery efforts, and the core team in particular, were committed to this issue alone. Your undersigned can personally attest that over the course of years, the team devoted hours of virtually every single day preparing the case with an eye towards this preliminary hurdle.⁷
- 23. This encompassed the review of tens of thousands of pertinent documents, developing themes from those documents that focused on what the *government* knew and when regarding the harms of PFOA and PFOS as well as what *defendants* knew and when regarding PFOA and PFOS, and what information, if any, defendants disclosed to the government. These efforts also included the deposition testimony of dozens of witnesses elicited using the documents and developed themes, which eventually formed the factual basis for plaintiffs' briefing. This required a massive effort and, as the Court itself noted:

All of y'all have just done an outstanding job of marshalling what is incredible complicated information in a way that is digestible and understandable. I mean, I roll my eyes looking at what y'all put on the record, but I imagine that is like one-fiftieth of what y'all actually generated. And y'all have done whatever you can to try to glean it down, and I've tried to glean it down. And I just want to tell y'all that I just observe a lot of first-class lawyering here, and I want to commend all of y'all for that. (Tr. of Oral Argument, Aug. 19, 2022, 57:5-14).

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⁷ In fact, evidence was adduced with respect to the government contractor issue at the very first substantive deposition held in the summer of 2020, more than two years before the Court issued its decision, when 3M's Dr. Butenhoff was confronted with documents indicating that 3M's AFFF was manufactured in accordance with a "performance" specification, an issue obviously relevant to the government contractor defense. (*See* ECF 2597-6 at 251:5-253:5).

- 24. Certain documents and testimony discovered were especially key, and were even cited by the Court in its decision denying Defendants' motions for summary judgment, including:
 - a. The internal memorandum from the files of 3M lead toxicologist Dr. John Butenhoff, indicating that, "3M needed to replace 'PFOS-based chemistry as these compounds [are] **VERY** persistent and thus insidiously toxic." (ECF 2601, quoting from 3M BELL00827716).
 - b. The infamous "Foam Nasties" email from National Foam's chemist Anne Regina, in which she stated that "a respected industry expert told her that 'the common understanding of telomer-based fluorosurfactants is that they break down to carboxylates,' which included PFOA" (ECF 2601, quoting from Kidde_Defendants_00069655), or her testimony in which she conceded that it was well known as early as 2001 the telomer-based foams could degrade to PFOA in the environment (ECF 2597-17 at 232:15-21).
 - c. The oft-cited testimony of the original custodian of the AFFF Military Specification ("MilSpec"), Robert Darwin, regarding the issue of whether the MilSpec was considered a design or performance specification, and thus whether defendants had discretion in their respective AFFF formulations: "The way we've always looked at it was it was up to each manufacturer to come up with his own magic witch's brew to meet the performance requirements." (ECF 2601, quoting from Tr. of Robert Darwin at 46:23-47:2).
 - d. The President of the Fire Fighting Foam Coalition, Tom Cortina, reporting to its members that the EPA had accepted the proposal that telomer-based AFFF will not be part of the PFOA ECA process, "declaring this to be 'a major victory for FFFC and the telomer-based AFFF industry" (ECF 2601, quoting from AFFF-MDL-CHE-00005308). "As a result of the FFFC's efforts, the EPA, per Cortina, had adopted the position of the Telomer Manufacturers." (ECF 2601 at 27).
- 25. After compiling and honing that mountain of evidence, the briefing team set its collective mind to writing the first round of briefing (not to mention the letter briefing which proceeded the actual motion practice) focused on Prong 1 of *Boyle*, per the Court's order, even before receiving defendants' motion (i.e., Defendants' Motion for Partial Summary Judgement on the First Element of the Government Contractor Immunity Defense) on November 5, 2021. Again, the majority of the core team, Science Committee, and Law & Briefing teams spent many waking hours devoted to this effort over the course of many months. In addition to the briefing itself, your

undersigned along with members of the core and expert teams worked extensively with three experts (namely, Drs. Linda Birnbaum and Patrick Lowder, and Mr. Greg Walton) to draft declarations in support of focused portions of the opposition briefing that required expert knowledge and interpretation. See Decl. of Rebecca G. Newman in Support of Class Counsel's Motion for Attorneys' Fees and Costs ("Newman Decl.") for more detail.

- 26. Once the first round of opposition briefing was submitted just before Christmas of 2021, with replies coming on January 28, 2022, the team turned its focus to preparation for the hearing on Prong 1, originally set for March 25, 2022. Your undersigned can personally attest to the extensive preparation that ensued for the oral argument, including weekly conference calls and multiple in-person marathon meetings, to develop a cohesive and streamlined presentation of our argument, as well as an arsenal of facts, documents, visual aids, and testimony readied to respond to defendants' arguments and the Court's questions. In fact, the core team arrived in Charleston to meet at the Law Offices of Motley Rice on March 22, 2022 for intense preparation of the upcoming hearing. However, as the Court is well aware, that hearing was unexpectedly adjourned the night before due to a COVID diagnosis, which turned out to be fortuitous, allowing the Court to make the wise decision to expand the scope of the briefing to include all three *Boyle* prongs. See Newman Decl. for more detail.
- 27. After receiving the second round of briefing from the defendants (i.e., Defendants' Omnibus Memorandum of Law in Support of their Motion for Partial Summary Judgement on the Second and Third Elements of the Government Contractor Immunity Defense, Defendant 3M Company's Memorandum of Law in Support of Defendants' Motion, and Telomer MilSpec AFFF Manufacturers' Memorandum of Law in Support of Defendants' Motion), your undersigned and the core and briefing teams took the Court's order to heart and set out to write a new opposition

brief that encompassed the interrelated essence of all three *Boyle* prongs and addressed all three of defendants' briefs in an effective and streamlined manner. This massive briefing effort, underpinned by many months of focused discovery, ultimately led to what the Court characterized as, "the best briefing that I've seen in my dozen years on the bench." (Tr. of Oral Argument, Aug. 19, 2022, 57:4-5). See Newman Decl. for more detail.

- After the second round of briefing was submitted in June 2022, your undersigned and the government contractor team once again turned our focus to preparation for the oral argument set for August 19, 2022. We devoted almost two months to this effort, again holding regular virtual strategy meetings and multiple in-person sessions (including again arriving in Charleston days in advance of the hearing to meet in person at the Law Offices of Motley Rice) that included mock hearings, along with the creation and execution of dozens of demonstratives to be used at the hearing, which the Court ultimately asked to be produced, and were provided, on the docket. As the Court observed, "I could tell this was not a slap shot, put-together-at-the-last-moment situation for any of y'all." (Tr. of Oral Argument, Aug. 19, 2022, 57:20-21).
- 29. As the Court will remember, this extensive preparation led to an expeditious, engaged, substantively packed hearing that lasted almost three (3) hours (Tr. of Oral Argument, Aug. 19, 2022), the culmination of over two years of hard work. The Court ultimately issued its order denying the defendants' motion less than a month later, on September 16, 2022. (ECF 2601).
- 30. Considering that much of the discovery, deposition, and briefing process up until that point was bent towards this one pivotal issue, the wide-reaching, intensive nature of this team effort cannot be overstated.

Bellwether Process

- 31. Simultaneous with the government contractor efforts, your undersigned was also involved extensively in the bellwether discovery process. Your undersigned was in charge of supervising, along with others, the bellwether selection, which required reviewing dozens of potential case files an exhaustive screening process of internal discussions, meetings with clients and counsel, and expert consultations, leading to the selection of the initial 10 cases for Tier 1 discovery.
- 32. Once the Tier 1 group embarked on the detailed discovery process, your undersigned, along with the core team and others, held regular strategy meetings and expert consultations in order to facilitate closer examination of the cases. This portion of the bellwether process also involved review and production of thousands of pages of documents specific to each bellwether plaintiff, hours and hours of witness preparation for depositions, and defending depositions of 16 witnesses. Further, your undersigned and the Science Committee oversaw the conduct of complex sampling for all 10 bellwether cases for isomer profiling, which required the negotiation of a protocol with defendants. As the Court is aware from prior briefing, this sampling was critical in identifying the percentage of PFOA contamination in the water at each of the 10 bellwether sites attributable to each defendant by isolating, identifying, and quantifying branched and linear isomers. This method, spearheaded by Ms. Cossich of Cossich, Sumich, Pariola & Taylor, L.L.C., and Mr. McWilliams of Levin Papantonio, is akin to finding the fingerprints at a crime scene and involved complex calculations, science, and methodology, including a complex validation process that ultimately passed *Daubert* muster (ECF 3059).
- 33. After Tier 1 discovery was complete, your undersigned, the Bellwether and Science Committees, and the core team, along with leadership, undertook the detailed task of selecting the

final three (3) cases to move forward in the Tier 2 phase of discovery. Once plaintiffs had internally agreed on the Tier 2 cases, plaintiffs then entered the meet and confer process with defendants to agree on the case selection for a joint submission to the Court. The Court then reviewed the parties' proposal and selected the Tier 2 cases (i.e., *City of Sioux Falls v. 3M Co., et al.*; *City of Stuart, Florida v. 3M Co., et al.*; and *Town of Ayer v. 3M Co., et al.*) in its order dated October 13, 2021. (ECF 1931).

- 34. Over the approximately six months following that order, the bellwether team plunged deeper into the discovery process for those three (3) cases. Your undersigned and the other members of the team defended 40 additional depositions and took four (4) corporate witness depositions regarding case-specific AFFF sales, which required multiple meetings and hours of preparation with each witness.
- 35. Additionally, the team conducted site visits for each case in preparation for upcoming expert reports and motion practice. The Science Committee and expert team worked tirelessly with five (5) experts (i.e., Drs. Christopher P. Higgins and Jonathan W. Martin, and Messrs. Ronald K. Berryhill, Robert Johnson, and Anthony Brown) to research, compile, and draft expert reports in each of the three (3) Tier 2 cases, which were submitted on March 18, 2022. Defendants then submitted reports for 23 case-specific expert witnesses on April 29, 2022, with supplemental or rebuttal reports from seven (7) of those witnesses in the weeks following. The expert witness deposition process began in May 2022 and lasted the entire summer, comprised of 14 plaintiff expert witness depositions, which spanned 21 days of testimony, and 12 defense expert witness depositions. See Bowden Decl. for further details.
- 36. Finally, once the expert witness discovery process was complete for all three (3) Tier 2 cases, your undersigned, along with others from the Bellwether and Science Committees

and leadership, held internal discussions and met and conferred with defendants to propose an order for the three (3) bellwether trials, which ultimately resulted in the Court's selection of *Stuart* as the first trial on September 23, 2022 (ECF 2613).

Trial Preparation

- 37. As mentioned above, your undersigned was selected as Lead Trial Counsel for the *Stuart* case with Wesley A. Bowden of Levin Papantonio serving as Co-Lead. From the very moment *Stuart* was selected as the first bellwether trial case, Mr. Bowden and I, along with Frank Petosa of Morgan & Morgan and Nancy Christensen of Weitz & Luxenberg, counsel of record for the City of Stuart, and a Trial Team made up of close to 30 incredible dedicated attorneys, paralegals, and support staff too numerous to mention here, devoted their complete time and attention to ensuring that *Stuart* was trial-ready..
- 38. One of the first major efforts required of the Trial Team was dispositive motion practice. On December 2, 2022, defendants filed their omnibus *Daubert* motion and Motions for Summary Judgement (i.e., Defendants' Omnibus Motion to Exclude Plaintiff's Experts' Testimony consisting of eight (8) subparts; Defendants' Omnibus Motion for Summary Judgment; and another eight (8) defendant-specific motions for summary judgment). Your undersigned, along with Ms. Newman and Frederick Longer of Levin, Sedran & Berman, in particular, as well as other members of the Trial Team, oversaw the complicated effort of coordinating, drafting, and filing plaintiff's responses to these various motions by January 20, 2023. See Newman Decl. for further detail.
- 39. The Trial Team, along with leadership, then set to the task of meeting and conferring with defendants to negotiate a detailed protocol for exchanging exhibits, deposition designations, witness lists, pretrial motions, jury questionnaires, jury instructions, and pretrial briefs (*see* CMO

19G, ECF 2887), to meet the Court's deadlines for disclosures originally set forth in CMO 19F (ECF 2649).

- 40. Pursuant to that agreed upon schedule, the parties exchanged close to 7,000 exhibits each on March 1, 2023. Needless to say, the effort of compiling such an exceptionally comprehensive list of the evidence in this case, led by Ms. Say, required many long days and nights in the weeks preceding the exchange. Following the exhibit exchange, the Trial Team spent dozens of hours reviewing the defendants' disclosed exhibits. Your undersigned, along with Ms. Say, then focused on coordinating with members of the Trial Team responsible for witnesses to whittle down those 7,000 exhibits to an initial Core List of 500 exhibits served on defendants on March 31, 2023.
- 41. Simultaneous with the exhibit list project, designated members of the Trial Team, including your undersigned, also reviewed all general liability and *Stuart* case-specific depositions taken since the beginning of discovery in order to designate testimony to be potentially played at trial. After pouring through hundreds of hours of testimony, the Trial Team was able to condense dozens and dozens of depositions down to just 28 witnesses. These deposition designations were then exchanged with defendants on March 3, 2023. That portion of the Trial Team, overseen by your undersigned, then spent hours and weeks reviewing defendants' counter-designations, objections, and affirmative designations served on March 24, 2023, to serve plaintiff's counter-designations and objections on April 7, 2023. Defendants then served their further objections on April 17, 2023.
- 42. Once the Core Exhibit Lists and all deposition designations, objections, and counter-designations were disclosed by both parties, the extremely painstaking task of meeting and conferring began. A small contingent of the Trial Team, led by Stephanie Biel of Sher Edling

and overseen by your undersigned, met with defendants on an almost daily basis in order to further whittle down the designations and hundreds of objections lodged by defendants, a large portion of which were based without any merit whatsoever on Federal Rule of Evidence 602, in which the defendants claimed that every single document at trial required a "sponsoring witness" as a foundation for admissibility, even documents considered a business record under FED. R. EVID. 803(6).

- 43. Despite weeks of negotiations, defendants refused to budge from their meritless evidentiary objection positions until, as the Court is aware, the PEC was left with no choice but to seek judicial intervention by way of letter dated May 3, 2023 (ECF 3064), which resulted in the issuance of an order from the Court on May 4, 2023 regarding authenticity, Rule 602, and hearsay objections (ECF 285). Per the Court's order, the parties were ordered to appear at a hearing on May 12, 2023, with your undersigned and Mr. Bowden designated to argue on behalf of the plaintiff. By then, and in light of the Court's May 4, 2023 decision, defendants had withdrawn the vast majority of their reported Fed. R. Evid. 602 objections to but a handful of assorted objections.
- 44. In light of the Court's rulings and guidance at the hearing regarding exhibits and deposition designations, the Trial Team continued to work with defendants to cull the few remaining objections to a manageable few. We then revisited our own initial deposition designations. Through hours of review and ongoing internal discussions, the Trial Team, overseen by your undersigned and Mr. Bowden, along with others responsible for witnesses, was able to whittle down our designations to just 10 witnesses and a handful of total hours of videotaped deposition testimony plaintiff intended to potentially play at trial. It should not go unrecognized that in order to whittle down the final deposition cuts to but a handful of hours to be played at trial, the Trial Team had no choice but to go through hundreds of hours of deposition testimony.

- 45. Also during this time, the Trial Team fielded virtually constant ongoing discovery disputes with defendants, particularly focused on the issue of continued damages. This ongoing issue led to additional depositions that required many hours of preparation, including an additional fact witness deposition of Dave Peters, the City of Stuart's now retired Public Works Director, which was defended by your undersigned, as well as two additional depositions of expert witnesses (i.e., Messrs. Kevin Berryhill and Avram Frankel), overseen by your undersigned, three (3) days before jury selection.
- 46. At the same time the exhibit and deposition designation projects were ongoing, the Law & Briefing team members of the Trial Team, led by Mr. Longer of Levin Sedran and Berman, Ms. Newman of Douglas & London, Ms. Pickrel Burke of Baron & Budd, P.C., and Kevin Madonna of Kenndy Madonna, drafted and filed seven (7) motions *in limine* ("MIL"), overseen by your undersigned and led largely by Ms. Newman and Mr. Longer, on March 24, 2023, with responses in opposition to defendants' omnibus MIL comprised of nine (9) subparts, as well as a handful of defendant-specific MILs, due April 7, 2023. Another team, led by Mr. Longer, also focused on the drafting and meet and confer process for jury questionnaires, exchanged with defendants in March 2023 and jointly submitted to the Court on April 3, 2023, as well as jury instructions, exchanged with defendants on April 10, 2023 and submitted to the Court on May 8, 2023. Additionally, Ms. Newman and Mr. Longer led the effort of compiling plaintiff's comprehensive pretrial brief, served on May 19, 2023. See Newman Decl. for further detail.
- 47. From the day the Court selected *Stuart* as the first bellwether trial in September 2022, your undersigned and Mr. Bowden, along with Mr. McWilliams, Mr. Longer, Ms. Newman, Ms. Say, Mr. Petosa, and Ms. Christensen, to name a few from the team in particular, began intensive preparation and drafting of direct examinations of expert and fact witnesses, which

involved hundreds of hours of meetings with experts, composing multiple drafts and iterations of outlines for each witness, the creation of dozens of demonstratives (i.e., animations, boards, PowerPoints) that your undersigned and Mr. Bowden finalized and were prepared to utilize at trial.

48. In addition, in the weeks leading up to trial, your undersigned and Mr. Bowden worked tirelessly on opening arguments, with integral input and support from Mr. McWilliams and our associates, to present a linear, comprehensive, streamlined, understandable picture of the evidence to be put forth at trial.⁸ In that regard, the Court may recall that during the hearing held on June 2, 2023, the Friday before jury selection was scheduled to start, your undersigned requested two hours for the plaintiff's opening statement. The two-hour presentation your undersigned and Mr. Bowden were prepared to deliver was the result of dozens and dozens of iterations, edits, and hours and hours of preparation over a period of months wherein we workshopped and nuanced every word, gave mock presentations, honed it and then honed it some more, until it was eventually finalized. Given these efforts, it is worth underscoring that the two-hour presentation we were prepared to give represented just a fraction of the time that it took to

⁸ As noted earlier, the PEC work cannot and should not be disaggregated for each defendant. Thus, the Trial Team planned and prepared for a full-throttle trial against both 3M and the so called "Telomer defendants," the latter of which with respect to *Stuart* included DuPont, as well as Tyco/Chemguard and Kidde/National Foam. However, in the weeks leading up to the trial, and consistent with the Court's preference, the decision was made to dismiss certain parties whose contribution to the contamination in City of Stuart were negligible and therefore, on May 4, 2023, Tyco/Chemguard was given a full release (ECF 3069). Then on Sunday May 18, 2023, Mother's Day, the Trial Team was made aware that Kidde and its related entities (e.g., National Foam) had filed for bankruptcy and the case, therefore, was stayed as against those entities. With Kidde/National Foam out of the case, it no longer made strategical sense to proceed against DuPont given the interplay between the liability with respect to DuPont and Kidde/National Foam. As such, the tactical decision was made to sever DuPont. In addition, in view of the fact that the PEC was extraordinarily close to a global settlement with DuPont by this time, it seemed the logical and judicially expeditious decision. In any event, the team was poised until at least May 18, 2023 to present its compelling case against not just 3M but a telomer case as well against DuPont and Kidde/National Foam.

put that two-hour presentation together. The same process of honing and revising was applied to every direct examination and outline for every single witness, both lay and expert.

- 49. On May 25, 2023, your undersigned and Mr. Bowden, along with a few core members of the Trial Team, moved to Charleston, South Carolina for trial. The team spent the entirety of Memorial Day weekend, away from family, friends, and loved ones, diligently preparing for trial. The remaining members of the Trial Team arrived the following week and immediately set to work, occupying three (3) large war rooms. The entire team worked tirelessly around-the-clock on myriad necessary tasks and projects, including finalizing opening statements and direct examination outlines, preparation of witnesses, honing of trial exhibits, etc., until 8:00pm, Sunday evening, June 4, 2023, when your undersigned received a call from Co-Lead Counsel to stand down in order to allow settlement negotiations to proceed.
- 50. The Court might recall the final pre-trial conference and evidentiary hearing on June 2, 2023, when it must have been clear to the packed courtroom that plaintiff was not only ready to present a devastating liability case but was eager to do so.

Conclusion

51. As set forth above, your undersigned personally participated in and bore witness to the highest level of professional skill and services that contributed significantly to the progression of this litigation. The work of the core members of the Science, Bellwether, Expert, and Law and Briefing Committees, and ultimately the Trial Team, involved complex litigation-shaping issues that touched upon nearly every aspect of the litigation from inception through the eve of trial (and now beyond). The ability of the PEC, and especially the aforementioned Strike Force, to work so well, efficiently, and effectively together should not be overlooked. It is inexorable to conclude that the greater the ability of individuals to work together as a cohesive group, the greater and more

likely the outcome for success. There is little doubt that *this* core team's ability to work as well as it has, under, at times, unprecedented circumstances and despite enormous challenges such as a global pandemic, played a significant if not indispensable role in achieving what will be, if approved, a historic settlement, – an achievement that will benefit thousands of Public Water Suppliers (Class Members) and their ability to deliver safe drinking water to millions and millions

I declare under penalty of perjury that the foregoing is true and correct.

Executed this 13th day of October 2023, in New York, New York:

of Americans.

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EXHIBIT F

IN THE UNITED STATES DISTRICT COURT FOR THE DISTRICT OF SOUTH CAROLINA CHARLESTON DIVISION

PRODUCTS LIABILITY LITIGATION) Masted Docket No.:) 2:18-mn-2873-RMG)
CITY OF CAMDEN, et al.,))
Plaintiffs,))
- <i>VS</i> -))
E.I. DUPONT DE NEMOURS AND COMPANY (n/k/a EIDP, Inc.), et al.,)))
Defendants.)))
	,

DECLARATION OF PAUL J. NAPOLI IN SUPPORT OF CLASS COUNSEL'S REQUEST FOR ATTORNEYS' FEES AND COSTS

I, Paul J. Napoli, pursuant to 28 U.S.C. § 1746, hereby declare as follows:

I. INTRODUCTION

I am an attorney licensed to practice in all courts in the States of New York and Illinois, as well as the United States District Courts for the Eastern, Southern, Western and Northern Districts of New York; the United States District Courts for the Eastern District of Michigan, the Eastern District of Missouri, the Northern District of Illinois, the Southern District of Illinois, and the District of Colorado; the United States Courts of Appeals for the Second and Third Circuits; and the United States Supreme Court. I make this declaration in support of Class Counsel's Request for Attorneys' Fees and Costs in the above-referenced matter. I have personal knowledge of the following facts, and if called as a witness, I could and would testify competently to them.

2. I am a Senior Partner in the law firm of Napoli Shkolnik, where I lead the firm's Environmental Department.

II. MY QUALIFICATIONS AND EXPERIENCE

- 3. I have a significant amount of experience serving in leadership positions in complex environmental and mass tort litigation cases, including representing numerous public entities and individuals in environmental tort cases like those included in this MDL. I have been appointed as lead or liaison counsel, and have served on, and overseen lawyers in my offices who have been on, numerous Plaintiffs' Steering Committees in national mass tort and complex litigations, and have held Court-appointed leadership positions in some of the largest mass torts over the past 25 years, including:
 - a. Plaintiff's Co-Liaison Counsel for *In re: World Trade Center Disaster Site Litigation, 21 MC 100* (AKH) settled in the U.S. District Court for the Southern District of New York by Judge Alvin K. Hellerstein.
 - b. Plaintiffs' Discovery Committee for In re: MTBE (Methyl Tertiary Butyl Ether) Products Liability Litigation (MDL-1358), United States District Court for the Southern District of New York (Judge Shira Scheindlin) on Environmental Contamination of Municipal Water Supplies of MTBE by Petroleum Refiners and Retailers.
 - c. Liaison Counsel in the Colorado PFOA / PFOS Toxic Tort Litigation (*Bell, et al. v. The 3M Company*, et al., No. 1:16-cv-02351-RBJ) by Judge R. Brooke Jackson of the United States District Court for the District of Colorado.
 - d. Plaintiffs' Liaison Counsel in the West Virginia Opioid Litigation (Civil Action No. 17-C-248) by Judge David W. Hummel, Jr. of the Second Judicial Circuit Court, Division 2 of Marshall County, West Virginia.
 - e. Co-Lead Counsel in the New York Opioid Cost Recovery Litigation by Justice Jerry Garguilo of the Supreme Court of the State of New York for Suffolk County.
 - f. New York Court Appointed Member of the Plaintiff's Steering Committee for *In re Rezulin Products Liability Litigation* (removed from the US market 3/21/2000).

- g. Appointed by the Supreme Court of the State of New York as a Liaison Counsel for the New York State Consolidated Diet Drug Litigation: *In re: Diet Drug (Phentermine, fenfluramine, dexfenfluramine) Products Liability Litigation.*
- 4. At Napoli Shkolnik, our Environmental Department team specializes in representing public water providers affected by chemical contamination of their water sources. The staff of these departments, many of whom hold advanced degrees in environmental law, is 100% dedicated to plaintiffs' environmental litigation. Over the years, we've advocated for water suppliers of varying sizes, from those managing extensive groundwater wells and expansive surface water systems to smaller suppliers. With over 25 years of experience in this field, we have cultivated an in-depth knowledge of water supplier operations. Collaborating closely with municipal clients, scientific and engineering experts, we've gained insights into the impact of contaminants on Public Water Systems (PWS) and the tools and methodologies required to mitigate or eliminate such pollutants. In addition to representing municipalities, public bodies, and individuals in environmental cases, I personally have been involved in numerous multiple party complex litigation matters involving thousands of plaintiffs, and dozens of defendants. The expertise I have gained through this experience greatly assisted our team in developing the vast amount of evidence in this case, which involved extensive documentation and data.
- 5. My expertise extends to playing pivotal roles as lead or class counsel in intricate environmental litigation cases. For over 25 years, I have stood as the legal representative for numerous public bodies and individuals in environmental tort cases, many of which closely parallel the settled class action. Instead of solely pursuing statutory environmental claims that hold an entity accountable, irrespective of its awareness of the potential harm, we often employ traditional product liability and other tort approaches. These strategies target chemical manufacturers responsible for contaminating public and private water resources, land, or other

public-owned natural assets. Unlike most firms, our approach zeroes in on those manufacturers who were aware of the risks their products posed but failed to alert downstream stakeholders. Such litigations under my guidance have secured billions in compensations for our clients. Some landmark cases in which I played a prominent role are listed below:

- a. \$600 Million Settlement in the Flint Water Litigation: The Flint, Michigan water crisis began in 2014 when the city's drinking water source was switched to the Flint River, leading to lead contamination due to inadequate water treatment. This change exposed residents to dangerous levels of lead, resulting in numerous health issues, especially among children. The crisis also unveiled layers of governmental negligence, mismanagement, and lack of transparency, sparking national outrage and leading to several legal actions and public health interventions.
- b. In re: Methyl Tertiary Butyl Ether ("MTBE") Prods. Liab. Litig., MDL 1358, (S.D.N.Y.). centered on the widespread contamination of groundwater by MTBE, a gasoline additive. Used to enhance octane levels and reduce carbon monoxide and ozone levels caused by auto emissions, MTBE was found to be a potential human carcinogen that can quickly contaminate groundwater. Numerous lawsuits were consolidated in the Southern District of New York (S.D.N.Y.) against gasoline producers and refiners, alleging they were aware of MTBE's environmental risks but continued its use and failed to warn the public.
- c. \$712.5 million settlement of injuries sustained by rescue and recovery workers at Ground Zero from toxic dust which pertained to injuries sustained by rescue and recovery workers at Ground Zero following the September 11th terrorist attacks. These workers were exposed to toxic dust and debris during their efforts at the World Trade Center site. The lawsuit alleged that the City of New York and its contractors failed to adequately protect these workers from the hazardous conditions, resulting in various health issues. After prolonged litigation, a settlement was reached to compensate the affected workers for their injuries and health complications.
- 6. Experience in these cases, particularly involving Ground Zero, the Flint water crisis, and the MTBE groundwater contamination, was invaluable background for the AFFF litigation. The Flint case required development of a deep understanding of public health crises, community advocacy, and the intricacies of water contamination litigation. The MTBE case involved large-scale environmental damage, especially in the context of contamination and its

long-term impact on communities. Both it and the Ground Zero litigation provided insights into navigating bureaucratic hurdles, crafting compelling arguments against governmental bodies, and understanding the intricacies of large-scale environmental and health-related claims. Additionally, familiarity with extensive discovery processes in these prior cases helped guide efficient evidence-gathering and strategy formulation in the AFFF Litigation.

III. MY FIRM'S ENTRY INTO LITIGATION CONCERNING AFFF AND PFAS

- 7. My and my firm's involvement in AFFF/PFAS related litigation significantly predated the formation of the MDL. On September 22, 2016, my firm filed a Complaint in the matter *Davis et al v. The 3M Corporation*, Docket Number 16-cv-02394-RBJ, in the United States District Court for the District of Colorado. Four days earlier, a related action was filed in *Bell v. 3M Company*, Docket Number 16-cv-02351-RBJ, in the U.S. District Court for the District of Colorado. These actions sought damages for PFAS contamination of the water in and around El Paso County, Colorado, caused by use of AFFF. The complaints proposed medical monitoring and property damage classes, along with personal injuries of individual plaintiffs. The defendants in these actions were various companies which produced and distributed AFFF. These defendants represent the same core of defendants in the later AFFF MDL. These actions were eventually consolidated, and on November 14, 2017, Judge R. Brook Jackson appointed me as Liaison Counsel.
- 8. The parties in the *Bell* and *Davis* actions addressed multiple motions to dismiss similar complaints and causes of action by the same defendant AFFF manufacturers. In addition, my firm, along with co-counsel in the *Bell* litigation, undertook extensive discovery, as well as a handling a motion to certify a question of state law to the Colorado Supreme Court. This included production and analysis of millions of pages of document discovery, and depositions of the class representatives and of various experts. At least eighteen (18) depositions were taken. The Court

scheduled a hearing on the plaintiffs' motion to certify the proposed classes on November 30, 2018. In preparation for the November 30, 2018, hearing, my firm, along with plaintiffs' leadership, worked to prepare for the hearing and prepare to present the case for certification of the proposed classes.

- 9. My colleagues and I also litigated water district cases before the formation of the AFFF MDL, including one for a public water system from New York.
- 10. On February 21, 2018, I and my firm filed an action on behalf of Hampton Bays Water District (HBWD) in the New York Supreme Court (Suffolk County) under index number 603477/2018. That action was brought against Defendants 3M Company, Buckeye Fire Equipment Company, Chemguard Inc., Tyco Fire Products L.P. and National Foam for the contamination of HBWD's water source with PFAS as a result of AFFF usage.
- 11. On April 4, 2018 the action was removed to Federal District Court for the Eastern District of New York under Docket Number 18-cv-01996-JS-AYS.
- 12. On July 30, 2018, the Court determined that in the interest of efficiency, it would hear motions to dismiss on seven substantially similar actions together. This included: Green (17-CV-2566), Singer (17-CV-6962), Suffolk County Water Authority (17-CV-6982), Ayo (18-CV-0373), Hampton Bays Water District (18-CV-1996), Shipman (18-CV-2496), and Py (18-CV-3225).
- 13. On August 13, 2018, the defendants filed a joint motion to dismiss. My office on behalf of HBWD filed opposition on September 28, 2018. While the parties briefed motions to dismiss, we also negotiated over various discovery themes, and filed competing written proposals to the Court.

- 14. On October 1, 2018. defendants filed a motion to stay proceedings pending decision of the Judicial Panel on Multidistrict Litigation (JPML) on whether to transfer the case into an MDL. My office filed opposition to the motion. On October 15, 2018, the Court granted the motion to stay.
- 15. On November 29, 2018, I presented argument to the JPML advocating for the establishment of this MDL. Consequently, the JPML combined the issues into the "AFFF MDL" and relocated them to the District of South Carolina on December 7, 2018. The scope of the MDL was narrowed to cover only claims related to PFAS exposure via AFFF, which is the most prominent known source of PFAS contamination.
- 16. On March 20, 2019, I was appointed by the Court to serve as Co-Lead Counsel in the *In Re: Aqueous Film-Forming Foams Prods. Liab. Litig. MDL* (MDL 2873), together with Michael London and Scott Summy, and have been re-appointed annually by the Court, with Joe Rice also appointed by Order on August 22, 2023. Dkt. 3602. As a Co-Lead Counsel, I have been involved in virtually all aspects of the litigation including investigation, litigation and the settlements, that give rise to this application. Further, I have worked alongside my Co-Lead Counsel organizing and overseeing work allocated to, and performed by, the Plaintiffs' Executive Committee ("PEC"), and have participated in negotiating the various CMOs, and discovery efforts against the multiple Defendants in this complex environmental products liability litigation. More specifically, I have served in leadership roles on the various committees that have been established under its umbrella, including serving as the Co-Chair of the PEC's Discovery and Personal Injury Committees, as well as a member of the PEC's Science, Legislative, and Public Water Supplier Committees. My firm also has members on the PEC's Document Review and Law and Briefing Committees.

- 17. On October 26, 2022, the Court appointed me and my Co-Leads¹ to serve as Settlement Counsel for all Plaintiffs in this MDL. In that capacity, I served as interim Class Counsel in negotiating the proposed Settlement in the above-referenced matter that is the subject of this request for fees and costs.
- 18. On August 22, 2023, the Court appointed me, Michael London, Scott Summy, Joe Rice, Elizabeth Fegan, and each of our respective firms, as Class Counsel under Rule 23(g)(3) of the Federal Rules of Civil Procedure, subject to final approval by the Court of class certification. Dkt. 3603 at ¶ 7.
- 19. I have participated in the drafting of the various Declarations being submitted in support of this fee application and incorporate by reference the sum and substance of those Declaration as they relate to the robust description of the work performed by the various Committees and Leadership.

IV. EFFORTS TO OBTAIN CRITICAL DISCOVERY ON AND LATER BRIEF ISSUES RELATING TO THE DEFENDANTS' GOVERNMENT CONTRACTOR DEFENSE

20. In this declaration, I first endeavor to summarize the robust and incredibly important work undertaken by Class Counsel on issues related to the United States' (the "Government") role in this litigation. I have personal knowledge of these matters not only in my capacity as Co-Lead Counsel for all Plaintiffs in this MDL but also as the PEC's designated discovery liaison for the Government and, more recently, as the chair of a PEC subcommittee comprised of Plaintiff counsel who have brought claims against the Government for AFFF-related

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¹ Except where noted, references to "my Co-Leads" means Michael London from Douglas & London P.C. and Scott Summy from Baron & Budd LLP. More recently, Joe Rice from Motley Rice was appointed as a fourth Co-Lead, though the work discussed in this declaration preceded that appointment.

injuries in this MDL. Although the sections that follow cannot fully account for all of the work Class Counsel performed on these issues, they are meant to demonstrate the enormity of Class Counsel's collective efforts in this area and the critical role those efforts played in advancing the claims of all plaintiffs in this MDL.

- 21. At the very first status conference held in this MDL, the Court emphasized to the parties that the government contractor defense was a critical issue that could have "a very significant impact on the shape of the litigation." 2/25/2019 Status Conference Tr. 39:10-41:3. For this reason, Judge Gergel advised the parties that it was an issue that needed to be addressed early on in the case, while still affording the parties the opportunity to conduct "robust discovery." *Id.*
- 22. From the Defendants' standpoint, they appeared to describe the government contractor defense as a "get out of jail free card" for all their improper conduct related to the sale and marketing of AFFF and its components parts. For this reason, the Government discovery team was tasked with the monumental undertaking to ensure this was properly evaluated so that our Law and Briefing Committee members could address the promised motions to dismiss all claims.
- 23. In the early months of this MDL, the Government challenged the notion that it should be obligated to provide robust discovery in a litigation comprised mainly of products liability cases in which it was not a named party, claiming at one point that "sovereign immunity gives the government the right to do it on its own terms." 4/5/2019 Status Conference Tr. 60:18-20. Not surprisingly, the parties made little progress in obtaining any discovery from the Government beyond a set of voluntary disclosures comprised entirely of materials that were "widely available in the public record, but sometimes hard to find." *Id.* at 56:12-17.

- 24. In July 2019, the Government made a substitution of counsel, whereby Christina M. Falk, Assistant Director of the Environmental Torts Section of the United States Department of Justice ("DOJ"), entered her appearance. As it happened, this roughly coincided with my appointment to serve as the PEC's discovery liaison for the Government. Recognizing the Government's critical role in obtaining the discovery needed to oppose the manufacturers' government contractor defense, my first priority as the PEC's discovery liaison was to establish a cooperative and productive relationship with the Government's lead attorney, Ms. Falk.
- 25. In September 2019, I helped prepare and serve a set of subpoenas on DOJ on behalf of the PEC that included document requests for both the Naval Research Laboratory and the Naval Sea Systems Command. See 11/1/2019 Joint Status Report² at 4. In the months following those subpoenas being served, I took the lead on behalf of the PEC in negotiations with DOJ and the DCC on a variety of issues related to Government discovery, including the search terms the Government should use to produce responsive ESI, and how DOJ should prioritize the productions from the various agencies that had received document requests. These negotiations ultimately resulted in DOJ agreeing to produce transcripts and expert reports from a related litigation in December 2019, and the parties reaching agreement in January 2020 on the search terms the Government would use. 1/10/2020 JSR at 11; 2/7/2020 JSR at 8. Similarly, I represented the PEC in a meet and confer with DOJ in early February 2020, in which the parties successfully negotiated a protocol for the Naval Facilities Engineering Command to produce responsive discovery from a set of eleven custodians. 4/3/2020 JSR at 23.

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² Joint Status Reports shall hereinafter be referred to individually as "JSR" and collectively as "JSRs."

- Although DOJ had retreated from its initial resistance to providing discovery in this MDL, concerns over the pace at which the Government was providing responsive discovery persisted in early 2020, which DOJ attributed to staffing and resource limitations at the relevant military branches and federal agencies. These staffing and resource limitations worsened significantly, however, with the onset of the COVID-19 pandemic in March 2020, see 4/3/2020 JSR at 21, which eventually led DOJ to propose staging Government discovery to begin solely with the production of materials relevant to the government contractor defense and certain jurisdictional defenses DOJ planned to raise in the small number of cases naming the Government as a defendant. 6/5/2020 JSR at 15.
- 27. Recognizing the Court's desire for the parties to prioritize completing discovery on the government contractor defense, and in stark contrast to the DCC's response to DOJ's proposal, the PEC communicated its support for staging Government discovery straightaway, explaining to the Court in the parties' June 2020 JSR that "this prioritization is imperative to keep discovery moving so that these threshold issues [i.e., the government contractor defense and DOJ's jurisdictional defenses] can be resolved." 6/5/2020 JSR at 15. But while the PEC would go on to agree in full, within a matter of weeks, with DOJ's staging proposal, the DCC prolonged negotiations over staging Government discovery for almost three months before reaching agreement with DOJ on September 1, 2020. See 9/1/2020 Ltr. from D. Ring to F. Hall.
- 28. As the COVID-19 pandemic dragged on through the summer of 2020, my Co-Leads and I considered other ways to expedite discovery on the government contractor defense.
- 29. After considerable delays, on July 13, 2020, DOJ admitted several critical facts relevant to the government contractor defense, including that (1) the AFFF MilSpec was a "performance specification" that was intended to "give the manufacturers the greatest flexibility

as to how they would meet the AFFF MilSpec's requirements and to promote competition both on performance and price"; and (2) the AFFF MilSpec "never required that AFFF contain PFOA or PFOS." 7/13/2020 DOJ RFA Responses at 3. In fact, the Court relied on DOJ's responses to the PEC's RFAs to support its finding that "the MilSpec did not specify the use of a particular formula or the use of C8 chemistry." Dkt. 2601 at 11. This proved to be a defining moment in the litigation, all but setting the stage to gut the government contractor defense.

- 30. In April 2020, my firm, on behalf of the PEC, retained Patrick D. Lowder, a registered United States Patent Attorney with a Ph.D. in organic chemistry, to serve as an expert in this highly specific field.
- 31. Over the course of several meetings, Mr. Lowder helped us understand the difference between method patents and composition patents, a key distinction that the PEC would later rely on to refute the DCC's interpretation of the NRL Patent. *See* Dkt. 2063-2 at ¶ 3.a. Mr. Lowder also suggested obtaining the USPTO's complete file on the NRL Patent, which revealed that NRL's original application sought a composition patent for certain AFFF formulations and their component fluorosurfactants. Critically, the file showed that the USPTO had rejected NRL's patent application precisely because 3M already owned the patents for the component fluorosurfactants, which was completely at odds with the DCC's attempt to use the NRL Patent as evidence that NRL was the principal developer of AFFF.
- 32. In addition to helping navigate these types of complex patent-related issues, we also relied on Mr. Lowder's expertise in organic chemistry to help develop key arguments concerning the AFFF MilSpec. Specifically, Mr. Lowder assessed the AFFF MilSpec's use of the term "fluorocarbon surfactant" and whether that language was reasonably precise, ultimately concluding it was not because the term refers to a large family of chemicals comprising thousands

of members. Both this opinion and his opinions concerning the NRL Patent were later memorialized in a declaration that the PEC submitted in support of its opposition to Defendants' motion for summary judgment on the government contractor defense. *See* Dkt. 2063-2.

- 33. Another project the Government discovery team undertook was to assemble a group from the three Co-Lead firms to investigate and draft a detailed dossier summarizing and analyzing the documents the Government and defendant manufacturers had produced in discovery relevant to the government contractor defense. Each of the three firms was assigned a different time period to focus on for their part of the dossier, with my firm taking the period from 1960 to 1990, the team from Baron & Budd taking the period from 1991 to 2005, and the team from Douglas & London taking the period from 2006 to present.
- 34. Over the course of several months, this group reviewed thousands of documents produced in discovery, exchanged numerous drafts of the dossier, and held meetings on close to a dozen occasions to discuss their respective findings. This work came to serve as a foundational resource for the PEC as the parties turned their focus to depositions and briefing on the government contractor defense.
- 35. After months of resistance from the DCC, the PEC made the decision to kick off deposition discovery on the government contractor defense in early March 2021. Relying on the work described above, leadership considered and discussed a number of potential deponents on issues relevant to the government contractor defense. This culminated in the PEC serving notices of deposition on DOJ for five Government witnesses: (1) Robert Darwin; (2) Frederick Walker; (3) Steven Fletcher; (4) John Farley; and (5) Janet Anderson. 3/19/2021 JSR at 23. The DCC followed suit the very next day, serving notices for one fact witness deposition and two 30(b)(6)

depositions of the Navy and Air Force. *Id.* Within weeks, the DCC served notices of deposition for ten additional fact witnesses. 4/16/2021 JSR at 25.

- 36. The three Co-Lead firms³ led the PEC's efforts in this respect and were ultimately able to resolve the dispute, allowing the parties to complete the first deposition of a Government witness by the end of April 2021. 5/14/2021 JSR at 27. Depositions of six more Government witnesses followed in the ensuing months, the last of which was completed on October 7, 2021. In total, these depositions accounted for 3,305 transcript pages of testimony and 237 deposition exhibits. But even that undersells the extensive preparation that went into these taking these depositions, which with one exception were all taken by attorneys from the three Co-Lead firms.
- This extensive preparation was reflected in the depositions themselves, which, from the beginning, were an unmitigated success for the PEC in its efforts to oppose the government contractor defense. For example, during the very first deposition of a Government witness in this case, Gary Douglas elicited testimony from Robert Darwin that "it was up to each manufacturer to come up with his own magic witch's brew to meet the performance requirements" of the AFFF MilSpec. Darwin Tr. 46:17-47:2. Likewise, Mr. Douglas elicited testimony from John Farley during his deposition that AFFF manufacturers treated their formulations as proprietary information and that it was not until 2000 that he learned PFOS was used in 3M's AFFF. Farley Tr. 89:15-24. The Court later relied on this testimony in denying Defendants' motions for partial summary judgment on the government contractor defense. Dkt. 2601 at 11, 13.

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³ Except where noted, references to the "three Co-Lead firms" mean collectively Napoli Shkolnik, Douglas & London P.C., and Baron & Budd LLP.

- 38. At the same time that depositions of Government witnesses were starting, the PEC and DCC were also in the midst of negotiating a protocol and schedule for briefing motions that Defendants planned to file seeking partial summary judgment on the basis of the government contractor defense. These negotiations were once again led by me and my Co-Leads, and required resolving disputes with the DCC over not just the schedule of the briefing but also the number of pages the parties would be allotted. The parties were eventually able to reach agreement on the schedule for the briefing, which was embodied in Case Management Order ("CMO") No. 16, entered by the Court on April 15, 2021. Dkt. 1521. The parties' dispute over page allotments stretched on for several more months, however, with the parties finally coming to an agreement in September 2021. See CMO 16.B, Dkt. 1890.
- 39. The parties' briefing on the government contractor defense began in earnest on November 5, 2021, with Defendants filing a single omnibus brief addressing just the first element of the defense that focused on whether the Government approved "reasonably precise specifications" for MilSpec AFFF. Dkt. 1965-1. Once filed, the three Co-Lead firms took the lead on reviewing and analyzing the Defendants' opening brief before turning to researching, drafting, and compiling the necessary support for Plaintiffs' opposition brief. That brief was filed on December 22, 2021, and was followed by the filing of Defendants' omnibus reply brief on January 28, 2022. Dkts. 2063 & 2141.
- 40. Not long after briefing was completed on Defendants' omnibus motion, DOJ informed the parties that it had substantially completed its production of Stage 1 discovery. 2/24/2022 JSR at 27. In total, the Government's Stage 1 discovery production included close to 390,000 documents consisting of more than 6.7 million pages. *Id*.

- 41. Two weeks later, the Court scheduled in-person oral argument on Defendants' omnibus motion on March 25, 2022. The night before those proceedings were to take place, however, a member of the DCC's briefing team contracted COVID-19 and the Court made the decision to adjourn oral argument to a later date. But the next day, the Court informed the parties that after reviewing the briefing the parties submitted on Defendants' omnibus motion, it felt it was necessary for Plaintiffs and the AFFF manufacturer defendants to submit supplemental briefing on the remaining two elements of the government contractor defense. *See* Dkt. 2247. In doing so, the Court left it to the parties to negotiate the schedule and protocol for submitting the supplemental briefing, with me and my Co-Leads once again leading those negotiations on behalf of the PEC. Those negotiations resulted in CMO 16 D, which the Court entered on April 7, 2022. Dkt. 2280.
- 42. On May 13, 2022, the AFFF manufacturer defendants filed their opening supplemental briefs on the two remaining elements of the government contractor defense. Dkts. 2346-1, 2347 & 2348. Like before, the three Co-Lead firms took the lead on reviewing and analyzing the AFFF manufacturer defendants' opening briefs before turning to researching, drafting, and compiling the necessary support for Plaintiffs' omnibus opposition brief. That brief was filed on June 17, 2022, and was followed by the AFFF manufacturer defendants filing their reply briefs on July 1, 2022. Dkts. 2409, 2437 & 2438.
- 43. Prior to the completion of the supplemental briefing, the Court scheduled oral argument on Defendants' motions for partial summary judgment on August 19, 2022. The three Co-Lead firms thereafter engaged in extensive preparation for the argument, which was led by Mr. Douglas and my Co-Lead, Scott Summy from Baron & Budd. This preparation, as well as the

immense time and effort that leadership put into the briefing itself, resulted in a resounding success when the Court issued its order denying Defendants' motions on September 15, 2022.

44. Although the Court's order speaks for itself, it is worth noting that from the time this MDL was created, Defendants placed significant stock in the government contractor defense early, going so far as to suggest at the first status conference in this MDL that it would provide "absolute immunity" for "somewhere around 80 to 90 percent" of the claims brought against the AFFF manufacturers. 2/15/2019 Tr. 36:12-20. It was only through the efforts described above, which were both led and primarily undertaken by the three Co-Lead firms, that Plaintiffs were able to get past the defense at the summary judgment stage, clearing the way for cases in this MDL to proceed to trial.

V. ONGOING WORK INVOLVING THE FEDERAL GOVERNMENT'S ROLE IN THE PFAS CRISIS

- 45. Shortly after the completion of the briefing addressing the government contractor defense, DOJ approached me about scheduling a meet and confer regarding briefing on the Government's jurisdictional defenses, which the Court had previously tabled until after it addressed the government contractor defense. 2/19/2021 Tr. 27:20-28:8. Negotiations over a protocol and schedule for briefing those defenses did not begin in earnest, however, until the Court issued its order denying Defendants' motions for partial summary judgment on the government contractor defense.
- 46. As with the government contractor defense briefing, these negotiations were led by me and my Co-Leads and early on in those discussions two disputes arose with DOJ. The first was the timing of any briefing of DOJ's defenses, which leadership did not want to conflict with the parties' preparations in the *City of Stuart* bellwether trial that was then scheduled to start on June 5, 2023. *See, e.g.*, Dkt. 2719 at 6. The second disputed issue was whether the plaintiffs who

had named the Government as a defendant and that would be subject to DOJ's jurisdictional defenses were entitled to site-specific discovery before any briefing is done on those defenses. *See, e.g., id.* at 9. On the latter issue, DOJ took the position that it had already voluntarily produced discovery relevant to the military sites at issue and no further discovery warranted. *See, e.g.*, Dkt. 2684.

- 47. On October 26, 2022, leadership and DOJ held another meet and confer where it was agreed that Plaintiffs would send an informal set of discovery requests to DOJ for review on or before November 9, 2022. *See id.* at 3. Thereafter, we quickly organized group meetings with the counsel that represented the plaintiffs in the cases at issue ("DOJ Motions Counsel") where these developments were discussed and the request was made for DOJ Motions Counsel to provide draft discovery requests. After sending those requests to DOJ, the parties held another meet and confer on November 14, 2022, where it became clear they were at an impasse on both disputes. *See* Dkts. 2684 & 2719.
- 48. The parties thereafter submitted letter briefs—which the three Co-Lead firms took the lead on drafting on behalf of the PEC—outlining their respective positions on the disputed issues on November 25 and December 12, 2022, respectively. *See id.* During a status conference held on December 22, 2022, the Court addressed these disputes and agreed with Class Counsel that any briefing should be scheduled after the upcoming trial in the *City of Stuart* case. 12/22/2022 Tr. 15:6-17:19. The Court also instructed that at least some jurisdictional discovery would take place but left it to the parties to negotiate the parameter of that discovery and the subsequent briefing. *Id.*
- 49. Thereafter, negotiations resumed between leadership and DOJ over a proposed CMO addressing the protocol and schedule for briefing the Government's jurisdictional defenses.

Those negotiations were successful in resolving all disputed issues except one. See Dkt. 2925 at 2. That lone exception concerned the page limits that would apply to the briefing and, in particular, whether plaintiffs in the affected cases would be allowed to file an individual opposition brief focusing on case-specific issues. Id. Finding ourselves once again at an impasse, it was agreed that the parties would file simultaneous letter briefs outlining their respective positions on the issues that remained in dispute.

- 50. Once again, the three Co-Lead firms took the lead on the letter briefing on behalf of DOJ Motions Counsel, which was filed with the Court on March 24, 2023. Dkt. 2925. At the ensuing status conference held on April 7, 2023, the Court informed the parties of its compromise decision allowing Plaintiffs to select one site for briefing on site-specific issues as part of the larger briefing on the Government's jurisdictional defenses. 4/7/2023 Tr. at 10:4-21. The Court further instructed that Plaintiffs would have two weeks to select the site for that briefing. *Id.* at 26:23-27:15.
- 51. In response to the Court's instructions, my firm helped organize a series of meetings amongst DOJ Motions Counsel that included a request for memoranda analyzing the merits and drawbacks of selecting each site for the site-specific briefing. After DOJ Motions Counsel had the chance to review and discuss those memoranda, the group selected Cannon Air Force Base as the site that would be subject to the referenced briefing. This selection, along with the other parameters and schedule for briefing the Government's jurisdictional defenses, was memorialized in CMO 25, entered by the Court on April 24, 2023. Dkt. 3030.
- 52. Under CMO 25, the PEC was afforded a 75-day period to review the existing discovery produced by the Government before site-specific discovery on Cannon Air Force Base opened on September 29, 2023. *Id.* During that time, my firm helped draft—with input from DOJ

Motions Counsel—a protocol for reviewing the Government's existing discovery on Cannon Air Force Base, organized and managed a review team comprised of attorneys from DOJ Motions Counsel firms, and held weekly meetings to provide guidance on the review and discuss key documents identified by reviewers. That review is now substantially complete, with DOJ Motions Counsel shifting their focus to obtaining any additional discovery that is needed for the forthcoming site-specific briefing on Cannon Air Force Base.

VI. EFFORTS TO COLLECT AND ANALYZE DATA RELATING TO MARKET SHARE FOR AFFF AND ITS COMPONENTS

- 53. One other area of the case that my colleagues and I at Napoli Shkolnik helped advance in this litigation on behalf of the PEC relates to investigating and evaluating the various defendants' shares of market for AFFF and its components. In attempting to reach resolutions with Defendants in this case, one challenge that Plaintiffs have collectively faced is the inherent difficulty associated with identifying the specific AFFF products responsible for the contamination underlying Plaintiffs' respective claims. While it is not difficult to distinguish the use of 3M's AFFF at a particular site—considering that 3M was the only manufacturer to use PFOS-based fluorosurfactants to formulate its line of AFFF products—depending on the circumstances, it can be much harder to identify the non-3M defendants responsible for manufacturing the telomer-based AFFF used at a particular site.
- 54. Recognizing that a different approach was needed to apportion liability amongst the non-3M manufacturer defendants, my Co-Leads and I began to discuss in early 2020 the prospect of investigating and evaluating the liability of the non-3M manufacturer defendants based on their respective share of one of four relevant product markets: (1) the market for finished, telomer-based AFFF products; (2) the market for the telomer-based fluorosurfactants used to formulate AFFF products; (3) the market for the telomer intermediates used to formulate the

fluorosurfactants used in telomer-based AFFF; and (4) the market for toll manufacturing services related to the production of telomer-based fluorosurfactants used in telomer-based AFFF. In April 2020, I led efforts to organize a new working group with the PEC to begin carrying out this work, which was comprised mainly of individuals from the Class Counsel firms.

- 55. Once established, this new working group initially focused on two projects. The first was identifying and retaining one or more consulting experts to assist with the group's investigation and evaluation of the relevant product markets. Within weeks we had retained someone and began meeting with them to formulate a plan for gathering the information needed to evaluate the product markets at issue. The working group then shifted to its second area of focus early on, which was searching, reviewing, and analyzing the discovery produced by the various manufacturer defendants to collect any data that could be used to help evaluate their share of the relevant product markets. This investigation took several months and revealed a substantial discrepancy between the data available for the AFFF manufacturer defendants that could be used to analyze market share versus the data available for the fluorosurfactant and telomer intermediate manufacturer defendants, which was generally far less robust, if it existed at all.
- 56. To help address the data gaps that existed for many of the fluorosurfactant and telomer intermediate manufacturer defendants, my firm took on responsibility for drafting and negotiating a new Defense Fact Sheet ("DFS") for those manufacturers requiring that they provide basic information on which products they sold for use in AFFF and how much of each product they sold over time. My firm then led the negotiations with those defendants—who called themselves the Non-Manufacturer Defendant Group—which began in early November 2020, and later culminated in the Court's entry of CMO 5.D on February 4, 2021, requiring that defendants who were not AFFF manufacturers submit a completed version of the new DFS (i) within 20 days

if a current defendant, and (ii) within 98 days of joining the MDL for any later added defendants.

Dkt. 1152. We also led negotiations with some members of the Non-Manufacturer Defendant

Group over deficiencies in the information and data they provided in the DFS, which in some cases

required them to supplement their responses.

57. In addition to the new DFS, another way that the working group tried to supplement

the existing information we had for some defendants on market share was through Rule 30(b)(6)

depositions. My firm helped prepare a template notice for such depositions and was responsible

for preparing and taking the deposition focusing on BASF Corporation's AFFF-related sales and

market share. My colleagues and I also drafted memos analyzing specific MDL defendants'

market share and helped create a detailed matrix analyzing the markets for fluorosurfactants and

telomer intermediates used in AFFF based on the information and data those defendants provided

in their CMO 5.D fact sheets.

I declare under penalty of perjury that the foregoing is true and correct.

Executed this day of October 2023

2:18-mn-02873-RMG Date Filed 10/15/23 Entry Number 3795-10 Page 1 of 94

EXHIBIT G

IN THE UNITED STATES DISTRICT COURT FOR THE DISTRICT OF SOUTH CAROLINA

IN RE: AQUEOUS FILM-FORMING FOAM PRODUCTS LIABILITY LITIGATION)	Master Docket No.: 2:18-mn-2873-RMG
CITY OF CAMDEN, et al., Plaintiffs,)))	Civil Action No.: 2:23-cv-03230-RMG
-vs- E.I. DUPONT DE NEMOURS AND COMPANY (n/k/a EIDP, Inc.), et al.,)	
Defendants.)	

DECLARATION OF STEPHEN J. HERMAN, ESQ.

I, the undersigned,

STEPHEN J. HERMAN

respectfully declare, under penalty of perjury, that the following are true and correct to the best of my knowledge, information, recollection, and belief:

- 1. I am licensed to practice law in the State of Louisiana, the United States District Courts for the Middle, Eastern and Western Districts of Louisiana, the U.S. Fifth Circuit, Second Circuit, Ninth Circuit, and Eleventh Circuit Courts of Appeal, and the U.S. Supreme Court.
- 2. Among other things, I:
 - teach the Complex Litigation: Advanced Civil Procedure course at Tulane Law School;
 - teach an Advanced Torts Seminar on Class Actions at Loyola Law School;
 - am a fellow of the International Academy of Trial Lawyers (IATL) and a member of the American Law Institute (ALI);
 - served as one of two court-appointed Liaison Counsel for Plaintiffs, Lead Class Counsel for Plaintiffs, and Chairs of the Fee Committee, in the BP Oil Spill Litigation, *In re Deepwater Horizon*, MDL No. 2179;

- served as one of several court-appointed Settlement Class Counsel for the Taishan Class Settlement in the *Chinese Drywall Litigation*, MDL No. 2047;
- have authored and co-authored several law review articles regarding the responsibilities of common benefit attorneys in MDLs and the determination of common benefit fees;¹
- was named one of the Top Attorney Fee Experts in Class Actions by the National Association of Legal Fee Analysis (NALFA) in 2018;
- serve as the current Chair of the Class Action Section of the LSBA;
- serve on the standing LSBA Rules of Professional Conduct Committee;
- am a Past President of the Louisiana Association for Justice (formerly the Louisiana Trial Lawyers Association), the National Civil Justice Institute (formerly the Pound Civil Justice Institute), and the Civil Justice Foundation, as well as the current President-Elect of the New Orleans Bar Association, and a long-standing member of the Board of Governors of the American Association for Justice (formerly the Association of Trial Lawyers of America);
- previously served as a Lawyer Chair for one of the Louisiana Attorney Disciplinary Board Hearing Committees;
- was appointed to serve on the Louisiana Supreme Court Committee on Rules of Professional Conduct for Class Actions, Mass Torts and Complex Litigation;
- am frequently asked to write, speak, and provide expert opinion and advice regarding class actions, complex litigation, legal ethics and professionalism, and attorneys' fees.

A full resume is attached hereto and incorporated herewith as ADDENDUM A.

- 3. I was retained by Class Counsel with respect to the proposed DuPont and 3M Settlements in the above-captioned MDL to provide the Court with information and opinions based upon my own personal experience, knowledge and expertise, regarding their request for an award of reasonable class counsel fees and, in particular, the way in which an appropriate national hourly rate can, and in my opinion should, be employed in any "cross-check" for reasonableness of the requested percentage-of-benefit fee.
- 4. In submitting this declaration, I am mindful and respectful of the Court's role as the expert on the law in this case. It is not my intent to simply suggest legal opinions or conclusions. It is my hope, rather, that the Court might benefit from viewing the relevant legal principles

¹ See "Duties Owed by Appointed Counsel to MDL Litigants Whom They Do Not Formally Represent" Loyola Law Review, Vol. 64, p.1 (Spring 2018); "Layers of Lawyers: Parsing the Complexities of Claimant Representation in Mass Tort MDLs," co-authored with Lynn A. Baker, Lewis & Clark Law Review, Vol.24, Issue No.2, p.469 (Spring 2020); "Percentage Fee Awards in Common Fund Cases," co-authored with Russ M. Herman, Tulane Law Review, Vol. 74, Nos. 5-6, p.2033 (June 2000).

and precedent through the lens of someone engaged in active practice within the legal community, with factual knowledge about the legal market, and personal experience in the litigation and management of mass, class, and MDL cases. It is in this spirit that I offer the information and observations that follow herein, in the hope it might be helpful to the Court in reaching a fair and just determination.

- 5. I am being compensated at a rate of \$950/hr.
- 6. The materials considered and relied upon are cited throughout the Declaration and/or listed in ADDENDUM B.

SUMMARY OF OPINION

- 7. While not generally required, some courts may employ a "lodestar"-type "cross-check" in evaluating the overall reasonableness of a percentage-of-benefit class counsel or other common benefit fee. In a complex MDL of this nature, which is national in scope and requires the commitment of many plaintiffs' firms working together from across the country, it is appropriate to use a national blended rate in the event that such a lodestar-type cross-check is performed.
- 8. The attorneys appointed to MDL leadership generally, and the Plaintiff Executive Committee Members involved in this case in particular, have high levels of knowledge, skill, experience, and reputation, as compared with the ordinary attorney whose hourly rates are likely to be reflected in averages from general survey data or prior awards in run-of-the-mill statutory fee-shifting cases.
- 9. In addition, Multi-District Litigation of this nature is much more difficult, expensive, lengthy and complex than a single-plaintiff civil rights, employment benefits, or consumer fraud case.
- 10. An obvious indication of reasonable and appropriate hourly rates in this litigation would be the hourly rates that are, in fact, being paid to attorneys compensated on an hourly basis in connection with PFAS Litigation. (Economically speaking, the hourly rates for common benefit attorneys should be considerably higher, as they are advancing their own costs, and accepting, at the very least, multi-year delays in payment, along with the contingent risk of non-collectability. However, these factors are properly accounted for in the multiplier, as opposed to the base "lodestar" rate.)
- 11. Taking the relevant *Johnson / Barber* factors into account, a blended rate in the range of \$725 \$825 / hour for cross-check purposes is supported by the hourly rates being billed

² In this particular MDL, the Plaintiff Executive Committee (PEC) includes firms that are not only highly experienced and respected in complex and environmental litigation generally, but are among the relatively few firms with specialized experience in these particular types of water system contamination cases.

by the firms defending the litigation; the hourly rates being billed by lawyers working for the creditors' committee in PFAS-related bankruptcy proceedings; the hourly rates which have been approved for these and other class action attorneys in other class actions; and the blended rates that have been approved in large complex MDLs.

- 12. In considering the number of common benefit hours for cross-check purposes, the Court should also include a factor for future hours relating to settlement implementation and administration.
- 13. The PEC should be permitted to hold back some of the fees awarded to compensate Class Counsel and/or other common benefit attorneys for post-settlement implementation and administration.
- 14. I understand that the PEC is requesting a hold-back of 5% out of the total fees awarded, which seems appropriate based on my experience.

Background and Overview of Legal Principles

- 15. Over the past twenty-nine years, I and other members of my firm have participated in numerous putative class actions, certified class actions, Federal MDLs, and State Court consolidated proceedings.
- 16. In connection with these proceedings, and otherwise, I have worked with many of the nation's leading MDL, class action, and other complex litigation firms, including many of the lawyers and firms involved in the PFAS Litigation.³ (And, with respect to those specific Plaintiff Executive Committee members, I know them to be highly skilled, experienced, and dedicated attorneys, who enjoy the highest of reputations among firms throughout the country, in complex, class action, MDL, and environmental litigation.)

³ While I am familiar with virtually all of the PEC firms through the American Association of Justice and other organizations, I personally worked with Mr. Summy in the *BP Oil Spill* MDL and other lawyers from Baron & Budd in both the *Chinese Drywall* MDL and *BP*; I worked closely with Mr. Rice in the *BP Oil Spill* MDL and have worked with lawyers from Motley Rice in several MDLs and complex cases throughout my career; I have worked with lawyers from Levin Papantonio in the *BP Oil Spill* MDL, the *Chinese Drywall* MDL, and several other cases; I have worked with Levin Sedran Berman lawyers in the *Propulsid* MDL, the *Vioxx* MDL, the *Chinese Drywall* MDL, the *BP Oil Spill* MDL, the *Tylenol* MDL, and numerous other cases; I worked with Weitz & Luxenberg in the *BP Oil Spill* MDL and the *Roundup* Litigation; I have served on the NCA Board with Carl Solomon, and we have taught together at AAJ Deposition Colleges; Ms. Pearson and I served together as Officers of the National Civil Justice Institute; my firm worked with Gary Douglas and the Douglas & London firm in the *Xarelto* Litigation; and I know both Phil and Christina Cossich well: Mr. Cossich and I served together as Presidents of the Louisiana Association of Justice and I worked with both he and Christina in the *BP Oil Spill* MDL.

- 17. In several situations, the attorneys agreed or were required to submit contemporaneous time records to a lead firm, accountant, special master, or administrative committee over the course of the litigation, on a periodic basis. And, in many but not all of these cases, the firms were asked or required to submit their hourly rates.
- 18. In cases where the plaintiffs were ultimately successful, class counsel and/or other common benefit fees were overwhelmingly, if not exclusively, awarded on a percentage-of-fund or percentage-of-benefit basis.
- 19. Nevertheless, in many of these situations, time records were agreed or required to be submitted (if they had not been previously) for either a lodestar-type "cross check" and/or for internal allocation purposes (*i.e.* the division of an aggregate class or other common benefit fee award between and among the participating common benefit firms).
- 20. This appears consistent with the prevailing practice among District Courts within the Fourth Circuit.⁴
- 21. One of the main advantages in applying the percentage-of-benefit method is that it avoids a time-consuming and detailed review and evaluation by the Court of voluminous time records.⁵

⁴ "Courts have increasingly favored the percentage method for calculating attorneys' fees in common fund cases." Kay Co. v. Equitable, 749 F.Supp.2d 455, 462 (S.D.W.Va. 2010) (citing MANUAL FOR COMPLEX LITIGATION (Fourth) §14.121 at 187; THIRD CIRCUIT TASK FORCE REPORT, Selection of Class Counsel, 208 F.R.D. 340, 355 (Jan. 15, 2002)). At the same time, many courts within the Fourth Circuit have incorporated a "lodestar cross-check" into their review of a percentage-based attorney fee. Kay, 749 F.Supp.2d at 463; see also, e.g., Unger v. Furman Univ., No.21-379, 2021 U.S.Dist.LEXIS 249549 (D.S.C. Dec. 3, 2021) ("many courts apply both the percentage-of-the-fund and the lodestar methods as a 'cross-check' to ensure that the award is fair and reasonable"); Mullinax v. Parker Sewer & Fire Subdistrict, No.12-1405, 2014 U.S.Dist.LEXIS 199340 (D.S.C. March 11, 2014) (although the Fourth Circuit has not issued any definitive guidance about which methodology is preferred for awarding or approving attorney's fees in class action cases, "numerous district courts within the Fourth Circuit have used the percentage of the fund method, and many have also employed the lodestar cross-check"); DeWitt v. Darlington County, No.11-740, 2013 U.S.Dist.LEXIS 172624 (D.S.C. Dec. 6, 2013) (numerous district courts within the Fourth Circuit have used the percentage of the fund method, many with a "cross-check", and judges in the District of South Carolina have used the percentage-of-the-fund framework with a modified lodestar cross-check). See also, e.g., Cantu-Guerrero v. Lumber Liquidators, 952 F.3d 471, 482 n.7 (4th Cir. 2020) ("Lumber Liquidators Γ") (describing the "lodestar cross-check" in the context of a CAFA 'coupon' case decision).

⁵ See, e.g., HERMAN, <u>Percentage-of-Benefit Fee Awards in Common Fund Cases</u>, 74 Tul.L.Rev. 2033, 2038-2039 (June 2000); citing, THIRD CIRCUIT TASK FORCE, Court Awarded Attorney Fees: Report of the Third Circuit Task Force, 108 F.R.D. 237, 246-249 (1985); <u>Swedish Hosp. Corp. v. Shalala</u>, 1 F.3d 1261, 1268-70 (D.C.Cir. 1993).

- 22. Therefore, when a cross-check on the reasonableness of a percentage fee request is undertaken, the lodestar-type methodology is only applied in a "broad", "rough", "abbreviated", "streamlined" and "imprecise" way.⁶
- 23. Finally, and relatedly, it is important to recognize that the approved rates (and multipliers) in these cross-check decisions tend to skew low. The Court is not generally being asked to determine "the" reasonable rate or multiplier, or a reasonable rates and multipliers, or the highest reasonable rate or multiplier; the question for the Court is simply whether percentage-of-benefit fee request is reasonable in light of the hours expended, the work performed, the risks assumed, and other relevant factors.
- 24. In the *BP Oil Spill Litigation*, for example, BP agreed to pay a sum certain in common benefit fees well before it was known how many hours would ultimately be expended or the eventual size of the recovery / benefit / fund. Indeed, Judge Barbier himself comments that "the fees sought here are not only reasonable, they are arguably below what class counsel could have reasonably requested."⁷

⁶ See, e.g., <u>Lumber Liquidators I</u>, <u>supra</u>, 952 F.3d at 482 n.7 (a so-called "lodestar cross-check" is the comparison of a calculation of attorney's fees using the percentage-of-recovery method to a "rough" or "imprecise" lodestar calculation); see also, e.g., <u>In re Deepwater Horizon</u>, MDL No. 2179, Rec. Doc. 21849 [2016 U.S.Dist.LEXIS 147378] (E.D.La. Oct. 25, 2016) at p.30 ("the Court will perform an abbreviated lodestar analysis as a broad cross-check on the on the reasonableness of the fee arrived at by the percentage method") and at p.39 ("the loadstar cross-check is a streamlined process, avoiding the detailed analysis that goes into a traditional lodestar examination"); <u>In re Vioxx</u>, 760 F.Supp.2d 640, 652 (E.D.La. 2010) ("The lodestar analysis is not undertaken to calculate a specific fee, but only to provide a broad cross check on the reasonableness of the fee arrived at by the percentage method").

⁷ In re Deepwater Horizon, MDL No. 2179, Rec. Doc. 21849 [2016 U.S.Dist.LEXIS 147378] (E.D.La. Oct. 25, 2016) at p.39. *See also*, *e.g.*, p.40, fn.14 (noting that (1) According to the 2014 National Law Journal Survey, the average nationwide rate was \$604 for partners and \$370 for associates. (2) The State of Louisiana reportedly paid its outside counsel in the BP MDL \$600 per hour. (3) Professor Miller, BP's expert in support of settlement approval, reported in 2014 median rates between \$810 - \$980 for partners in bankruptcy matters. (4) In 2011, Kirkland & Ellis, BP's Lead Trial Counsel, reported in a bankruptcy proceeding rates of \$580-995 for partners and \$340-995 for other attorneys).

A National Blended Rate for MDL Attorneys

- 25. Billing rates can be "blended" both in the sense that the billing rates of partners, special counsel, associates, paralegals and other relevant time-keepers have been blended together into a single hourly rate, and/or in the sense that billing rates have been blended across multiple firms and/or multiple jurisdictions into a single rate or set of rates.⁸
- 26. In several of the MDLs in which I have been involved, the Court, in applying a lodestartype "cross-check", utilized and applied a national blended rate, such that the hours of all time-keepers in the MDL, irrespective of firm, practice level, or geographical location, were blended together into one single rate.⁹
- 27. Based on my experience, this makes a lot of sense.
- 28. A few of the firms engaged in plaintiff MDL practice have performed a sufficient amount of commercial, corporate and/or defense work to have established standard hourly billing rates. In addition, some of the more prominent class action firms have had their fees formally accepted in enough judicial proceedings that they can be said to have established hourly rates. (Which may also be true of a handful of firms who engage in substantial litigation under fee-shifting statutes, like ERISA or Civil Rights cases.) But many of the plaintiff firms who contribute to the common benefit effort in MDLs work overwhelmingly under percentage contingency fee contracts with their clients, and essentially have no standard or established hourly rates.
- 29. As we observed in the *BP Oil Spill Litigation*:
 - "... many of the petitioning Common Benefit Attorneys typically work on a contingency fee basis, and have no established hourly rates. The hourly business that some of the Common Benefit Firms do have is generally limited,

⁸ As the Court discusses in *Rite Aid*, for example: "The lodestar multiplier equals the proposed fee award divided by the product of the total hours worked by class counsel and blended billing rates that approximate the fee structure of all the attorneys who worked on the matter." And further: "We read the Court of Appeals' approval of 'blended rates' in conjunction with its recognizing that the lodestar crosscheck calculation need entail neither mathematical precision nor bean-counting. A traditional lodestar calculation would require the court to monetize the value of the work that each lawyer expends on a case (by multiplying the number of hours that she worked by her hourly rate) and then to arrive at the 'lodestar' by summing the values of each lawyer's contribution. This sort of 'bean-counting' becomes unnecessary if the court approximates the lodestar by simply multiplying an appropriate 'blended rate' and the total number of hours worked by all class counsel. Our error in Rite Aid II occurred in 'blending' only the rates of the most senior attorneys when we should have 'blended' the rates of all attorneys." In re Rite Aid, 362 F.Supp.2d 587, 589 and n.1 (E.D.Pa. 2005). [Note that it is my understanding that, in many securities and/or consumer class action cases, Lead Class Counsel only blend the rates of law firm partners, of counsel/special counsel, and associates, while submitting the time and rates of paralegals, law clerks and/or contract reviewers separately. Obviously, in those cases, the "blended" attorney rate is going to be higher than cases like this, where paralegal and staff attorney or law clerk rates are also being blended into the single hourly rate for cross-check purposes.]

⁹ See, e.g., Deepwater Horizon, Rec. Doc. 21849, at p.40; Vioxx, 760 F.Supp.2d at 660.

or sporadic; the applicable rates vary widely by the type of matter, and by geography; and would typically arise in family law, or real estate, or small business commercial matters, or other one-off disputes, which are not very comparable to this type of high-stakes complex litigation. While some of the Common Benefit Firms have had specific rates submitted and approved in previous class actions, the experience of some of those attorneys has been fairly isolated, and/or occurred in the relatively distant past. And even the rates of more established class action firms tend to vary somewhat according to the type of litigation, the firm's role in the litigation, and, where blended, the rates of the other firms who were participating in the litigation alongside them. Therefore, the Fee Committee did not attempt to solicit or present what might be claimed to be the Common Benefit Attorneys' individual or average blended hourly 'rate'. We have, instead, looked to publicly available information regarding hourly billing rates throughout the country, as well as rates which have been approved for plaintiff attorneys working on comparable complex litigation."¹⁰

30. Nor does it really make sense to tie the relevant rate to the jurisdiction in which the transferee court just happens to be sitting.

¹⁰ FEE PETITION, In re Deepwater Horizon, MDL No. 2179, Rec. Doc. 21098 (E.D.La. filed July 21, 2016), at pp.108-109. (And this approach was essentially accepted and adopted by the Court. See Deepwater Horizon, MDL No. 2179, Rec. Doc. 21849 (E.D.La. Oct. 25, 2016) at p.40 and fn.14) Although not specifically cited in our papers, nor explicitly relied upon by the Court, I had made a similar observation in a co-authored law review article in 2000. See HERMAN, 74 Tul.L.Rev. at 2040 ("One flaw, in this respect, is the lodestar method's use of the attorney's customary billing rates, despite the fact that a great number of class actions and other complex cases are handled by plaintiffs' attorneys who commonly work on a contingent percentage-of-benefit basis and have no customary hourly rate. A similar flaw is the use of the attorney's customary rate in the attorney's geographical area. In many complex cases, attorneys from all over the country are working together on a 'national' group of claims. According to the Lindy method, a big city lawyer who played a peripheral role in the litigation might be awarded a larger fee than a small town plaintiffs' attorney who was essential to the successful resolution of the case. Also, under the Lindy method, a defense attorney with a customarily high hourly rate who has no experience in handling a consumer class action would be entitled to a larger attorney's fee than an experienced contingency fee lawyer who could have resolved the case more quickly and efficiently with a greater recovery for the class"); see also REPORT OF THE THIRD CIRCUIT TASK FORCE, Court Awarded Attorney Fees, 108 F.R.D. 237, 247 (1985) ("many plaintiffs' lawyers who seek fees usually work on the basis of contingent fee arrangements and do not have a 'customary' or 'normal' billing rate').

- 31. Neither the benefit nor the percentage-of-benefit is dependent on the geographical location of the transferee court, and the approval of a requested percentage as "reasonable" does not generally vary in class action or MDL cases according to the venue where the court is sitting.¹¹
- 32. Nor, for the most part, are the individually-retained attorneys hired to represent litigants in the case determined by the District chosen by the JPML.
- 33. While certainly some attorneys are chosen based on the Transferee District, the representation of most MDL Defendants is, in my experience, orchestrated and in substantial part conducted by national firms, whose lawyers generally work in and/or travel to the extent necessary from large cities, with generally high hourly rates.

The PACER Docket in this case, for example, reflects that the Lead Attorney for DuPont is David Erickson from Shook Hardy's Kansas City Office, and that the company is also represented by Joshua Ackerman and Katherine Roin from Bartlit Beck's Chicago Office, and Katherine Hacker from Bartlit Beck's Denver Office, along with counsel from Columbia and Charleston. I understand that Kirkland & Ellis was also brought in as Settlement Counsel, along with Watchtell Lipton and Cravath Swain & Moore. 12

3M is represented by Wilkinson Steklof in Washington DC, Mayer Brown in Chicago, Campbell Conroy & O'Niell in Boston, Goldman Ismail in Chicago, and Gunster Yoakley & Stewart in West Palm Beach. I understand that Jenner & Block was also brought in as settlement counsel. ¹³ I also understand that the Gibson Dunn firm is also representing them.

Other Defendants are represented by Norris McLaughlin in New York, Norris McLaughlin in New Jersey, Williams & Connolly in Washington DC, DLA Piper in Boston, Smith Anderson in Raliegh, Goldberg Segalla in New York and New Jersey, Day Pitney in Boston and Hartford, Sullivan & Cromwell in New York, Sullivan & Cromwell in

¹¹ In the U.S. Ninth Circuit, the Court has established a "benchmark" fee of 25% in successful class actions, which could have some effect on a common benefit award in that Circuit. (The Seventh Circuit also uses a sliding scale of percentage benchmarks and risk factors.) But in MDLs like this one, the basis of comparison for percentage-of-benefit common benefit fees generally tends to be the percentages awarded in other MDLs, irrespective of where the lawyers, the litigants, or even the MDL Transferee Court, is located.

¹² See, e.g., CLASS ACTION SETTLEMENT AGREEMENT, Camden v. DuPont, No.23-3230, Rec. Doc. 4-2 (D.S.C. dated June 30, 2023, filed July 10, 2023) at pp.39-40, ¶13.17 (Notice to Parties) (directing that copies be provided to Kevin T. Van Wart and Kirkland & Ellis in Chicago, as well as Jeffrey Winter at Wachtell Lipton and Michael Reynolds at Cravath Swain & Moore, both in New York), and FAQ No. 8 (https://www.pfaswatersettlement.com/dupont-frequently-asked-questions/) (listing Mr. Van Wart as one of three Lead Counsel for Settling Defendants, along with Wachtell Lipton and Cravath).

¹³ See, e.g., SETTLEMENT AGREEMENT BETWEEN PUBLIC WATER SYSTEMS AND 3M COMPANY, Camden v. 3M, No.23-3147, Rec. Doc. 10-3 (D.S.C. signed June 22, 2023, filed July 3, 2023) at p.47, ¶13.15 (Notice to Parties) (directing that copies be provided to Thomas J. Perrelli at Jenner & Block's Washington DC office, along with Mr. Bulger at Mayer Brown), and FAQ No. 11 (https://www.pfaswatersettlement.com/3m-frequently-asked-questions/) (listing Mr. Perrelli as 3M counsel, along with Mayer Brown).

Washington DC, Kazmarek Mowrey in Birmingham and Atlanta, Parker Poe in Raleigh and Charlotte as well as Charleston, Crowell & Moring in Washington DC, Allen Glaessner in San Francisco, Sidley Austin in Chicago, Arnold & Porter in Washington, DC, Kilpatrick Townsend & Stockton in Atlanta, Orrick in New York, Morgan Lewis in Los Angeles and San Francisco, Dechert in New York, Hogan Lovells in Houston, Cozen O'Connor in Los Angeles, Gordon & Rees in Seattle, Resnick & Louis in Scottsdale, Bernstein Shur in Portland, Maine, Jones Day in New York, King & Spaulding in Los Angeles, Baker & Hostetler in Houston and Washington DC, Bryan Cave in St. Louis, Freeman Mathis & Gary in Boston and Philadelphia, Hinshaw & Culbertson from Boston, and Gloor Law Group from Chicago. 14

The Court initially appointed a Defense Coordinating Committee including lawyers with Williams & Connolly in Washington DC, Mayer Brown in Chicago, Sive Paget & Riesel in New York City, and from the Department of Justice in Washington DC, as well as lawyers from Charleston and Columbia SC, with Lead Defense Counsel from Chicago and Washinton DC.¹⁵ Additional Sub-Group Defense Counsel were appointed from Philadelphia, Little Rock, Washington DC, Miami, and Kansas City.¹⁶

34. Similarly, the plaintiffs' lawyers performing common benefit work are not dependent on the venue of transferee court, but come from offices located all across the country.¹⁷

In this particular case, for example, Lead Counsel have their primary offices located in Dallas, New York City, and Puerto Rico, as well as Charleston SC, while the Plaintiffs' Executive Committee is made up of lawyers and firms from Philadelphia, Washington DC, Denver, Cleveland, Houston, Wisconsin, San Francisco, Hurley NY, Pensacola, Nashville, Miami, Belle Chasse LA, Birmingham, and Minneapolis, as well as Charleston, Mt.

¹⁴ See Official Docket for the United States District Court for the District of South Carolina Case No. 2:18-mn-02873-RMG (as of Sept. 24, 2023).

 $^{^{15}}$ See Case Management Order No. 2, No.18-2873, Rec. Doc. 48 (D.S.C. March 20, 2019) $\P\P$ 19, 21.

¹⁶ See Case Management Order No. 10, No.18-2873, Rec. Doc. 529 (D.S.C. March 23, 2020) ¶¶ 8-14. See also, generally Case Management Order No. 15, No.18-2873, Rec. Doc. 1358 (D.S.C. March 24, 2021) ¶¶ 7-9 and Case Management Order No. 24, No.18-2873, Rec. Doc. 2259 (D.S.C. March 30, 2022) ¶¶ 7-9) (see also Case Management Order No. 15.A, No.18-2873, Rec. Doc. 1858 (D.S.C. Aug. 16, 2021).

¹⁷ The one notable exception is the appointment of Liaison Counsel. But even "Lead Counsel" are frequently appointed from outside the MDL Court's jurisdiction.

Pleasant, and Columbia $SC.^{18}$ Additionally appointed Co-Class Counsel is located in Chicago. 19

- 35. These practical considerations are reflected in the caselaw.
- 36. For example, in the *Transvaginal Mesh Litigation*, Judge Goodwin, sitting in the Southern District of West Virginia, observed that "these MDLs encompass law firms from across the country and are national in scope" and therefore: "When selecting an hourly rate for determining legal fees the court cannot consider just one market because 'the relevant legal community' is one national in nature."
- 37. The U.S. Second Circuit Court of Appeals had recognized in *Agent Orange* that "the use of national hourly rates in exceptional multiparty cases of national scope, where dozens of non-local counsel are involved, appears to be the best available method of ensuring adherence to the principles of the lodestar analysis." Judge Fallon, in the *Vioxx* MDL, used an average of the rates that were reported by the common benefit attorneys. Although recognizing that billing rates vary among legal markets, the Court found that "the attorneys come from states across the country. Thus a more national rate is the appropriate pole star to guide the Court." This approach has also been followed, not only by Judge Goodwin in *Transvaginal Mesh*, but also by Judge Barbier in the *BP Oil Spill Litigation* and by Judge Doherty in the *Actos Litigation*. ²³

¹⁸ See CASE MANAGEMENT ORDER NO. 2, No.18-2873, Rec. Doc. 48 (D.S.C. March 20, 2019) ¶¶2-4, and CASE MANAGEMENT ORDER NO. 3, No.18-2873, Rec. Doc. 72 (D.S.C. April 26, 2019) ¶6. See also CASE MANAGEMENT ORDER NO. 10, No.18-2873, Rec. Doc. 529 (D.S.C. March 23, 2020) ¶¶3-7; CASE MANAGEMENT ORDER NO. 10.A, No.18-2873, Rec. Doc. 536 (D.S.C. March 30, 2020); CASE MANAGEMENT ORDER NO. 14, No.18-2873, Rec. Doc. 1112 (D.S.C. Jan. 15, 2021); CASE MANAGEMENT ORDER NO. 15, No.18-2873, Rec. Doc. 1358 (D.S.C. March 24, 2021) ¶¶ 4-6); CASE MANAGEMENT ORDER NO. 24, No.18-2873, Rec. Doc. 2259 (D.S.C. March 30, 2022) ¶¶ 4-6.

 $^{^{19}}$ See Preliminary Approval Order, No.18-2873, Rec. Doc. 3603 (D.S.C. Aug. 22, 2023) at pp.4-5 $\P 7.$

²⁰ <u>In re Cook Medical, Inc., Pelvic Repair Systems Products Liability Litigation,</u> 365 F.Supp.3d 685, 701 (S.D.W.Va. 2019).

²¹ In re Agent Orange Prod. Liab. Litig., 818 F.2d 226, 232 (2d Cir. 1987).

²² <u>Vioxx</u>, <u>supra</u>, 760 F.Supp.2d at 660. *See also* FALLON, *Common Benefit Fees in Multidistrict Litigation*, 74 La.L.Rev. 371, 383 (2014) ("When the attorneys come from all parts of the country, as is often the case, it is appropriate to use some average of the various rates").

²³ See Deepwater Horizon, supra, Rec. Doc. 21849 (Oct. 25, 2016) at p.40 (citing *Vioxx*); In re Actos, 274 F.Supp.3d 485, 521 (W.D.La. 2017) ("In reality, with an MDL, the 'relevant legal community' is, in fact, as the Honorable Eldon Fallon noted in *Vioxx* ... a national collective.... Therefore, this Court is of the opinion a broader view of what constitutes the 'relevant legal community' when dealing with an MDL of this size is appropriate to address a lodestar evaluation").

- 38. Fourth Circuit caselaw also recognizes that the specialized nature and complexity of a case may make it appropriate to look to the prevailing rates in other communities.²⁴ While those decisions sometimes ask whether it was reasonable or necessary for the litigant to have selected an attorney from outside the community in order to prosecute the case successfully, that type of consideration makes little sense within the context of an MDL.
- 39. No one doubts that there were and are attorneys within the District qualified to represent the plaintiffs in complex litigation, (including some of the common benefit attorneys involved), but it would place the plaintiffs, collectively, at an extreme disadvantage if they could only draw from attorneys located within a Transferee District.
- 40. In order to successfully prosecute a case of this magnitude and complexity, the talents and resources of many law firms are necessary. In my experience, this is only accomplished by drawing on a diverse group of firms who can offer different levels of personal and financial commitment, across multiple areas of specialization and expertise, who can collectively afford to engage in a sustained, protracted, and at times all-consuming effort. Over the course of an MDL, different firms, and their attorneys, tend to get called away, from time to time, due to other personal and professional commitments. At those times, other lawyers and firms will have to step up. And it is difficult to predict at the outset who exactly will be necessary or available over the course of the litigation. There are only a limited number of firms around the country that have the specialized knowledge of complex and environmental law, the ability to commit their resources, and the willingness to invest their time, money and efforts into such a large and difficult case. The likelihood of finding such lawyers and firms within one judicial District is small to non-existent.

²⁴ See, e.g., Rum Creek Coal Sales, Inc v. Caperton, 31 F.3d 169, 175 (4th Cir. 1994); National Wildlife Federation v. Hanson, 859 F.2d 313, 317 (4th Cir.1988); Nutramax Laboratories, Inc. v. Manna Pro Products, No.16-1255, 2017 U.S.Dist.LEXIS 57964, 2017 WL 1371080 at *3 (D.S.C. 2017); Phillips v. Triad Guar. Inc., No.09-71, 2016 U.S.Dist.LEXIS 60950, 2016 WL 2636289 (M.D.N.C. May 9, 2016) (although Lead Counsel's hourly rates are much higher than the hourly rates generally charged in this jurisdiction, "they are within the range of reasonableness for PSLRA cases, where the market for class action attorneys is nationwide and populated by very experienced attorneys with excellent credentials"). Although outside of the Fourth Circuit, a District Court sitting in the Middle District of Florida recently applied a National Rate when evaluating a fee request by "perhaps the only consumer class action firm in Orlando." The Court said: "Put simply, in complex consumer class actions, the 'market rate' derives less from an attorney's physical location than from her actual competitors – wherever they may be." ORDER, Anthony Sos v. State Farm, No.17-0890, Rec. Doc. 256 (M.D.Fla. March 19, 2021) (citing Jeffboat LLC v. Dir., OWCP, 553 F.3d 487, 491 (7th Cir. 2009) (reading "community" to imply a "community of practitioners" rather than the "local market area" and suggesting that the geographic scope may sometimes need to be expanded "particularly when ... the subject matter of the litigation is one where the attorneys practicing it are highly specialized and the market for legal services in that area is a national market")). See also, e.g., McCurley v. Flowers Foods, Inc., No.16-0194, 2018 U.S.Dist.LEXIS 226234 at *4 (D.S.C. Sept. 10, 2018) ("Class counsel representing the Class here has extensive, national class action experience. In addition, Defendants are part of a national corporation and the issues involved here are part of Defendants' national operation. Under the circumstances of this case and the material implications to Defendants' business model, class counsels' rates are reasonably applied here").

- 41. Indeed, MDL Transferee Judges are encouraged to appoint Steering Committees with geographical diversity. ²⁵
- 42. The MDL transfer under 28 U.S.C. §1407 is for administrative and procedural purposes, and is not intended to alter substantive rights. ²⁶
- 43. Neither the MDL litigants nor their attorneys select the venue.
- 44. Many of the attorneys representing MDL plaintiffs (and defendants) are hired before the MDL is established or the transferee court is selected.
- 45. Moreover, it is appropriate, if not necessary, to hire counsel in the various Transferor Districts, in the event that the matter is not resolved in the MDL and needs to be remanded back to the Transferor District or some other appropriate District for trial.
- 46. As Judge Doherty observed in the *Actos Litigation*:
 - "... in an MDL, there are as many separate counsel as there are separate claims, and each claim retains its own independent procedural vehicle, and identity, as well as its own home venue for resolution the location and venue of the MDL court being only temporary in time, and limited in scope
 - "... in MDLs the venue for resolution of each case remains the venue of original filing for that case. There is no collective venue but for the temporary venue of the court, temporarily empowered to handle pretrial matters, with ultimate resolution to occur in the original court of proper venue, unless previously terminated within the MDL
 - "Thus, with an MDL, there is no inherent requirement that the transferee district(s) be the situs of the conduct complained of, nor the district where any party is located, nor where any counsel is located, nor where any acts might

limited. In the *BP Oil Spill Litigation*, for example, many of the Steering Committee members were appointed from the affected Gulf Coast area; but the Committee also included Lieff Cabraser from San Francisco, Weitz & Luxenburg from New York, Baron & Budd from Dallas, Motley Rice from Charleston, and Jeffrey Briet from Virginia; additional Common Benefit Attorneys contributed to the effort from places like Boston, New York, Philadelphia, Portland, Norfolk and Kentucky. *See, e.g.*, FEE COMMITTEE RECOMMENDATION, *Deepwater Horizon*, No.10-2179, Rec. Doc. 22628 (E.D.La. filed April 11, 2017). In the recent East Palestine Train Derailment Matter, which would seem to be fairly localized, the Court appointed a Steering Committee that includes lawyers from Nashville, Charleston, New York, Philadelphia, Puerto Rico, and Pensacola, among other places, with Co-Lead Counsel from Denver, San Francisco, and New York. *See, e.g.*, ORDER, *Feezle, et al v. Norfolk Southern*, No.23-0242, Rec. Doc. 28 (N.D.Ohio April 5, 2023).

²⁶ See generally Lexecon Inc. v. Milberg Weiss, 523 U.S. 26 (1998); see also, e.g., <u>Axline v. 3M</u> <u>Co.</u>, 8 F.4th 667, 674 (8th Cir. 2021) (even when a lawsuit is directly filed into an MDL, the "forum" for purposes of substantive law analysis remains the State where the action originated).

have occurred, nor where the work should or might be done. In fact, as a practical matter, often no party is a resident of the district selected for the MDL court, and it is not at all unusual that none of the counsel serving for the common benefit is from the location of the MDL court, nor is any of the discovery or pretrial work performed in that venue. Indeed, the selection of the MDL judge and court location historically has had little to do with the location of the defendant or the location of the plaintiffs, or where original venue is proper for the many cases involved – venue being suspended by the statute – rather, that selection is made by the panel with an eye to 'the convenience of the parties and witnesses' and to the 'just and efficient conduct' of such actions, and historically has keyed more to the capability of the judge and the judge's court's ability to handle such a large collective of cases, and practical considerations such as ease of transportation for the expected out of state counsel, witnesses, and parties when working in a given court. Thus, to tie the allowable fee for out of state counsel representing clients in individual suits filed throughout the country and destined to be resolved in courts throughout the country to the fees prevalent in the locality of the court selected to handle the temporary collective, does not support or display the same logic as with class actions. Rather, such a requirement in an MDL, in fact, could have unintended negative and harmful consequences, by having the locations which might support a higher hourly rate being favored by counsel over locations which might reflect a lower hourly rate, and act to bypass courts which might be well suited to the task at hand and bypass a judge who might be highly capable, and thus, handicap the sought judicial efficiency. Requiring common benefit fees in MDLs to be determined by the typical hourly rates charged in the locality of the transferee court - which might have little if any connection or relationship to the parties, the counsel, the claims made, or proper venue of the many cases involved – does not hold the same compelling logic as it does with a class action

"While this MDL court is located in Lafayette, Louisiana, only a portion of the work in the MDL was performed by attorneys in the physical area of Lafayette, Louisiana and that work, for the most part, was tied directly to participation in Court matters. Rather, the legal community of the attorneys who prosecuted the MDL, quite literally, spans the nation, conducting work across the nation and outside the United States, for the collective benefit of cases properly filed across the nation, and destined, by statute, to be returned to and resolved in courts located across the nation. While the legal community of Lafayette, Louisiana is no less skilled or professional than those of, perhaps, San Francisco or New York, in an MDL of this nature, the differing local rates that might prevail in San Francisco or New York or in Lafayette, Louisiana should not by themselves determine the rates of counsel from all across the nation who did work for the benefit of cases from across the nation, destined to be resolved in courts across the nation. To use the typical hourly rates charged in the area which happens to be where the selected and

temporary MDL Court sits – which, again, almost always is not where all of the parties reside, or where the majority of counsel practice, or the proper venue for every member case – such as here, Lafayette, Louisiana, to calculate the lodestar, again, clearly lacks the compelling logic found in a class action and as noted, would result in an arbitrary determination, higher or lower than that which should be proper for compensation, either for the time expended, or for the caliber of work produced. Again, MDLs, by their statutory creation, represent a temporary collective of cases from across the nation, pursued by a nationwide collective of counsel, who engage in a national practice, for the common benefit of a collection of nationwide claimants."²⁷

47. In this particular MDL, these considerations are even more compelling, given the significant challenges presented by the COVID-19 pandemic. Many of the proceedings, as I understand it, had to be conducted remotely, from the attorneys' own offices or homes. 28, 29

²⁷ Actos, supra, 274 F.Supp.3d at 517 and 519-521 (emphasis in original).

²⁸ See, e.g., CASE MANAGEMENT ORDER NO. 11 (Remote Depositions), No.18-2873, Rec. Doc. 680 (D.S.C. June 19, 2020); CASE MANAGEMENT ORDER NO. 11A, No.18-2873, Rec. Doc. 1173 (D.S.C. Feb. 8, 2021); and CASE MANAGEMENT ORDER NO. 11B, No.18-2873, Rec. Doc. 1778 (D.S.C. July 15, 2021).

²⁹ This is in sharp contrast to the *BP Oil Spill* MDL, for example, where a physical War Room / Document Depository was staffed in New Orleans full-time by common benefit attorneys, and virtually all of the depositions were conducted in New Orleans. (And yet nevertheless a national blended rate was applied.)

"Lodestar" Rates Generally

- 48. The premise of the lodestar method is that "the reasonable value of an attorney's time should be based upon the price that time normally commands in the marketplace in which it is offered." Some courts start from the proposition that the rate the lawyer in question actually demands and is paid is reasonable within that marketplace for that case. And/or the court may look to average rates that are generally known, or published, or otherwise understood for attorneys practicing in the area. And/or the court may look to rates that have been previously reported or approved within that District. ³¹
- 49. Hence, the reported and approved rates in one-off, single-plaintiff, run-of-the-mill fee-shifting cases often tend to be "baked into", if not explicitly relied on, in common benefit cases.
- 50. In my opinion, (and as implicitly and/or explicitly experienced and/or expressed by several of the courts who have been faced with these fee requests), it is challenging to apply such precedent in the context of an MDL, as:
 - i. Common Benefit Attorneys are not hired; they are appointed by the Court. There is, in essence, no "market" for Common Benefit Attorneys. At least in the sense that you could determine what their time normally commands by looking at their retainer agreements with their own clients. For one thing, the overwhelming majority of those contracts are going to be based on a percentage of recovery, not an hourly rate. But, perhaps more importantly, the attorney in question is not being hired to be the client's "Lead Counsel" or "Liaison Counsel" or "Plaintiffs' Executive Committee" member or other common

³⁰ See THIRD CIRCUIT TASK FORCE, Court Awarded Attorney Fees, 108 F.R.D. 237, 244 (1985). See also, e.g., Perdue v. Kenny A, 559 U.S. 542, 551 (2010) ("the lodestar method produces an award that roughly approximates the fee that the prevailing attorney would have received if he or she had been representing a paying client who was billed by the hour in a comparable case").

³¹ See, e.g., Rum Creek Coal Sales v. Caperton, 31 F.3d 169, 175 (4th Cir. 1994) (The hourly rate included in an attorney's fee is fact intensive and is best guided by what attorneys earn from paying clients for similar services in similar circumstances. "While evidence of fees paid to attorneys of comparable skill in similar circumstances is relevant, so too is the rate actually charged by the petitioning attorneys when it is shown that they have collected those rates in the past from the client") (citing Gusman v. Unisys Corp., 986 F.2d 1146 (7th Cir. 1993) (recognizing that attorney's actual billing rate provides a "starting point" for purposes of establishing a prevailing market rate)); see also, e.g., Muzikowski v. Paramount Pictures, 477 F.3d 899, 909-910 (7th Cir. 2007) ("the attorney's actual billing rate for comparable work is presumptively appropriate to use as the market rate.... If the court is unable to determine the attorney's true billing rate ... (because he maintains a contingent fee or public interest practice, for example)" the court should "look to the next best evidence - the rate charged by lawyers in the community of reasonably comparable skill, experience, and reputation").

benefit attorney; he or she is simply being hired to represent that litigant with respect to his or her own individual case.³²

- ii. The attorneys involved in these cases generally (and the PEC Members in this case in particular) have much more knowledge, skill, experience, and reputation than the ordinary lawyer practicing in their geographical area. In this particular MDL, for example, the PEC includes firms that are not only highly experienced and respected in complex and environmental litigation generally, but are among the relatively few firms with specialized experience in these particular types of water system contamination cases.³³ Both Rule 1.5(a) and the *Johnson/Barber* Factors explicitly use this as a basis in assessing the reasonableness of an attorney's fee.³⁴ And,
- iii. Multi-District Litigation of this nature is typically much more difficult, expensive, lengthy and complex than a single-plaintiff civil rights, employment benefits or statutory fraud case. Which is also an important consideration under Rule 1.5 and *Johnson / Barber*. 35

³² To the extent there can be said to be a "market" for common benefit attorneys, it is driven overwhelmingly by an anticipated percentage-of-benefit, and not an hourly-based fee. The hours, if factored at all, only tend to provide a rough or approximate "cross-check" on the percentage.

³³ See generally Memorandum in Support of Motion for Preliminary Approval, Camden v. DuPont, No.23-3230, Rec. Doc. 4 (D.S.C. filed July 10, 2023) at pp.40-41; DECLARATION OF SCOTT SUMMY, Rec. Doc. 4-3 (signed July 9, 2023 and filed July 10, 2023) ¶¶4-5; DECLARATION OF MICHAEL LONDON, Rec. Doc. 4-4 (July 10, 2023) ¶¶7-15; DECLARATION OF PAUL NAPOLI, Rec. Doc. 4-5 (July 10, 2023) ¶¶3-7; DECLARATION OF ELIZABETH FEGAN, Rec. Doc. 4-7 (signed July 8, 2023 and filed July 10, 2023) ¶¶9-10.

³⁴ See ABA MODEL RULE OF PROFESSIONAL CONDUCT 1.5(a)(7) ("the experience, reputation, and ability of the lawyer or lawyers performing the services"); Barber v. Kimbrell's Inc., 577 F.2d 216, 226 n.28 (4th Cir. 1978) (citing Johnson v. Georgia Highway Express, Inc., 488 F.2d 714, 717-719 (5th Cir. 1974) and adopting the so-called *Johnson* Factors, including "the experience, reputation, and ability of the attorney").

³⁵ See, e.g., ABA MODEL RULE 1.5(a)(1) ("the novelty and difficulty of the questions involved, and the skill requisite to perform the legal service properly"); (a)(2) ("the likelihood ... that the acceptance of the particular employment will preclude other employment by the lawyer"); (a)(4) ("the amount involved"); and (a)(5) ("the time limitations imposed ... by the circumstances"); Barber, 577 F.2d at 226 n.28 (and Johnson, 488 F.2d at 717-719) ((2) the novelty and difficulty of the questions raised; (3) the skill required to properly perform the legal services rendered; (4) the attorney's opportunity costs in pressing the instant litigation; (7) the time limitations imposed; and (8) the amount in controversy).

- 51. In arriving at an appropriate rate for MDL work,³⁶ therefore, the overriding considerations are "the customary fee for *like work*" and "attorneys' fees awards in *similar cases*".³⁷
- 52. As originally conceived, the factors that relate to the skill and experience of counsel and the complexity and difficulty of the litigation were intended to be reflected in the rate, while the factors relating to risk and results were intended to be reflected in the multiplier.³⁸
- 53. In practice, however, some courts would simply use an average or other accepted or reported rate for the locality as the "lodestar" rate, and then apply the *Johnson / Barber* factors to arrive at the multiplier.
- 54. When the court elects to perform a "cross-check", the *Johnson / Barber* factors are often applied methodically in arriving at the appropriate percentage, followed by a straightforward and perfunctory cross-check. In other cases, some or all of the *Johnson / Barber* factors may be discussed in arriving at the rate, but then not specifically addressed in connection with the multiplier. Or some or all of the factors may be discussed in connection with the multiplier, but not in connection with the "lodestar" rate itself. Or

³⁶ *Note* that, throughout this declaration, I tend to speak of MDLs and class actions somewhat interchangeably. Certainly there are similar, if not identical, legal underpinnings to the common fund and common benefit doctrines which inform the courts' awards of class counsel and/or other common benefit fees in both types of cases. At the same time, however, the courts tend to approach the fee petition and approval process in consumer class actions and "mass tort" type MDLs somewhat differently. (In part because the leadership structures in securities and/or consumer class actions tend to be a lot more streamlined, and in part because of the presence in mass tort MDLs of numerous individually-retained counsel who are representing the MDL plaintiffs alongside the steering committee.) In the larger complex MDLs, however, the approaches tend to overlap, particularly where, as here, "mass actions" are settled as class actions.

 $^{^{37}}$ See Barber, 577 F.2d at 226 n.28 and Johnson, 488 F.2d at 717-719 Factors Nos. 5 and 12 (emphasis supplied).

³⁸ See generally THIRD CIRCUIT TASK FORCE, Court Awarded Attorney Fees, 108 F.R.D. 237, 243 (1985) ("Hourly rates may vary according to the status of the attorney who performed the work (that is, the attorney's experience, reputation, practice, qualifications, and similar factors) or the nature of the services provided. This multiplication of the number of compensable hours by the reasonable hourly rate was said to constitute the 'lodestar' of the court's fee determination. The 'lodestar' then could be increased or decreased based upon the contingent nature or risk in the particular case involved and the quality of the attorney's work. An increase or decrease of the lodestar amount is referred to as a 'multiplier'"); see also, e.g., Lumber Liquidators I, 952 F.3d at 482 n.7 (citing In re Rite Aid Corp. Sec. Litig., 396 F.3d 294, 305-306 (3d Cir. 2005) ("The lodestar award is calculated by multiplying the number of hours reasonably worked on a client's case by a reasonable hourly billing rate for such services based on the given geographical area, the nature of the services provided, and the experience of the attorneys. The multiplier is a device that attempts to account for the contingent nature or risk involved in a particular case and the quality of the attorneys' work")). See also, e.g., In re Facebook, No.21-15553, 2022 WL 822923, 2022 U.S.App.LEXIS 6935 (9th Cir. March 17, 2022) ("Lodestar multipliers tend to increase as the size of the class's fund increases and are reasonable based on the risks trial would have presented").

- some or all of the factors are discussed in connection in arriving at the rate, and then some or all of the same or different factors are discussed in connection with the multiplier.
- 55. Of course, the Court has broad discretion and flexibility in making these determinations. But the reported or approved "lodestar" rates sometimes tend to vary based on which of the *Johnson / Barber* factors are or are not considered.

A Blended Hourly Rate in the Range of \$725 - \$825 / hr. For Cross-Check Purposes Is Supported by a Totality of the Circumstances in This Case

56. In this MDL, the DuPont (and 3M) settlements are the product of hard-fought, protracted litigation, proceeding along multiple tracks, and made even more challenging by the COVID-19 pandemic. The PEC developed and introduced a Science Day presentation for the Court just months after the commencement of the litigation. Over a two-year-plus discovery period, substantial document production by all defendants and the Department of Justice occurred, followed by depositions of defense witnesses and Federal employees regarding the merits of the parties' claims and defenses; and, thereafter, following exhaustive briefing, supplemental briefing, and an evidentiary hearing, the Court rejected the defendants' Government Contractor Defense. At the same time, the PEC coordinated and completed a bellwether pre-trial process, including fact discovery, expert development and preparation, *Daubert* briefing, the submission of a comprehensive and trial-ready core exhibit list, evidentiary objections, coordination of live witnesses for trial and preparation of their respective direct examinations, the preparation of opening statements, and the briefing of motions in limine. Over 160 depositions were conducted, and many were "cut" for trial presentation. Over 4.6 million documents – 37.4 million pages – were reviewed. Summary judgment motions were briefed. The PEC had to parse the statutory and regulatory history, and follow a complex set of corporate and successor liability issues. While the PEC believed, and still believes, in the case, the litigation was and is risky. And even assuming clear liability, the time and expense of providing causation and damages for the class members is a monumental undertaking, with potential bankruptcy or other insolvency risks, and the need (absent resolution) for years of in-court testimony and other proceedings, together with likely appeals, and all of the intendant delays.³⁹

³⁹ See generally MEMORANDUM IN SUPPORT OF MOTION FOR PRELIMINARY APPROVAL, Camden v. DuPont, No.23-3230, Rec. Doc. 4 (D.S.C. filed July 10, 2023) at pp.7-9, 36-38, and 42-47; DECLARATION OF SCOTT SUMMY, Rec. Doc. 4-3 (signed July 9, 2023 and filed July 10, 2023); DECLARATION OF MICHAEL LONDON, Rec. Doc. 4-4 (July 10, 2023); DECLARATION OF PAUL NAPOLI, Rec. Doc. 4-5 (July 10, 2023); DECLARATION OF ELIZABETH FEGAN, Rec. Doc. 4-7 (signed July 8, 2023 and filed July 10, 2023); DECLARATION OF LAYN PHILLIPS, Rec. Doc. 4-6 (signed July 9, 2023 and filed July 10, 2023).

- 57. With respect to an appropriate hourly rate in this litigation for cross-check purposes, an obvious indication of reasonable and appropriate rates would be the hourly rates that are, in fact, being paid to attorneys compensated on an hourly basis in connection with PFAS Litigation. (Economically speaking, the hourly rates for common benefit attorneys should be considerably higher, as they are advancing their own costs, and accepting, at the very least, multi-year delays in payment, along with the contingent risk of non-collectability. However, these factors are properly accounted for in the multiplier, as opposed to the base "lodestar" rate.)
- 58. While the actual rates being charged by defense counsel are not generally made available to plaintiffs, such rates can be drawn from publicly available sources, such as the fee petitions that many of these firms submit into the record in connection with Bankruptcy proceedings.

⁴⁰ See, e.g., Chrapliwy v. Uniroyal, 670 F.2d 760, 768 n.18 (7th Cir. 1982) ("The rates charged by the defendant's attorneys provide a useful guide to rates customarily charged in this type of case"). Although this approach was rejected by the U.S. Fifth Circuit in a fee-shifting case, Judge Dennis persuasively suggests that "the Perdue Court's comment that 'the lodestar method produces an award that roughly approximates the fee that the prevailing attorney would have received if he or she had been representing a paying client who was billed by the hour in a comparable case,' does indicate to me that the hourly rates or total fees charged by defense counsel are relevant to the question of what is a reasonable hourly rate or total fee for a prevailing plaintiff's counsel." McClain v. Lufkin Industries, 649 F.3d 374, 388 (5th Cir. 2011) (Dennis, J., dissenting) (citing Perdue, supra, 559 U.S. at 551 (emphasis in original), and Chrapliwy, supra, 670 F.2d at 768 n.18). Notably, in the McClain case, supra, defense counsel's compensation was only 2.63% higher than the fee awarded to plaintiffs, which, the Fifth Circuit majority concedes, would seem to fall within a "rough approximation" of the fee that the prevailing attorney would have received if he or she had been representing a paying client who was billed by the hour in a comparable case. McClain, supra, 649 F.3d at 384. I suspect, moreover, that we do not typically see a comparison of rates in lodestar decisions – not because, as the majority suggests, there is a logical incomparability between the tasks and roles of counsel, but – because courts generally want to avoid disputes over the extent to which defense counsel billing records should be protected as competitively sensitive and/or privileged. See also, e.g., ORDER AND REASONS, In re Deepwater Horizon, MDL No. 2179, Rec. Doc. 21849 (E.D.La. Oct. 25, 2016) at p.40 fn.14 (citing hourly rates paid to counsel in the litigation as additional support for the blended rate). It is also my recollection that the Special Master asked defense counsel to submit their hourly rates in camera in Scott v. American Tobacco (see ADDENDUM A at pp.10 and 11). See also, e.g., McCurley, supra, No.16-0194, 2018 U.S.Dist.LEXIS 226234 at *4 (D.S.C. Sept. 10, 2018) ("Defendants are part of a national corporation and the issues involved here are part of Defendants' national operation. Under the circumstances of this case and the material implications to Defendants' business model, class counsels' rates are reasonably applied here").

	2022	2023
Partner Rates	\$975 - \$2,100	\$1,100 - \$2,250
Associate Rates	\$610 - \$1,325	\$665 - \$1,400
[Blended Average]	[\$1,252.50]	[1,353.75]

The Kirkland & Ellis rates were reported as:

	2022	2023
Partner Rates (highest)	\$1,995	\$2,245
Associate Rates (highest)	\$1,245	\$1,395

The Mayer Brown rates were reported as:

	2022	2023
Partner Rates (highest)	\$1,635	\$1,940
Associate Rates (highest)	\$970	\$1,075

- These numbers are high, given the absence of paralegal / law clerk rates, as well as an 60. apparent focus on the rates at the higher ends of each range.⁴²
- 61. A more fulsome picture can be observed by looking at, for example, the JC Penny Bankruptcy filings, which contain more comprehensive defense counsel rates. In June of 2020, for example, Kirkland & Ellis was reporting the following rates: 43

Partner Rates	\$1,075 - \$1,845
Of Counsel Rates	\$625 - \$1,845
Associate Rates	\$610 - \$1,165
Paralegal Rates	\$245 - \$460
[Blended Average]	[\$983.75]

⁴¹ Source: Bloomberg Law analysis of Bankruptcy Dockets. (See "Rising Rates Are Law Firms' Salve Amid Layoffs, Pay Cuts" by Roy Strom, Bloomberg Law (Jan. 19, 2023) (found at https://news.bloomberglaw.com/ business-and-practice/rising-rates-are-law-firms-salve-as-layoffs-and-pay-cuts-surge as of Sept. 26, 2023)) (attached as ADDENDUM F).

⁴² And, of course, the rates paid to Bankruptcy attorneys may be slightly higher than the rates paid to other litigators within the firm.

⁴³ DEBTOR'S APPLICATION FOR RETENTION OF KIRKLAND & ELLIS, *In re J.C. Penny Co.*, No.20-20182, Rec. Doc. 684 (S.D.Tex. Bankruptcy filed June 11, 2020) p.6, ¶13.

62. In 2016, the *Wall Street Journal* reported the following rates for Partners and Of Counsel at some of the top U.S. law firms (including several firms representing Defendants in this MDL) ⁴⁴:

Prokauer Rose	\$925 - 1,475
Ropes & Gray	\$895 - \$1,450
Kirkland & Ellis	\$875 - \$1,445
Skadden Arps	\$935 - \$1,425
Akin Gump	\$725 - \$1,425
Paul Hastings	\$875 - \$1,325
Jones Day	\$600 - \$1,300
Morrison & Foerster	\$825 - \$1,290

- 63. It was also recently reported that, in Houston and Dallas, Kirkland & Ellis partners were billing as much as \$1,797 \$2,225 per hour, and that one of the Weil Gotshall partners was billing as much as \$1,895. 45
- 64. In connection with the LTL (*i.e.* Johnson & Johnson Talc) Bankruptcy, Hogan Lovells filed a Declaration revealing the following rates: ⁴⁶

Partner Rates	\$950 - \$2,465
Counsel Rates	\$910 - \$1,735
Associate Rates	\$605 - \$1,055
Paralegal Rates	\$275 - \$550
[Blended Average]	[\$1,068.12]

Other pleadings filed in the Bankruptcy reflect Partner and Of Counsel rates of: 47

Jones Day	\$1,000 - \$1,450
Skadden Arps	\$900 - \$1,875
Weil Gotshal	\$1,150 - \$1,795
Orrick	\$805 - \$1,750

⁴⁴ "Legal Fees Cross New Mark: \$1,500 an Hour" by Sara Randazzo, <u>Wall Street Journal</u> (Feb. 9, 2016) (available at https://www.wsj.com/articles/legal-fees-reach-new-pinnacle-1-500-an-hour-1454960708).

⁴⁵ See "Texas Lawyers Hit \$2,000 an Hour" by Mark Curriden, <u>The Texas Lawbook</u> (Sept. 25, 2023) (https://texaslawbook.net/texas-lawyers-hit-2000-an-hour/).

 $^{^{46}}$ See Certification of Neal Kumar Katyal, In re LTL Management, No.21-30589, Rec. Doc. 2240-1 (D.N.J. Bankruptcy May 4, 2022) at p.2 $\P 5$.

⁴⁷ See Objection of the Trustee to Retention of Hogan Lovells, *In re LTL Management*, No.21-30589, Rec. Doc. 2324 (D.N.J. Bankruptcy May 4, 2022) at p.6 ¶23. [The retention of Hogan Lovells was, in fact, approved. *See* Order Authorizing Retention of Hogan Lovells, Rec. Doc. 2508 (June 15, 2022).]

65. A second telling set of numbers are the hourly rates actually being billed by lawyers representing the Unsecured Creditors' Committee in the Bankruptcy of Kidde-Fenwal, Inc., a PFAS Defendant: 48

Partners	Associates	Paralegals	Law Clerks	[Blended Rate]
\$1,325 - \$1,895	\$875	\$595	\$495	[893.75]

- 66. These lawyers are representing the same group of litigants against one of the same defendants under what would appear to be much less complex and challenging circumstances.
- 67. A third set of relevant numbers are the rates that have been approved by other courts in similar complex class action proceedings.
- 68. Fourth, we can look at previous MDLs in which blended rates have been approved.
- 69. In *NFL Concussion*, for example, the Court used a blended rate of \$623.05/hour as a cross-check against a percentage-of-benefit fee award.⁴⁹
- 70. While some blended rates utilized for cross-check purposes have been lower,⁵⁰ it is my view that a reasonably higher range of blended rates can and should be accepted.
- 71. First, as noted *supra*, the lodestar-type cross-check is only supposed to be a "rough" approximation, and, at least in my opinion, tends to skew low.
- 72. Secondly, as outlined *supra*, the blended rates of law firms who are defending these MDLs appear to be significantly higher.

 $^{^{48}}$ See FEE APPLICATION, In re Kidde-Fenwal, No.23-10638, Rec. Doc. 392 (D.Del. Bankruptcy filed Sept. 1, 2023).

⁴⁹ See, e.g., <u>In re NFL Players' Concussion Injury Litig.</u>, No.12-02323, 2018 WL 1635648 at *9 (E.D. Pa. April 5, 2018) (approving blended rate of \$623.05 per hour for all common benefit counsel). *See also, e.g.*, OPINION, *NFL Concussion Injury Litig.*, No.12-02323, Rec. Doc. 10019 (E.D. Pa. May 24, 2018), pp.20-21 (approving lodestar for the Lead Counsel firm of \$861.28/hr).

⁵⁰ See, e.g., Cantu-Guerroro v. Lumber Liquidators, 27 F.4th 291, 300 (4th Cir. 2022) ("Lumber Liquidators II") (accepting a blended rate of \$524/hr from 2018); ORDER, In re Volkswagen, No.15-2672, Rec. Doc. 3053 [2017 WL 1047834] (N.D.Cal. Mar. 17, 2017) at p.8 (accepting a blended average hourly rate of \$529/hr in 2017); Deepwater Horizon, supra, Rec. Doc. 21849 (approving an average/blended rate of \$450 in 2016); Vioxx, supra, 760 F.Supp.2d at 660 (approving an average/blended rate of \$443.29 in 2010); In re Enron, 586 F.Supp.2d 732, 779-780 (S.D.Tex. 2008) (approving an average/blended hourly rate of \$456 in 2008).

- 73. Third, the blended rates are built, at least in part, upon average surveyed rate data and/or hourly rates that have been approved in run-of-the-mill statutory fee-shifting cases, and not high stakes complex litigation performed by highly reputable, skillful, and experienced litigators.⁵¹
- 74. For example, Professor Rubenstein recently examined the specific cases used to develop the Fitzpatrick Matrix,⁵² and found that the hourly rates in the eight class action cases were 43.98% higher than the hourly rates in the seventy-four routine fee-shifting cases.⁵³
- 75. Finally, and perhaps most significantly, we have seen hourly rates steadily increase over the past two decades, and particularly among top-level litigators involved in complex and difficult litigation.
- 76. The primary work in the *BP Oil Spill Litigation*, for example, was performed between 2010 and 2015, with the highest concentration of efforts from 2010 to 2013.
- 77. This litigation, as I understand it, did not even commence until 2018,⁵⁴ two years after the *BP Oil Spill Litigation* Approval Order was entered, and five-to-eight years after much of the work was performed.
- 78. Based on my knowledge, understanding and experience, lawyer rates have materially increased since the *BP Oil Spill Litigation* (2010-2016), and certainly since *Vioxx* (2004-2010), to say nothing of *Enron* (2001-2008). (And, indeed, it is my opinion that the *BP* rate is low, not only because of the reasons discussed in Paragraph 24 *supra*, but also by simple virtue of the fact that it reflects no material increase from the *Vioxx* rate, entered six years earlier, and is even lower than the *Enron* rate, eight years prior.)

⁵¹ In some cases, they have also been based, in whole or in part, on "rates" that were reported by the participating common benefit firms themselves, which, from a reliability standpoint, suffer from some of the issues outlined in Paragraphs 28-29 and 50 *supra*.

 $^{^{52}}$ The development and use of the so-called "Fitzpatrick Matrix" is defined and described in ADDENDUM C at fn.8, and the Matrix is attached as ADDENDUM E.

⁵³ DECLARATION OF WILLIAM B. RUBENSTEIN, *National Veterans Legal Services v. United States*, No.16-745, Rec. Doc. 160-2 (D.D.C. filed Oct. 3, 2023) at pp.15-16 ¶21-22; *see also, e.g.*, SUPPLEMENTAL DECLARATION OF BRIAN FITZPATRICK, *National Veterans Legal Services v. United States*, No.16-745, Rec. Doc. 160-1 (D.D.C. filed Oct. 3, 2023) at p.3 ¶6 ("The Matrix was created using a trove of data from all manner of complex cases and all manner of lawyers; the data includes individual employment-discrimination cases, FOIA cases, and Fair Debt Collection Practices Act cases, among many others. The numbers in the Matrix fall in the *middle* of this data").

⁵⁴ It is worth noting that, while the PFAS Litigation broadly commenced in 2018, the MDL was not established until December, and the PEC was not appointed until March of 2019. *See* TRANSFER ORDER, *In re Aqueous Film-Forming Foams*, MDL No. 2873, Rec. Doc. 239 (J.P.M.L. Dec. 7, 2018) *and* CMO 2, No.18-2873, Rec. Doc. 48 (D.S.C. March 20, 2019).

- 79. The Laffey Matrix,⁵⁵ at the same time, reflects that rates increased by approximately 18% between 2001 when *Enron* started and 2004 when *Vioxx* started, and then increased another 23-24% by the time *BP* started in 2010, another 25-26% by 2018 when this case started, and then approximately 18% since that time.⁵⁶
- 80. The Fitzpatrick Matrix similarly reflects a steady increase in standard legal billing rates of around 50% from 2013 to 2021.⁵⁷
- 81. Taking the *NFL Concussion* decision as an example, the \$623.05/hr rate from 2018 would be \$735.20/hr with an 18% increase.
- 82. Based on the foregoing, I believe that a blended rate in the range of \$725 \$825 / hour is supported by the hourly rates being billed by the firms defending the litigation; the hourly rates being billed by the lawyers working for the creditors' committee in PFAS-related bankruptcy proceedings; the hourly rates which have been approved for these and other class action attorneys in other class actions; the blended rates that have been approved in large complex MDLs; and the general inflation of hourly rates across the legal market, particularly in complex and high stakes litigation.
- 83. Additional Hourly Rate Information and Analysis that might be helpful and/or relevant is provided for the Court's reference in ADDENDUM C.

Additional Hours for Settlement Implementation and Administration

- 84. When a class or other "global" settlement is approved in one of these large mass tort MDLs or other similar proceedings, class counsel (and/or other common benefit attorneys) are generally called upon to expend numerous additional hours in connection with settlement implementation and administration.
- 85. In the *BP Oil Spill* MDL, for example, class counsel spent voluminous hours in settlement implementation and administration.⁵⁸ While that situation was somewhat atypical, class

⁵⁵ The development and use of the so-called "Laffey Matrix" is defined and described in ADDENDUM C at fn.8 (*see also generally* p.2 and fn.5), and the Matrix is attached as ADDENDUM D.

⁵⁶ The Supreme Court has suggested that, when a case extends over a multi-year period, the use of current rates is "an appropriate adjustment for delay in payment." <u>Missouri v. Jenkins</u>, 491 U.S. 274, 283–284 (1989).

⁵⁷ Specifically, the rates for paralegals and law clerks increased by 53.8%. The rates for lawyers in practice for only two years increased by 76%. The rates for lawyers in practice for ten years increased by 53.6%. The rates for lawyers in practice for twenty years increased by 42.5%. And the rates for lawyers in practice for thirty years increased by 38.3%. (These five rate increases average out to 52.8%.) *See* ADDENDUM E.

⁵⁸ See, e.g., DECLARATION OF STEPHEN J. HERMAN AND JAMES PARKERSON ROY, *In re Deepwater Horizon*, MDL No. 2179, Rec. Doc. 21098-1 (July 14, 2016), at pp.20-27, ¶¶ 68-88; PETITION FOR REIMBURSEMENT OF EXPENSES AND COLLECTIVE COMMON BENEFIT FEE AWARD, Rec. Doc. 21098 (July 21, 2016), at pp.53-63; *and* In re Deepwater Horizon, MDL No. 2179, Rec. Doc. 21849 [2016 U.S.Dist.LEXIS 147378] (E.D.La. Oct. 25, 2016) at pp.15-21.

counsel are generally called upon to assist class members with claims; to answer questions; to respond to inquiries from the Claims Administrator and/or the Court, and to address any disputes with the Defendants over interpretation; to monitor the qualified settlement funds and administrative expenses; and to assist class members and the Claims Administrators in resolving factual and/or interpretive discrepancies. In the *Citizens* class action,⁵⁹ the *Vioxx* settlement,⁶⁰ and the settlement with Knauf in the *Chinese Drywall* litigation,⁶¹ the PSC / class counsel spent a lot of time assisting the class members, their individually-retained counsel, and the Court, with settlement implementation and administration. But even in fairly straight-forward distributions, like the *Chinese Drywall* Taishan settlement,⁶² or *McGowan*,⁶³ there are always questions and issues that arise.

- 86. In this particular case, I would anticipate that Class Counsel have spent and will continue to spend a lot of time assisting class members, the Claims Administrator, and/or the Court. There are a variety of different types of claims, with different claims forms, and certain testing requirements. I suspect that questions and/or disputes will arise regarding the PWS Registration, the Duo Multi-Factor Authentication, the specific Baseline Testing requirements and/or results, which Claim Form or Forms to use, allocation issues, the Supplemental Claims, and the Special Needs Claims. While the Claims Administrator will likely address much of this, I would expect that many class members will also enlist Class Counsel to answer their questions and to advocate for them when disputes or discrepancies with the Claims Administrator arise. I would also expect the Claims Administrator and/or the Court to enlist Class Counsel with respect to any interpretation issues, as well as with respect to the supervision and use of the qualified settlement fund.
- 87. Notably, the Phase Two Testing System Claims Form is not due until January 1, 2026; the Phase Two Public Water System Claims Form is not due until June 30, 2026; the Phase Two Special Needs Claims form is not due until August 1, 2026; and the Phase One Supplemental Fund Claims Form and the Phase Two Supplemental Fund Claims Form are not due until December 31, 2030.⁶⁴ Thus, the parties and Class Counsel will be dealing with DuPont Public Water System settlement administration issues into 2031, and beyond.

⁵⁹ See Oubre v. Louisiana Citizens Fair Plan, No.2011-0097 (La. 12/16/2011), 79 So.3d 987.

⁶⁰ See Vioxx, supra, 760 F.Supp.2d 640 (E.D.La. 2010).

 $^{^{61}}$ See Chinese Drywall, No.09-7628, 2012 WL 92498, 2012 U.S.Dist.LEXIS 5223 (E.D.La. Jan. 10, 2012).

⁶² See Chinese Drywall, 424 F.Supp.3d 456 (E.D.La. 2020).

⁶³ See Fairway v. McGowan Enterprises, No.16-3782, Rec. Doc. 60 (E.D.La. March 20, 2018).

⁶⁴ See CLASS NOTICE (Long Form), ¶ XIII (Important Deadlines) (https://www.pfaswatersettlement.com/wp-content/uploads/2023/08/DuPont-Notice-Long-Form-with-Coversheet.pdf) at p.19. (see also CLASS NOTICE (Long Form), ¶XIII (Important Deadlines) (https://www.pfaswatersettlement.com/wp-content/uploads/2023/09/AFF-3M-Long-Form-Notice-Final.pdf) at p.12).

88. Hence, it is my opinion that the Court should take into consideration, in performing the "cross-check", that the hours expended to-date are likely going to be substantially less than the total hours expended by the PEC and other common benefit attorneys in connection with the settled claims. 65

Hold-Back for Settlement Implementation and Administration

- 89. As previously discussed, it is likely that many hours, and perhaps some expenses, will have to be expended on settlement implementation and administration.
- 90. In addition, the PEC members (and/or other common benefit attorneys) are currently helping class members and are obligated to continue to assist the class in connection with their Court appointments in the MDL. These ongoing efforts are going to require additional shared expense funding for future litigation expenses.
- 91. In the *NFL Litigation*, for example, the Court ordered the Claims Administrator to hold back 5% of the fees awarded for settlement implementation. ⁶⁶
- 92. Therefore, while more of a matter of allocation/distribution than fee approval, the PEC should be permitted to hold back some of the fees awarded to compensate common benefit attorneys for post-settlement administration with respect to the DuPont Public Water System Settlement, and/or to fund ongoing and future PFAS-related litigation.
- 93. I understand that the PEC is requesting a 5% hold-back, which seems reasonable based on my experience.

⁶⁵ See, e.g., ORDER, *In re Volkswagen*, No.15-2672, Rec. Doc. 3053 [2017 WL 1047834] (N.D.Cal. Mar. 17, 2017) at p.8 (granting fee request reserving "an additional 21,000 hours" for post-settlement work); Reyes v. Bakery & Confectionery Union, 281 F.Supp.3d 833, 853, 856–57 (N.D.Cal. 2017) (including estimated hours for "future work" related to, *inter alia*, "managing class members' claims"). *See also*, e.g., Sewell v. Bovis Lend Lease, Inc., No.09-6548, 2012 U.S.Dist.LEXIS 53556, 2012 WL 1320124 at *13 (S.D.N.Y. April 20, 2012) (*citing* Bellifemine v. Sanofi, 2010 U.S.Dist.LEXIS 79679, 2010 WL 3119374, at *6 (S.D.N.Y. Aug. 6, 2010)) ("where class counsel will be required to spend significant additional time on this litigation in connection with implementing and monitoring the settlement, the multiplier will actually be significantly lower because the award includes not only time spent prior to the award, but after in enforcing the settlement").

⁶⁶ See EXPLANATION AND ORDER, In re NFL Concussion Injury Litigation, No.12-2323, Rec. Doc. 10019 (E.D.Pa. May 24, 2018) at p.4 and fn.2.

ADDENDA

The following Addenda are attached hereto and incorporated herewith:

- A. Current Resume
- B. Documents Reviewed and Considered
- C. Additional Rate Information and Analysis
- D. Laffey Matrix
- E. Fitzpatrick Matrix
- F. Bloomberg Law Rate Information
- G. Excerpts From ELM 2020 Real Rate Report

I declare, under penalty of perjury, that the above and foregoing is true and correct to the best of my knowledge, information, and belief.

This 13th day October, 2023.

Stephen J. Herman, Esq.

STEPHEN J. HERMAN

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E-Mail: sherman@hhklawfirm.com

New Orleans, LA

PERSONAL

Born, in New Orleans, Louisiana, on November 22, 1968.

Married, in 1994, to the Honorable Karen Kirshbom Herman, Louisiana Fourth Circuit Court of Appeal.

Children: Alexandra Rae Herman, 23, and Harris Andrew Herman, 20.

EDUCATION

Isidore Newman School New Orleans, LA

Board of Regents Scholar, 1987.

National Merit Letter of Commendation, 1986.

Dartmouth College Hanover, NH

Bachelor of Arts, 1991.

GPA, Overall: 3.3; Major (English): 3.6.

Third Honor Group, 1989-1990.

Citation of Excellence in the Study of Milton, 1990.

Citation of Excellence in the Study of Shakespeare, 1990.

Winner of the Elenor Frost Playwriting Competition, 1991.

Tulane University School of Law

Juris Doctor, Magna Cum Laude, 1994. GPA: 3.52; Class Rank: Top Ten Percent.

Order of the Coif.

EMPLOYMENT

Herman, Herman & Katz, L.L.C.

Associate, 1995 - 2001.

Partner, 2002 -

Herman Gerel, L.L.P. Atlanta, GA

Associate, 1999 - 2001.

Partner, 2002 -

Justice Harry T. Lemmon, Louisiana Supreme Court

Judicial Clerk, 1994-1995.

Democratic Senatorial Campaign Committee Washington, DC

Paid Intern, 1989.

ACADEMIC POSITIONS

Tulane University Law School

Adjunct Professor of Law, Advanced Civil Procedure: Complex Litigation, 2009 -

Loyola University School of Law

Adjunct Professor, Advanced Torts Seminar on Class Actions, 2005 -

PROFESSIONAL APPOINTMENTS

American Law Institute, Member, 2023 -

Louisiana Attorney Disciplinary Board

Hearing Committee Member, 4th and 5th Circuits, 2008-2010.

Lawyer Chairman, Hearing Committee 56, 2010 -2013.

Southeast Louisiana Legal Services, Board of Directors, 2009-2011

Louisiana State Law Institute, Code of Civil Procedure Committee, Sub-Committee on Multi-District Litigation, 2009.

Louisiana Attorney Fee Review Board, 2014-2015.

Louisiana Supreme Court Committee on Rules of Professional Conduct for Class Actions, Mass Torts and Complex Litigation, 2015-

LSBA Rules of Professional Conduct Committee, 2016 -

LSBA Receivership Panel, 2019 -

ADMISSIONS TO PRACTICE

State of Louisiana, Supreme Court and all inferior courts, 1994.

United States District Courts, Eastern, Western, and Middle Districts of Louisiana, 1995.

U.S. Fifth Circuit Court of Appeals, 1995.

U.S. Ninth Circuit Court of Appeals, 2004.

U.S. Second Circuit Court of Appeals, 2009.

U.S. Eleventh Circuit Court of Appeals, 2020.

U.S. Supreme Court, 2007.

BAR AND TRIAL LAWYER ASSOCIATIONS

International Academy of Trial Lawyers.

Fellow, 2015 -

American Bar Association, 1994 -

Patron Fellow, American Bar Foundation.

Member, Labor and Employment Section, 2004-2017.

Member, Tort Trial and Insurance Practice Section, 2014 -

Member, Litigation Section, 2015 -

American Association for Justice, (formerly ATLA), 1995 -

Executive Committee, 2011-2012.

Board of Governors, 2014 -

Distinguished Service Awards, 2021, 2023.

Harry Philo Award, 2018.

State Delegate, Louisiana, 2007-2013.

Chair, AAJ State Delegates, 2011-2012.

National College of Advocacy (NCA) Board of Trustees, 2011-2017, 2019 -

AAJ Endowment Board, 2010 -

Secretary, 2022.

Wiedemann-Wysocki Award, 2001, 2011.

Heavy Lifting Award, 2012.

Above and Beyond Award, 2019.

Amicus Curiae Committee, 2008 -

Chair, 2019 -

Chair, AI Task Force, 2023 -

Legal Affairs Committee, 2016 -

"Fellow" - National College of Advocacy.

Co-Chair, Gulf Oil Spill Litigation Group, 2010-2018.

Co-Chair, Chinese Drywall Litigation Group, 2009-2011.

Co-Chair, Dialysis Products Litigation Group, 2012.

ATLA Press Advisory Board, 1999-2002, 2007-2010.

Keyperson Committee, 1996 -

AAJ PAC Eagle / M-Club.

Leaders' Forum Member.

Constitutional Litigation Committee, 1997 -

Preemption Task Force, 2008 -

Rule 23 Working Group, 2014 -

30(b)(6) Working Group, 2017 -

MDL Working Group, 2018 -

Member, Commercial Law Section, 1996 -

Member, Insurance Law Section, 1996 -

Member, Product Liability Section, 2014 -

Member, Jury Bias Litigation Group, 2015 -

Member, Class Action Litigation Group, 2009 -

Member, Tobacco Litigation Group, 1996 -

Member, Health Care Finance Litigation Group, 1998 -

Member, Electronic Discovery Litigation Group, 2004 -

BAR AND TRIAL LAWYER ASSOCIATIONS (cont.)

Louisiana State Bar Association, 1994 -

Rules of Professional Conduct Committee, 2016 -

Chair, Class Action Section, 2022 -

Fellow, Louisiana Bar Foundation.

Receivership Panel, 2019 -

Cuba Task Force, 2016-2017.

Louisiana Association for Justice, (formerly LTLA), 1995 -

President, 2014-2015.

Stalwart Award, 2017.

Executive Committee, 2011-2017.

Amicus Curiae Committee, 1999 -

Chair, 2017 -

Chair, Maritime Section, 2012-2013.

Chair, Law Office Technology Section, 2006-2007.

Board of Governors, 2004-2017.

Council of Directors, 2006-2017.

AAJ State Delegate, 2007-2013.

President's Advisory Board, 1996-1997, 1999-2000.

Constitutional Litigation Committee, 1996 -

Key Contacts Committee, 1997 -

Speakers Bureau, 1999 -

National Civil Justice Institute (formerly Pound Civil Justice Institute).

President, 2020-2021.

Board of Trustees, 2015-2022.

Association of Professional Responsibility Lawyers.

Civil Justice Foundation.

President, 2003-2004.

Board of Trustees, 1999-2012.

President's Award, 2001.

Public Justice, (formerly TLPJ).

Executive Committee, 2015-2016, 2017-2018.

Board of Trustees, 2010-2022.

Emeritus Board, 2022 -

Membership Committee Co-Chair, 2008-2009.

Louisiana State Network Coordinator, 2000-2012.

Litigation Counsel of America.

Senior Fellow, 2016 -

Fellow, 2007-2016.

Federal Bar Association, New Orleans Chapter.

Board of Trustees, 2018-2023.

Fellow, Federal Bar Association Foundation.

Bar Association of the Fifth Federal Circuit.

New Orleans Bar Association.

President-Elect, 2022 -

Board of Trustees, 2018 -

Treasurer, 2020-2022.

Inn of Court, 2019 -

Attorney Information Exchange Group (AIEG).

Academy of New Orleans Trial Lawyers.

National Association of Legal Fee Analysis (NALFA) (member 2018-2020)

Nation's Top Attorney Fee Experts: Assessing Fees in Class Actions, 2018.

Out-of-State Member of the Mississippi Trial Lawyers Association, Consumer Attorneys of California, the Illinois Trial Lawyers Association, the Florida Justice Association, the Arkansas Trial Lawyers Association, the Arizona Association for Justice, and the Wyoming Trial Lawyers Association.

Injury Board.

PUBLICATIONS

- America and the Law: Challenges for the 21st Century, Austin & Winfield, 1998, (revised edition, Gravier House Press, 1999).
- "Duties Owed by Appointed Counsel to MDL Litigants Whom They Do Not Formally Represent" <u>Loyola Law Review</u>, Vol. 64, p.1 (Spring 2018).*
- "Layers of Lawyers: Parsing the Complexities of Claimant Representation in Mass Tort MDLs," co-authored with Lynn A. Baker, Lewis & Clark Law Review, Vol.24, Issue No.2, p.469 (Spring 2020).**
- "HMO Litigation" Tort Litigation: Preparation and Tactics 2000 and Beyond (West 2003).
- "Spoliation of Evidence" Civil Trial Practice: Winning Techniques of Successful Trial Attorneys (Lawyers & Judges Publishing, 2000), revised and reprinted in, Aircraft Accident Reconstruction and Litigation (Lawyers & Judges Publishing, 2003).
- "Percentage Fee Awards in Common Fund Cases" Tulane Law Review Vol. 74, Nos. 5-6, p.2033 (June 2000).
- "Back to Basics Briefing and Arguing Motions" <u>TRIAL Magazine</u> (Oct. 2019) p.18, and, reprinted in revised and edited form, as: "Tips for Briefing and Arguing Motions" <u>Louisiana Advocates</u> (Nov. 2019) p.9.
- Contributing Author, "Lead Counsel Duties" <u>Standards and Best Practices for Large and Mass Tort MDLs</u> (Bolch Judicial Institute, Duke Law School) (September 2018).
- Editorial Board, <u>Guidelines and Best Practices Implementing 2018 Amendments to Rule 23</u> (Duke Law School Center for Judicial Studies) (August 2018).
- Contributing Author, "Procedures and Standards for Objections and Settlement of Objections Under Rule 23(e)(5)" <u>Guidelines and Best</u>
 Practices Implementing 2018 Amendments to Rule 23 (Duke Law School Center for Judicial Studies) (August 2018).
- "Evidence Preservation and Spoliation" TRIAL Magazine, September 2005, p.50.
- "Federal Preemption: Geier and Its Implications" Louisiana Advocates Vol.XVI, No.1, p.8 (Jan. 2001).
- "The Use and Abuse of Privilege in Discovery" Australian Products Liability Reporter, Vol. 10, No.5 (June 1999).
- "Understanding Spoliation of Evidence" TRIAL Magazine March 2001, p.45.
- Review of In Defense of Tort Law, TRIAL Magazine November 2001, p.86.
- "Proposed Changes to Rule 23: Consulting with Practicing Attorneys" <u>Sidebar</u> Vol. 3, No. 2, p.7 (Spring 2002), reprinted in, <u>The Federal Lawyer</u> Vol. 49, No.8, p.14 (Sept. 2002).
- "Fighting Mandatory Arbitration" <u>Louisiana Advocates</u> Vol.XVII, No.5, p.13 (May 2002).
- "Roark v. Humana: What This New Decision Means for Your Medical Malpractice Cases Involving HMOs" Louisiana Advocates Vol. XVIII, No. 1, p.8 (Jan. 2003).
- "TLPJ Urges Trial Lawyers to Fight Court Secrecy" Louisiana Advocates Vol.XVII, No.6, p.13 (June 2002).
- "Federal Court Upholds Rights of Plaintiffs Who Opted Out of Nationwide Class Action Settlement to Pursue Individual Claims" Louisiana Advocates Vol. XVIII, No. 1, p.14 (Jan. 2003).
- "U.S. Supreme Court Rules Asbestosis Victims Can Recover Damages Based on Fear of Cancer"

 <u>Louisiana Advocates</u> Vol.XVII, No.6, p.7 (June 2003).
- "Being a Savvy Blogger" Louisiana Advocates (July 2007), p.12.
- "How to Maximize the Advantages of E-Mail and Eliminate the Risks" Louisiana Advocates (August 2007), p.6.
- "Standing on the Shoulders of Those Who Came Before Us" Louisiana Advocates Vol. XXIX, No.10 (Oct. 2014).
- "To Protect and Preserve an Independent Judiciary" Louisiana Advocates Vol. XXIX, No.12 (Dec. 2014).
- "Hot Coffee" Louisiana Advocates Vol. XXX, No.2 (Feb. 2015).
- "Personal Remarks" <u>Louisiana Advocates</u> Vol. XXX, No.5 (May 2015).
- "How I Spent My Summer Vacations (and Still Remember the Lessons Learned)" <u>Louisiana Advocates</u> Vol. XXX, No.6 (June 2015).
- "The Long Arc of Justice" Louisiana Advocates Vol. XXX, No.8 (Aug. 2015).
 - * Cited and quoted with approval in Casey v. Denton, No.17-521, 2018 WL 4205153 (S.D.Ill. Sept. 4, 2018).
 - ** Cited in Clopton & Rave, MDL in the States, 115 Nw.U.L.Rev. 1649, 1651 n.3 (2021).

SPEECHES AND PAPERS

- "Removal by Preemption Under the *Avco* Exception...." Litigation at Sunrise, 1996 ATLA Annual Convention, Boston, Massachusetts, July 23, 1996.
- "Spoliation of Evidence and Related Topics" Yours to Choose Seminar, LTLA, New Orleans, Louisiana, December 28, 1996.
- "The Use and Abuse of Privilege in Discovery" Litigation at Sunrise, 1998 ATLA Annual Convention, Washington D.C., July 1998, and Yours to Choose Seminar, LTLA, Baton Rouge, Louisiana, December 30, 1998.
- "Force-Placed Insurance: Banks' Failure to Disclose" Last Chance Seminar, LTLA, New Orleans, Louisiana, December 18, 1998.
- "HMO Litigation" Winter Ski Seminar, LTLA, Aspen, Colorado, March 6, 2000, and Last Chance Seminar, Winning With the Masters, LTLA, New Orleans, Louisiana, Dec. 14, 2000.
- "Class Action Litigation Against HMOs" 2001 ATLA Annual Convention, Montreal, Canada, July 17, 2001.
- "Managing Complex Litigation for the Louisiana Paralegal" Institute for Paralegal Education, New Orleans, Louisiana, July 9, 1999.
- "Subrogation and Loss Recovery in Louisiana" National Business Institute, New Orleans, Louisiana, March 24, 2000.
- "Can We 'Import' Better Law in Personal Injury Cases?" LTLA Spring CLE Retreat, Orlando, Florida, March 31, 2002.
- "Case Evaluation and Other Pre-Filing Considerations" Tobacco Litigation Group, ATLA Annual Convention, Atlanta, Georgia, July 21, 2002.
- "Proving Fraud in Tobacco Cases" ATLA Annual Convention, Atlanta, Georgia, July 21, 2002.
- "Preparing and Taking Depositions for Use at Trial" STLA, New Orleans, Louisiana, February 28, 2003, and LTLA *A La Carte* Seminar, New Orleans, Louisiana, December 30, 2004.
- "Trial and Post-Trial Motions: The Plaintiff's Perspective" National Business Institute, New Orleans, Louisiana, June 20, 2003.
- "A Practical Framework for Class Action Litigation" ABA National Institute on Class Actions, San Francisco, California, Oct. 24, 2003, and Washington, D.C., Nov. 7, 2003.
- "Identifying Spoliation of Evidence Issues and Related Issues Surrounding the Preservation and Discovery of Electronic Data" National Business Institute, New Orleans, LA, March 30, 2004, and Lafayette, LA, December 2, 2004.
- "Civil Discovery Sanctions" Dealing with Destruction: Preservation and Spoliation of Electronic Data and Other Evidence in Louisiana, National Business Institute, New Orleans, LA, March 30, 2004, and Lafayette, LA, December 2, 2004.
- "Plaintiff's Personal Injury from Start to Finish" National Business Institute, New Orleans, Louisiana, November 30, 2004, and New Orleans, Louisiana, June 30, 2006.
- "Litigating the Class Action Suit in Louisiana" National Business Institute, New Orleans, Louisiana, January 7, 2005.
- "Proposed Changes to the Federal Rules" Electronic Discovery Teleseminar, May 10, 2005, and, ATLA Annual Convention, Toronto, Canada, July 25, 2005.
- "Recent Decisions Affecting E-Discovery" E-Discovery: Get Ready to Apply the New FRCP Changes, National Business Institute, New Orleans, Louisiana, December 20, 2006.
- "E-Discovery Procedures and Compliance with the New Rules" E-Discovery: Get Ready to Apply the New FRCP Changes, National Business Institute, New Orleans, Louisiana, December 20, 2006.
- "Conducting Forensic Analysis" E-Discovery: Get Ready to Apply the New FRCP Changes, National Business Institute, New Orleans, Louisiana, December 20, 2006.
- "E-Discovery Under the New Rules" LTLA A La Carte Seminar, New Orleans, Louisiana, December 29, 2006.
- "The E-Discovery Amendments to the Federal Rules: Panel Discussion E-Discovery Practical Considerations" Federal Bar Association, New Orleans Chapter, February 2, 2007.
- "The E-Discovery Amendments to the Federal Rules: Panel Discussion E-Discovery Ethics" Federal Bar Association, New Orleans Chapter, February 2, 2007.
- "Class Action Reforms Post CAFA: Leverage the Reforms and Emerging Trends" Strafford Publications, CLE Teleconference, March 20, 2007.
- "Electronic Evidence Symposium: New Rules, E-Discovery, Spoliation & Sanctions" New Orleans Bar Association, 2007 Bench Bar Conference, Point Clear, Alabama, March 30, 2007.
- "Personal Injury Cases: Calculating and Proving Damages" National Business Institute, New Orleans, LA, October 16, 2007.
- "Vioxx Litigation: History, Overview and Navigating Through the Settlement Process" AAJ Weekend With the Stars, New York, NY, December 8, 2007.
- "E-Discovery: Applying the New FRCP Changes" National Business Institute, New Orleans, LA, Dec. 13, 2007.

SPEECHES AND PAPERS (cont.)

- "Rethinking Depositions: Discovery vs. Trial" LAJ CLE A La Carte, Baton Rouge, LA, December 27, 2007.
- "E-Discovery: A Changing Landscape Practical & Legal Perspectives" SeminarWeb, January 16, 2008.
- "Approaches to Defense Expert Depositions Technique & Style" AAJ Mid-Winter Convention, Puerto Rico, January 26, 2008.
- "E-Discovery Workshop" National Disability Rights Network Annual Conference, New Orleans, LA, June 4, 2008.
- "San Diego Fire Cases" Litigation at Sunrise, AAJ Annual Convention, Philadelphia, PA, July 16, 2008.
- "E-Discovery: The Paralegal's Role and Ethical Considerations" AAJ Annual Convention, Philadelphia, PA, July 16, 2008.
- "Preparation of Expert Testimony" National Business Institute, New Orleans, LA, October 30, 2008.
- "Avoiding Common Ethical Pitfalls" Building Your Civil Trial Skills, National Business Institute, New Orleans, LA, Dec. 18, 2008.
- "Documentary Evidence" Personal Injury Trials: Getting the Most out of Your Evidence, National Business Institute, New Orleans, LA, April 29, 2009.
- "Electronic Evidence" Personal Injury Trials: Getting the Most out of Your Evidence, National Business Institute, New Orleans, LA, April 29, 2009.
- "Ethics and Professionalism" AAJ Jazz Fest Seminar, New Orleans, LA, May 3, 2009.
- "12 Lessons in Litigation" Web 2.0 and The Trial Bar, InjuryBoard.com, St. Petersburg, FL, June 5, 2009.
- Moderator, Chinese Drywall Litigation Seminar, AAJ, New Orleans, Louisiana, August 11, 2009.
- "Re-Thinking Experts" LAJ Post-Legislative Retreat, Carmel, CA, June 30, 2009, LAJ Last Chance Seminar, New Orleans, LA, December 10, 2009, and, LAJ CLE a la Carte, Baton Rouge, LA, December 30, 2009.
- "Re-Thinking Experts" SeminarWeb! Live, December 17, 2009.
- "Avoiding Common Ethical Pitfalls" Building Your Civil Trial Skills, National Business Institute, New Orleans, LA, Dec. 18, 2009.
- "Evaluating Class Actions: How Do You Know When You Have One?" LAJ CLE a la Carte, New Orleans, LA, December 30, 2009.
- "Predatory Lending and Sub-Prime Class Actions" AAJ Mid-Winter Convention, Maui, Hawaii, January 30, 2010.
- "Coast Guard / MMS Hearings" Gulf Coast Oil Spill Symposium, LSBA, New Orleans, LA, May 25, 2010.
- Moderator, Gulf Coast Oil Spill Litigation Teleseminar, AAJ, June 2, 2010.
- "Chinese Drywall Litigation" LSBA Summer School for Lawyers, Sandestin, Florida, June 7, 2010.
- "12 Lessons in Litigation" LAJ Post-Legislative Retreat, Carmel, CA, June 29, 2010, (invited) (submitted paper) (could not attend).
- Moderator, Chinese Drywall Litigation Program, AAJ, Vancouver, British Columbia, July 14, 2010.
- Status of BP Claims Facility and Escrow Fund, Gulf Coast Oil Spill Litigation Group Program. Vancouver, British Columbia, July 16. 2010.
- Update on MDL Issues and Litigation in the Eastern District of Louisiana, Gulf Coast Oil Spill, Vancouver, British Columbia, July 16, 2010.
- "Oil Pollution Act of 1990: An Overview" Gulf Coast Oil Spill Litigation Group Program. Vancouver, British Columbia, July 16. 2010.
- Oil Spill Litigation Panel Discussion: Liability, Punitive Damages, Environmental Issues, etc., HB Litigation Conference, Miami, Florida, November 4, 2010.
- "Class Actions and Mass Torts" Avoyelles Parish Bar Association, Marksville, Louisiana, November 5, 2010.
- "Ethical Issues in Litigation" SeminarWeb! Live, November 8, 2010.
- "Ethics and Professionalism" Last Chance Seminar, Louisiana Association for Justice, New Orleans, Louisiana, December 9, 2010.
- "Ethics and Professionalism" CLE a la Carte, Louisiana Association for Justice, New Orleans and Baton Rouge, Louisiana, December 30, 2010.
- "Ethics and Professionalism in Litigation" AAJ Annual Convention, San Francisco, California, July 2013.
- "The BP Oil / Deepwater Horizon Oil Spill Litigation: An Overview" Louisiana State Bar Association 20th Annual Admiralty Symposium, New Orleans, Louisiana September 20, 2013.
- Faculty, Essentials of Civil Litigation AAJ Trial Advocacy College, Tulane Law School, New Orleans, Louisiana, October 7-10, 2013.
- "Multi-District Litigation" National Association of Women Judges, New Orleans, Louisiana, October 11, 2013.
- "Ethical Questions Raised by the BP Oil Spill Litigation" 22nd Annual Admiralty and Maritime Law Conference, South Texas College of Law, Houston, Texas, October 18, 2013.

SPEECHES AND PAPERS (cont.)

- "BP / Deepwater Horizon Oil Spill Litigation" Louisiana Judicial Conference, Evidence and Procedure Seminar, New Orleans, Louisiana, February 20, 2014.
- "Ethical and Professional Issues in MDLs" LSBA Annual MDL Conference, New Orleans, Louisiana, March 14, 2014.
- "'Legalnomics': Lessons from the Field of Behavioral Economics About Perception and Decision-Making for Trial Lawyers" LAJ a la Carte, New Orleans and Baton Rouge, Louisiana, December 29-30, 2014, and Mississippi Association for Justice Annual Convention, June 12, 2015.
- "When the Levee Breaks Resolving Complex Claims: Lesson of the Deepwater Horizon, Katrina, and More" ABA Section of Litigation, Annual Conference, New Orleans, Louisiana, April 15, 2015.
- "E-Discovery: It's Not Just for Big Civil Suits in Federal Court Anymore" NOBA Bench-Bar Conference, Point Clear, April 17, 2015.
- "Ethical and Professional Questions in Mass Tort Cases" LSBA Summer School for Lawyers, Sandestin, Florida, June 10, 2015.
- "Telling Our Story: The Trial Lawyer's Journey" LAJ Post-Legislative Retreat, Carmel, California, June 22, 2015, and AAJ Weekend with the Stars, New York, New York, December 12, 2015.
- Faculty Moderator, Pound Civil Justice Institute 2015 Forum for State Appellate Court Judges, "Contracting Transparency: Public Courts, Privatizing Processes, and Democratic Practices" and "Judicial Transparency in the 21st Century", Montreal, Canada, July 11, 2015.
- "Sidestepping Some of the Daubert Landmines" AAJ Annual Convention, Montreal, Canada, July 14, 2015.
- "Unsettling Issues with Mass Tort Settlements" ABA Annual Convention, Chicago, Illinois, July 31, 2015.
- Stephen J. Herman and James Bilsborrow, "Much Ado About Nothing: The So-Called 'No-Injury Class'" August 18, 2015.
- "Class Actions, Mass Torts and Potential Changes to Rule 23" NOBA Bench-Bar Conference, Point Clear, March 10, 2016.
- "Attacks on the Judiciary" LSBA Summer School for Lawyers and Judges, Sandestin, Florida, June 6, 2016.
- "Procedure & Tactics in Complex Appellate Proceedings: A Case Study" Texas State Bar, Advanced Civil Appellate Practice, Austin, Texas, September 8, 2016.
- "Ethics Important Recent Developments that Impact Litigators on Both Sides of the 'V'" LSBA 23rd Annual Admiralty Symposium, New Orleans, Louisiana, September 16, 2013.
- Duke Law Center for Judicial Studies MDL Conference, Panel 1: Extent of Co-Lead Counsel's and PSC's Fiduciary Responsibility to All Plaintiffs, Washington, DC, October 27, 2016.
- "Federal State Coordination: Peacefully Co-existing in Parallel Universes" LSBA 16th Annual Class Action / Complex Litigation Symposium, New Orleans, Louisiana, November 11, 2016.
- Moderator, "Pros/Cons of State MDLs: Complex Litigation Rules of Professional Responsibility" LSBA 16th Annual Class Action / Complex Litigation Symposium, New Orleans, Louisiana, November 11, 2016.
- "Managing Complex Litigation" NOBA Masters of the Courtroom, New Orleans, Louisiana, December 15, 2016.
- "Fool Me Once, Shame on You (and Other Thoughts on Professionalism)" NOBA Procrastinators' Program, New Orleans, Louisiana, December 28, 2016.
- "A Conversation on Intergenerational Professionalism" NOBA Bench-Bar Conference, Point Clear, Alabama, April 2, 2017.
- "Litigating the Disaster Case" ABA Business Section, New Orleans, Louisiana, April 6, 2017.
- "Defense Perspective" AAJ Future of Class Actions Conference, Nashville, Tennessee, May 11, 2017.
- "Duties Owed by Appointed Counsel to MDL Litigants Whom They Do Not Formally Represent" AAJ Mass Torts Best Practices Seminar, Boston, MA, July 21, 2017.
- "Handling Complex Litigation" EDLA First Biennial Bench and Bar Conference, September 28, 2017.
- "Duties Owed by Appointed Counsel to MDL Litigants Whom They Do Not Formally Represent" LSBA 17th Annual Class Action/Complex Litigation Symposium, New Orleans, LA, November 10, 2017.
- Faculty, AAJ Advanced Deposition College, New Orleans, LA, January 2018.
- "Social Media as Evidence" LAJ / La. Judicial College Evidence & Procedure Seminar, New Orleans, Louisiana, March 16, 2018.
- Duke Law Center for Judicial Studies MDL Conference, Panel 3: Standards in Determining Optimum Number of PSC Members and Amounts of Common Benefit Fund, Atlanta, Georgia, April 26, 2018.
- "Emerging Issues in Civil Litigation" George Mason University Law & Economics Center 12th Annual Judicial Symposium on Civil Justice Issues, Arlington, Virginia, May 21, 2018.

SPEECHES AND PAPERS (cont.)

- Panel: Update on La. Supreme Court Committee on Ethical Rules in Complex Litigation and Multi-District Litigation, LSBA Summer School for Lawyers, Sandestin, Florida, June 5, 2018.
- "Ethics of Class Action Settlements" AAJ Annual Convention, Denver, Colorado, July 8, 2018.
- "Punitive Damages After *Batterton, Tabingo,* and *McBride*: What's Next?" LAJ High Stakes on High Seas, New Orleans, Louisiana, August 17, 2018, and LSBA 25th Annual Admiralty Symposium, New Orleans, Louisiana, September 14, 2018.
- Program Coordinator / Moderator, LSBA Personal Injury Seminar, September 7, 2018.
- Faculty, AAJ Mass Tort Deposition College, New Orleans, Louisiana, October 24-26, 2018.
- "The 'Take No Prisoners' Deposition" AAJ Mass Tort Deposition College, New Orleans, Louisiana, October 24, 2018.
- "So, You Settled the Case: Now What?" AAJ Class Action Seminar, New York, NY, December 6, 2018.
- "Ethics" NOBA Procrastinators' Program, New Orleans, LA, December 19, 2018.
- "Four Hot Spots to Avoid Legal Malpractice" AAJ Mid-Winter Convention, Miami, FL, February 5, 2019.
- "Current Landscape of Punitive Damages under Maritime Law" ABA Admiralty and Maritime Law Conference, New Orleans, LA, March 23, 2019.
- "Bet the Company Litigation: Are We Really Going to Trial?" LSBA Annual Convention, Sandestin, FL, June 3, 2019, and, New Orleans, LA, December 12, 2019.
- "Why Knowing Admiralty Law is Important to Your Practice" Melvin Belli Seminar, San Diego, CA, July 26, 2019.
- "Ethical Issues in Class Action Litigation" AAJ Annual Convention, San Diego, CA, July 28, 2019.
- "Ethical Issues Facing Litigators" LSBA, Lafayette, LA, Sept. 5, 2019, and New Orleans, LA, Sept. 20, 2019.
- "Layers of Lawyers in MDLs: Parsing the Complexities of Claimant Representation in Mass Tort MDLs" Lewis & Clark Symposium on Class Actions, Mass Torts, and MDLs: The Next 50 Years" Portland, Oregon, Nov. 1, 2019.
- "Fee Disputes: Intersection of Ethical Rules and Contract Law" Avoyelles Parish Bar CLE, Marksville, LA, November 8, 2019.
- "Thoughts on Professionalism" New Orleans Bar Association, Nov. 26, 2019.
- "Ethics: Survey of Recent Cases and Advisory Opinions" New Orleans Bar Association, November 26, 2019, and, Louisiana State Bar Association, New Orleans, LA, Dec. 11, 2019.
- Program Coordinator / Moderator, LSBA Personal Injury Seminar, December 4, 2019.
- "Next Big Thing(s) What Are the New Class Actions to Watch For?" AAJ Class Action Seminar, New York, NY, December 5, 2019.
- "E-Discovery from the Plaintiff's View" New Orleans Bar Association, December 12, 2019.
- "A Trial Lawyer's Journey" Winning With the Masters, LAJ, New Orleans, LA, December 12, 2019, and, Western Trial Lawyers Association, Jackson Hole, WY, March 6, 2020 (invited) *
- "Legal Ethics in Maritime Cases" Admiralty Law Institute, Tulane University Law School, New Orleans, LA, March 13, 2020.
- "Financing Litigation: Views from the Bench and Bar" NOBA Bench-Bar Conference, Point Clear, AL, March 22, 2020 (invited) *
- "Bet the Company Litigation: Are We Really Going to Trial?" LSBA Annual Convention, Sandestin, FL, June 8, 2020 (invited) *
- "Masters of Disaster: What 9/11, Hurricane Katrina, and Northern California Fires Taught Us That Can Help You with Your Case During and After the COVID Crisis" San Francisco Trial Lawyers Association, SeminarWeb, June 22, 2020.
- "Ethical Issues Facing Litigators" Louisiana State Bar Association, New Orleans, LA, June 19, 2020 (invited) *
- "Difficult Depositions: Ethical Issues and Strategies" AAJ Annual Convention, Washington, DC, July 14, 2020.
- "Whether to Pursue an MDL, and, if so, Issues Affecting What Court to Recommend to the JPML" Baylor Law School Complex Litigation Program, August 4, 2020.
- "Plaintiff Perspective on Common Benefit Orders" Baylor Law School Complex Litigation Program, August 13, 2020.
- "How to Get the Most out of Lay Witnesses" FBA Federal Practice Series, New Orleans, LA, August 20, 2020.
- "Implications for Civil Litigation and the Courts in a Post-Pandemic World" COVID and the Courts Symposium, sponsored by the Civil Justice Research Initiative at Berkeley Law School and RAND, September 24, 2020.
- "Case Management" Mass Tort MDL Certification Program, Bolch Judicial Institute, Duke University, Nov. 9, 2020.
- "Ethics: Update of Recent Decisions" New Orleans Bar Association, Nov. 17, 2020.
- "Thoughts on Professionalism" New Orleans Bar Association, Nov. 17, 2020.
- "Evaluation, Preparation, Research and Background Checks on Plaintiff and Defense Experts" New Lawyers Bootcamp, AAJ, April 12, 2021.

SPEECHES AND PAPERS (cont.)

- "Difficult Depositions: Ethical Issues and Strategies" Arkansas Trial Lawyers Association, Little Rock, AR, April 31, 2021.
- "Bet the Company Litigation: Are We Really Going to Trial?" LSBA Annual Convention, Sandestin, FL, June 6, 2021.
- "What Will Be the New Normal?" AAJ Annual Convention, Las Vegas, NV, July 14, 2021.
- "Where Are We With Punitive Damages?" LSBA Annual Admiralty Symposium, Sept. 17, 2021.
- "Attorneys' Fees in Class Actions" Strafford Publications, October 14, 2021.
- "Getting Older: How Perspective in Practicing Law Changes" InjuryBoard Summit, Dove Mountain, AZ, Nov. 5, 2021.
- "Daubert Update" AAJ Mid-Winter Convention, Desert Springs, CA, Feb. 14, 2022.
- FBA Civil Rights Program, Mock Appellate Argument in Students for Fair Admissions v. Harvard College case, February 22, 2022.
- "Ethics Update" New Orleans Bar Association, Nov. 30, 2021.
- "Professionalism: What Not to Do" New Orleans Bar Association, Nov. 30, 2021.
- "Let's Try This Case!" So You Want to Be a Personal Injury Lawyer, LSBA, Dec. 14, 2021.
- "Reflections on Getting Older: Changes in the Profession" New Orleans Bar Association, Dec. 23, 2021.
- "The Trial Lawyer's Journey: Reflections on Changes in the Profession" Academy of New Orleans Trial Lawyers, Jan. 19, 2022.
- "Should the Shipowners Act of 1851 be Repealed, Modified or Untouched?" Shipowners Limitation of Liability Symposium, Loyola Maritime Law Journal, New Orleans, LA, Feb. 18, 2022.
- "Confidentiality Orders and Secrecy Agreements" Virtual Coffee Hour, Mass. Academy of Trial Lawyers, March 18, 2022.
- "Litigation Management" Harris Martin MDL Conference: The Current Mass Tort Landscape Infant Formula, Philips CPAP, Hernia Mesh, and More, New Olreans, LA, March 30, 2022.
- "Witness Preparation" AAJ New Lawyers Boot Camp, Vail, CO, May 27, 2022.
- "The Show Must Go On: Learning From Your Mistakes" AAJ New Lawyers Boot Camp, Vail, CO, May 28, 2022.
- "Ethics Update" Mississippi Association of Justice Annual Convention, New Orleans, LA, June 23, 2022.
- "Seller Liability" AAJ Annual Convention, Product Liability Section CLE, Seattle, WA, July 18, 2022.
- "The Road Ahead: Recent Law on Trucking Cases Updates from the Court" LAJ Fall Conference, Sept. 23, 2022.
- "Finding the Right Balance Between Your Own Clients and the Greater Demands of the Profession" InjuryBoard Summit, Cliff House, Maine, October 24, 2022.
- "Legal Ethics: Top Mistakes in Everyday Practice" FBA Webinar, November 9, 2022.
- "Getting Older: Changes in the Profession" New Orleans Bar Association, December 9, 2022.
- "Difficult Depositions: Ethics and Strategies" LAJ Last Chance, New Orleans, LA, December 10, 2022.
- "Vetting and Preparing Your Expert to Survive Daubert" NOBA Masters of the Courtroom, New Orleans, LA, Dec. 15, 2022.
- "A Trial Lawyer's Journey Thoughts on the Profession" Tennessee Trial Lawyers Association, Jan. 14, 2023.
- Howard Twiggs Memorial Lecture on Legal Professionalism, Phoenix, Arizona, Feb. 6, 2023.
- Ethics Panel, "View on Financing Litigation", NOBA Bench-Bar Conference, Point Clear, AL, March 26, 2023.
- Faculty, AAJ Deposition College, Washington, DC, April 13-15, 2023.
- "Fee Issues in Class Actions" George Washington Law Conference on Resolving Mass Torts in Different Forums, Washington, DC, April 27, 2023.
- "What We Are Talking About When We Are Talking About 'Class Actions': Two Recent Examples: The Hard Rock Collapse and the Dean Nursing Home Cases" LSBA Summer School for Lawyers and Judges, Sandestin, FL, June 6, 2023.
- "Settlement Considerations and Issues: Fee Charges, Experts Tied Up, and Failure to Produce Trial Package" AAJ Mass Torts Seminar, Philadelphia, Pennsylvania, July 14, 2023.
- "Playing with Others: The Benefits and Challenges of Working with Co-Counsel" InjuryBoard Summit, Big Sky, Montana, Oct. 14, 2023.
- Class Action Ethics Webinar, AAJ, December 5, 2023 (invited).
- Untitled, SEABOTA, Biloxi, Mississippi, January 26, 2024 (invited).
- "Ethics for Using ChatGPT/AI in Your Practice" AAJ Mid-Winter Convention, Austin, Texas, February 12, 2024 (invited).

^{*} Postponed or Cancelled Due to the Covid-19 Coronavirus Crisis.

Resume of Stephen J. Herman October 5, 2023 Page 10

REPORTED CASES

- Alliance for Affordable Energy vs. New Orleans City Council,, No. 96-0700 (La. 7/2/96), 677 So.2d 424.
- O'Reilly and Griffith vs. Brodie, et al and PMIC, 975 S.W.2d 57 (Tex. App. 4th Dist. San Antonio 1998), review denied, (Aug. 25, 1998); and, 42 ATLA Law Reporter 264 (Sept. 1999).
- Marchesani v. Pellerin-Milnor, 248 F.3d 423 (5th Cir. 2001), and, 269 F.3d 481 (5th Cir. 2001); and, ATLA Law Reporter, Vol. 46, p.240 (Sept. 2003), and Louisiana Advocates Vol.XVIII, No.4 (April 2003) p.14.
- Scott v. American Tobacco, No. 01-2498 (La. 9/25/01), 795 So.2d 1176, and, No. 02-2449 (La. 11/15/02), 830 So.2d 294, and, No. 2004-2095 (La. App. 4th Cir. 2/7/07), 949 So.2d 1266, writ denied, 973 So.2d 740 (La. 2008), cert. denied, 128 S.Ct. 2908 (2008), and, later proceeding, No. 2009-0461 (La. App. 4th Cir. 4/23/2010), 36 So.3d 1046, writ denied, 44 So.3d 686 (La. 2010), cert. denied, 131 S.Ct. 3057 (2011).
- Schultz v. Texaco Inc., 127 F.Supp.2d 443 (S.D.N.Y. 2001), and, 308 F.Supp.2d 289 (S.D.N.Y. 2004), and, 2009 WL 455163 (S.D.N.Y. Feb. 24, 2009).
- Oubre / Orrill v. Louisiana Citizens Fair Plan, No. 09-0566 (La. App. 4th Cir. 12/09/09), 26 So.3d 994, and, No. 2009-0888 (La. App. 4th Cir. 4/21/2010), 38 So.3d 457, writ denied, 45 So.3d 1035 (La. 2010); and, No. 2011-0097 (La. 12/16/2011), 79 So.3d 987.
- In re Oil Spill by the Oil Rig Deepwater Horizon, 808 F.Supp.2d 943 (E.D.La. 2011) ("B1 Order"); and, 910 F.Supp.2d 891 (E.D.La, 2012), aff'd, 739 F.3d 790 (5th Cir. 2014) ("Deepwater Horizon II"), cert. denied, 135 S.Ct. 754 (2014); 744 F.3d 370 (5th Cir. 2014) ("Deepwater Horizon III"); 785 F.3d 986 (5th Cir. 2015) ("Rule 79 Decision"); 785 F.3d 1003 (5th Cir. 2015) ("Non-Profits Decision"); 793 F.3d 479 (5th Cir. 2015) ("Data Access Appeal"); 858 F.3d 298 (5th Cir. 2017) ("495 Appeal"); and, 295 F.R.D. 112 (E.D.La, 2013) (approval of Medical Benefits Settlement); and, 21 F.Supp.3d 657 (E.D.La, 2014) ("Phase One Trial Findings and Conclusions").

In re Harrier Trust, No. 2018-1467 (La. 2/18/2019), 263 So.3d 884.

Frego v. Settlement Class Counsel, 16 F.4th 1181 (5th Cir. 2021).

Alicea v. Activelaf, No.2016-1818 (La. 10/19/2016), 218 So.3d 1001 (and Duhon v. Activelaf d/b/a SkyZone, 2016 WL 6123820) (amicus curiae).

Maggio v. Parker, No.2017-1112 (La. 6/27/2018), 250 So.3d 874 (amicus curiae).

Martin v. Thomas, No.2021-1490 (La. 6/29/2022), 346 So.3d 238 (amicus curiae).

George v. Progressive Waste Solutions, No.2022-01068 (La. 12/9/22) (amicus curiae).

Wightman v. Ameritas Life Ins. Co., No.2022-00364 (La. 10/21/22), 2022 La.LEXIS 1763, 2022 WL 12396518 (amicus curiae).

Bulot v. Intracoastal Tubular, No. 00-2161 (La. 2/9/01), 778 So.2d 583 (amicus curiae).

Dumas v. Angus Chemical, No. 97-2356 (La. 11/14/97), 702 So.2d 1386.

Sommers v. State Farm, No. 99-2586 (La. App. 4th Cir. 5/3/00), 764 So.2d 87.

Andrews v. TransUnion Corp., No. 2004-2158 (La. App. 4th Cir. 8/17/2005), 917 So.2d 463, writ denied, 926 So.2d 495 (La. 4/17/06), and MDL No. 1350; Louisiana Advocates, Vol.XXIV, No.5 (May 2009), p.14.

Bratcher v. National Standard Life, 365 F.3d 408 (5th Cir. 2004), cert. denied, 125 S.Ct. 277 (2004).

Bauer v. Dean Morris, 2011 WL 3924963 (E.D.La. Sept. 7, 2011).

Schafer v. State Farm, 507 F.Supp.2d 587 (E.D.La. 2007), and, 2008 WL 131225 (E.D.La. Jan 10, 2008).

Moeckel v. Caremark Inc., 385 F.Supp.2d 668 (M.D. Tenn. 2005).

In re Managed Care Litigation, 150 F.Supp.2d 1330 (S.D.Fla. 2001).

Lakeland Anesthesia v. Aetna U.S. Healthcare, 2000 U.S. Dist LEXIS 8540 (E.D.La. June 15, 2000), Andrews Managed Care Litigation Reporter, Vol.I, Issue 13 (July 17, 2000) p.12.

Mays v. National Bank of Commerce, 1998 U.S. Dist. LEXIS 20698 (N.Dist. Miss. Nov. 20, 1998), aff'd No. 99-60167 (5th Cir. April 11, 2000).

Jones v. Hyatt, No. 94-2194 (La. App. 4th Cir. 9/25/96), 681 So.2d 381 (appeal counsel).

Delcambre v. Blood Systems, Inc., No. 2004-0561 (La. 1/19/05), 893 So.2d 23 (amicus curiae).

VERDICTS, DECISIONS, REPORTED SETTLEMENTS AND AWARDS

- Scott v. American Tobacco, et al, Civil District Court for the Parish of Orleans, State of Louisiana, No. 96-8461, July 28, 2003, (Jury verdict in Phase I trial for class of Louisiana smokers finding tobacco industry liable for fraud, conspiracy, and intentional torts, and responsible for the establishment of a court-supervised medical monitoring and/or cessation program), and, May 21, 2004 (Jury verdict in Phase II in the amount of \$591 Million for 10-year comprehensive court-supervised smoking cessation program), aff'd, in part, No. 2004-2095 (La. App. 4th Cir. 2/7/07) (upholding award of \$279 Million fund to Class for 10-year cessation program), on subsequent appeal, No. 2009-0461 (La. App. 4th Cir. 4/23/2010), 36 So.3d 1046 (ordering Defendants to deposit \$241 Million, plus interest, into the Registry of the Court), writ denied, 44 So.3d 686 (La. 2010), cert. denied, 131 S.Ct. 3057 (2011) (Member of Trial Team, Philip Morris Team, and co-Lead of Briefing Team).
- In re Oil Spill by the Oil Rig *Deepwater Horizon*, 21 F.Supp.3d 657 (E.D.La. 2014) (Phase One Trial Findings & Conclusions that BP was guilty of gross negligence and reckless and willful misconduct) (Co-Liaison Counsel for Plaintiffs and member of the Trial Team).
- In re Oil Spill by the Oil Rig Deepwater Horizon, 910 F.Supp.2d 891 (E.D.La. 2012), aff'd, 739 F.3d 790 (5th Cir. 2014), rehearing en banc denied, 756 F.3d 320 (5th Cir. 2014), cert. denied, 135 S.Ct. 734 (2014) (approving BP Economic & Property Damages Class Settlement), and, 295 F.R.D. 112 (E.D.La. 2013) (approving BP Medical Benefits Class Settlement) (Settlements in Excess of \$12.9 Billion) (Co-Lead Class Counsel), and, No.10-2179, Rec. Doc. 22252 (E.D.La. Feb. 15, 2017), aff'd, 934 F.3d 434 (5th Cir. 2019) (approving Distribution Model for \$1.25 Billion Halliburton/Transocean Class Settlements) (Co-Lead Class Counsel).
- Hernandez v. Knauf, No.09-6050, 2010 WL 1710434, *In re Chinese-Manufactured Drywall Products Liability Litigation*, MDL No. 2047 (E.D.La. April 27, 2010) (awarding over \$164,000 in remediation and other damages, plus interest, costs, and reasonable attorneys' fees, in first bellwether trial, holding that all drywall, insulation, entire electrical system, HVAC system and copper plumbing must be removed) (Co-Lead Trial Counsel).
- In re Chinese-Manufactured Drywall Products Liability Litigation, 424 F.Supp.3d 456 (E.D.La. 2020) (approving class settlement of \$248 Million against Chinese Manufacturers) (Settlement Class Counsel); (see also, Amorin v. Taishan, 861 Fed.Appx. 730 (11th Cir. 2021) (affirming common benefit fee award)); (see also, Frego v. Settlement Class Counsel, 16 F.4th 1181 (5th Cir. 2021) (dismissing appeal by individual classmembers)).
- Marchesani v. Pellerin-Milnor, 248 F.3d 423 (5th Cir. 2001), and, 269 F.3d 481 (5th Cir. 2001), and, *Louisiana Advocates* Vol.XVIII, No.4 (April 2003) p.14, and *ATLA Law Reporter*, Vol. 46, p.240 (Sept. 2003) (\$3.375 million settlement).
- Turner v. Angelo Iafrate, et al, No. 596-274 (La. 24th JDC), Louisiana Advocates, Vol.XXI, No.10, p.15 (Oct. 2006), and, AAJ Law Reporter, Vol.L, No.6 (Aug. 2007) (\$4.5 million settlement).
- Niven v. Boston Old Colony, et al, 24th JDC, State of Louisiana, No.373-299, December 28, 1998, (judgment of \$529,027.02 for plaintiff against La. DOTD total damages \$5,290,270.20), rev'd, No. 99-783 (La. App. 5th Cir. 1/25/2000).
- Schultz v. Stoner, et al, 127 F.Supp.2d 443 (S.D.N.Y. 2001), and, 308 F.Supp.2d 289 (S.D.N.Y. 2004), and, 2009 WL 455163 (S.D.N.Y. Feb. 24, 2009) (summary judgment granted in favor of mis-classified employees' right to benefits under the Texaco pension plans).
- Oubre v. Louisiana Citizens Fair Plan, No. 2011-0097 (La. 12/16/2011), 79 So.3d 987 (affirming class judgment of \$92.8 Million).
- <u>Fairway v. McGowan Enterprises, Inc.</u>, No. 16-3782, Rec. Doc. 60 (E.D.La. March 20, 2018) (successfully resolving TCPA claims thru approved class settlement on behalf of Defendant, McGowan Enterprises).
- In re: Vioxx Prod. Liab. Lit., MDL No. 1657 (E.D.La.), *Louisiana Advocates*, Vol.XXIII, No.1 (Jan. 2008) (\$4.85 Billion Settlement Fund) (Co-Chair of Sales & Marketing Committee, Insurance Committee, Member of Drafting Team for PNC).
- Andrews v. TransUnion Corp., No. 2004-2158 (La. App. 4th Cir. 8/17/2005), 917 So.2d 463, writ denied, 926 So.2d 495 (La. 4/17/06), and MDL No. 1350, Louisiana Advocates, Vol.XXIV, No.5 (May 2009), p.14 (\$75 million settlement fund and significant additional in-kind relief).
- <u>DeGarmo v. Healthcare Recoveries, Inc.</u>, No. 5:94cv14 (N.D.W.Va. 2001), 45 *ATLA Law Reporter* 180 (June 2002), and *Louisiana Advocates*, Vol.XVI, No.9, p.10 (Sept. 2001) (\$3 million settlement for class of policyholders for unlawful subrogation practices).
- Galuzska v. Rosamond and GEICO, No.618-435 (La. 24th JDC), *Louisiana Advocates*, Vol.XXIII, No.6 (June 2008) (\$925,000 settlement in auto case).
- Marberry v. Sears, 15th JDC, State of Louisiana, No.96-3244, December 7, 1998, (judgment of \$195,054.96 for plaintiff).
- Kettles v. Hartford Life, 1998 U.S. Dist. LEXIS 12899 (E.D.La. Aug. 14, 1998) (summary judgment for plaintiff awarding over \$80,000 in disability benefits).

EXPERT TESTIMONY

- Mitchell v. Freese, Civil Action No. 61C11:16-CV-00023, Circuit Court, Rankin County, Mississippi, (report August 24, 2017), (testimony, arbitration proceeding, November 15, 2017) (ethical and professional duties to clients and co-counsel in mass tort cases).
- U.S. ex. rel. Boogaerts v. Vascular Access Centers, No. 17-2786, United States District Court for the Eastern District of Louisiana, (declaration submitted on November 2, 2018 in support of fee petition for prevailing relator in qui tam case).
- Holmes v. Pigg, No. 2007-2803, Civil District Court, Parish of Orleans, State of Louisiana, (deposition September 20, 2011) (legal malpractice liability arising out of an ERISA case).
- Cressy v. Lewis, No. 2017-2704, Civil District Court, Parish of Orleans, State of Louisiana, (report October 14, 2019) (alleged malpractice liability in product liability case).
- *Hampton v. Hampton,* No. 775-881, 24th Judicial District Court, State of Louisiana, (preliminary report of questions and impressions re fee request of adversary party).
- Bayou Corne Sinkhole Litigation: *LaBarre v. Occidental*, No.33796, 23rd Judicial District Court, State of Louisiana, (report July 7, 2020 in support of AIG's Reconventional Demand on Texas Brine's claim for reimbursement of costs and attorneys' fees, and report August 10, 2020 relating to Texas Brine's Third-Party claims for costs and fees against Zurich and AIG) (deposition June 29, 2021) (affidavit July 17, 2021) (tendered, accepted, and testified as expert in complex litigation and professional ethics, including the submission, review and approval of litigation expenses and fees, April 27, 2022); *Pontchartrain Natural Gas, et al v. Texas Brine*, No.34,265, 23rd Judicial District Court, State of Louisiana, (report May 10, 2023 relating to Texas Brine's third-party claims for costs and attorneys' fees against AIG) (deposition June 27, 2023).
- Cantu v. Gray Ins. Co., No.745-245, 24th Judicial District Court, State of Louisiana (report submitted Jan. 15, 2021 in fee dispute between former counsel and subsequent counsel for plaintiff on intervention) (deposition Jan. 22, 2021).
- PG&E Fire Victims Trust, Bankruptcy Case No. 19-30088 (declaration submitted on February 15, 2021 in support of reimbursement of attorneys fees to Fire Victim Trust Claimants represented by Singleton Schreiber McKenzie & Scott, LLP).
- Roundup Products Liability Litigation, MDL No. 2741 (N.D. Cal.) (declaration submitted in opposition to Proposed Ramirez Class Settlement) [Rec. Doc. 12682-6] (Feb. 25, 2021).
- Curley v. Andrews, No.19-2102, Court of Common Pleas, Allegheny County, PA (report submitted on May 24, 2021 in legal malpractice case).
- Crosby v. Waits Emmett Popp & Teich, No. 2019-1609, Civil District Court for the Parish of Orleans, State of Louisiana (report submitted on June 11, 2021 in legal malpractice case) (deposition October 15, 2021) (affidavit Nov. 12, 2021) (testimony at hearing on exception, Nov. 7, 2022, and on Daubert motions, Sept. 22, 2023 (qualified on standard of care)).
- Gangi Shrimp Company vs. Michael A. Britt, et al, No.771-620, 24th Judicial District Court for the Parish of Jefferson, State of Louisiana (report submitted on August 9, 2021 in legal and accounting malpractice case).
- Anderson v. Bob Dean Jr., et al, No.820-839, 24th Judicial District Court for the Parish of Jefferson, State of Louisiana (affidavit in support of objectors' opposition to proposed class settlement, Sept. 5, 2022).
- Foreman v. Whitmore, et al, No.19-09407, Civil District Court for the Parish of Orleans, State of Louisiana (report submitted January 5, 2023 on behalf of defendants in legal malpractice claim arising out of underlying auto accident case).
- Rogers v. Bivalacqua, et al, No.2019-686, Civil District Court for the Parish of Orleans, State of Louisiana (affidavit and report May 10, 2023 on behalf of plaintiff in legal malpractice case arising out of business transaction).
- *In re Reilly-Benton Bankruptcy*, No.17-12870, United States Bankruptcy Court for the Eastern District of Louisiana (declaration May 10, 2023 on behalf of asbestos victim creditors regarding the sufficiency of notice of proposed insurance settlement).

OTHER ACTIVITIES, APPEARANCES, APPOINTMENTS, RECOGNITION, AND AWARDS

A/V Rated, Martindale-Hubbell.

Finalist, Trial Lawyer of the Year Award, TLPJ, 2005.

Leadership in the Law Recipient, *New Orleans CityBusiness*, 2010, 2017, 2018. Hall of Fame, 2018.

Louisiana Appleseed, Board of Trustees, 2018-2023.

Top 500 Lawyers in America, *Lawdragon*, 2013, 2018, 2020. 500 Leading Plaintiff Consumer Lawyers, 2021.

OTHER ACTIVITIES, APPEARANCES, APPOINTMENTS, RECOGNITION, AND AWARDS (cont.)

Best Lawyers in America, 2012 -

"Lawyer of the Year" in the area of Product Liability Litigation, in New Orleans, by Best Lawyers, 2016.

"Lawyer of the Year" in the areas of Product Liability Litigation and Personal Injury Litigation, in New Orleans, by Best Lawyers, 2023.

Recognized in areas of Appellate Practice, Mass Tort/Class Actions, Product Liability, and Personal Injury Litigation as of 2023.

"Superlawyer" in the area of Class Actions and Mass Torts, 2007 -

Top 100 Trial Lawyers, National Trial Lawyers Association, 2008 -

Million Dollar Advocates Forum.

Appointed Plaintiffs' Co-Liaison Counsel / Co-Lead Class Counsel, *In re: Deepwater Horizon*, MDL No. 2179, Civil Action No. 2:10-md-02179, USDC for the Eastern District of Louisiana.

Appointed to the Plaintiffs' Steering Committee, *In re: Express Scripts Pharmacy Benefits Management Litigation*, MDL No. 1672, Civil Action No. 4:05-md-01672-SNL, USDC for the Eastern District of Missouri.

Appointed to the Plaintiffs' Executive Committee, *In re: Cox Set-Top Box Antitrust Litigation*, MDL No. 2048, Civil Action No. 5:09-ml-02048-C, USDC for the Western District of Oklahoma.

Appointed to the Plaintiffs' Executive Committee, *In re: Budeprion XL Marketing and Sales Litigation*, MDL No. 2107, Civil Action No. 09-md-2107, USDC for the Eastern District of Pennsylvania.

Appointed Settlement Class Counsel, *In re Chinese Drywall Litigation*, MDL No. 2047 (re Class Settlement with Taishan Defendants, 2019).

Curator Ad Hoc, Boomco LLC vs. Ambassador Inn Properties, et al, CDC No. 98-21208, Parish of Orleans, State of Louisiana.

Receiver, In re P. Michael Doherty Breeden, III, No.2020-OB-00315, appointed by Chief Judge, CDC, Parish of Orleans.

Receiver, In re LaRue Haigler, III, No.2023-B-00446, appointed by Chief Judge, CDC, Parish of Orleans.

Host Committee, Fifth Circuit Judicial Conference, New Orleans, Louisiana, April 19-22, 1998.

Moderator, "Juries, Voir Dire, *Batson*, and Beyond: Achieving Fairness in Civil Jury Trials" Pound Institute for Civil Justice, July 17, 2021.

Moderator, "Dangerous Secrets: Confronting Confidentiality in Our Public Courts" sponsored by AAJ and the Pound Institute, October 13, 2020.

Moderator, "Preparing and Trying a Case in a Covid and Tribal Environment", AAJ Annual Convention, Las Vegas, NV, July 14, 2021.

Moderator, "Winning With the Masters" Last Chance Seminar, LTLA, New Orleans, Louisiana, December 19, 1998.

Moderator, "Winning With the Masters" Last Chance Seminar, LTLA, New Orleans, Louisiana, December 14, 2000.

Welcome, ATLA Jazz Fest Seminar, New Orleans, Louisiana, May 1, 2003.

Guest Appearance, It's the Law "Challenges for the 21st Century" New Orleans Bar Association, March 15, 1999.

Guest Appearance, *Bev Smith Show* "Is Tobacco Litigation Good For America?" American Urban Radio Network, June 8, 2000; *The Morning Show* "Are Tobacco Lawsuits Good For America?" KRLV Radio, June 9, 2000; *On the Air with Mike Bung* "Tobacco Litigation and Challenges for the 21st Century" 1540 AM, June 15, 2000.

Guest Lecturer, "The Nuremberg Trials" Touro Synagogue Religious School, April 2003.

Judge, ATLA Student Trial Advocacy Competition, Finals, New Orleans, Louisiana, March 26, 1999.

Associate Member, Louisiana Injured Employees Union Education Fund, 1999-2003.

Board of Directors, Touro Synagogue Brotherhood, 1998-2000.

Top Individual Fundraiser, Susan G. Komen Race for the Cure, Oct. 25, 2014.

Advocacy Award, Breastoration, (Cancer Association of Greater New Orleans), 2019.

Member, Mystery Writers Association, 1999 -

Author of three novels: The Gordian Knot (Gravier House Press 1998), The Sign of Four (Gravier House Press 1998), and A Day in the Life of Timothy Stone (Gravier House Press 1999), a fourth book, Broken Lighthouse (Gravier House Press 2021), and a two-act play, Shots Across the Bow (Gravier House Press 2021), as well as Parables of Joy (from Leave It to Psmith!) (Gravier House Press 2022).

Maintains Website / Blawg regarding Legal, Literary and Other Issues, including updates of What's New in the Courts, including What's New in Products Liability, Class Actions, Legal Ethics and Professionalism, ERISA Litigation, and Electronic Discovery and Spoliation, at: www.gravierhouse.com.

Documents Reviewed and Considered

- 1. Official Docket for the United States District Court for the District of South Carolina Case No. 2:18-mn-02873-RMG (as of Sept. 24, 2023).
- 2. CMO No. 1 (Jan. 2, 2019)
- 3. CMO No. 2 (March 20, 2019)
- 4. CMO No. 3 (April 26, 2019)
- 5. CMO No. 4 (May 20, 2019)
- 6. CMO No. 5 (Aug. 7, 2019)
- 7. CMO No. 6 (Oct. 4, 2019)
- 8. CMO No. 7 (Nov. 1, 2019)
- 9. CMO No. 8 (Nov. 1, 2019)
- 10. CMO No. 5B (March 18, 2020)
- 11. CMO No. 9 (March 18, 2020)
- 12. CMO No. 10 (March 23, 2020)
- 13. CMO No. 10A (March 30, 2020)
- 14. CMO No. 5A (April 30, 2020)
- 15. CMO No. 11 (June 19, 2020)
- 16. CMO No. 12 (Sept. 3, 2020)
- 17. CMO No. 13 (Dec. 28, 2020)
- 18. CMO No. 14 (Jan. 15, 2021)
- 19. CMO No. 11A (Feb. 8, 2021)
- 20. CMO No. 15 (March 24, 2021)
- 21. CMO No. 16 (April 15, 2021)
- 22. CMO No. 17 (May 12, 2021)
- 23. CMO No. 18 (May 19, 2021)
- 24. CMO No. 18A (June 8, 2021)
- 25. CMO No. 11B (July 15, 2021)
- 26. CMO No. 19 (Aug. 11, 2021)
- 27. CMO No. 15.A (Aug. 16, 2021)

Addendum B

- 28. CMO No. 20 (Nov. 23, 2021)
- 29. CMO No. 21 (Dec. 2, 2021)
- 30. CMO No. 22 (Feb. 14, 2022)
- 31. CMO No. 23 (Feb. 24, 2022)
- 32. CMO No. 2.B (Oct. 26, 2022)
- 33. CMO No. 25 (April 24, 2023)
- 34. CMO No. 26 (May 5, 2023)
- 35. CLASS ACTION COMPLAINT, City of Camden, et al v. E.I. DuPont, et al, No.23-3230, Rec. Doc. 7 (D.S.C. July 12, 2023).
- 36. CLASS ACTION COMPLAINT, City of Camden, et al v. 3M Company, No.23-3147, Rec. Doc. 2 (D.S.C. July 12, 2023).
- 37. CLASS ACTION SETTLEMENT AGREEMENT, *Camden v. DuPont*, No.23-3230, Rec. Doc. 4-2 (D.S.C. dated June 3, 2023, filed July 10, 2023) (and, as amended, on August 7, 2023, Rec. Doc. 30-1).
- 38. SETTLEMENT AGREEMENT BETWEEN PUBLIC WATER SYSTEMS AND 3M COMPANY, *Camden v. 3M*, No.23-3147, Rec. Doc. 10-3 (D.S.C. signed June 22, 2023, filed July 3, 2023) (and, as amended, on August 28, 2023).
- 39. Preliminary Approval Order, *Camden v. DuPont*, No.18-2873, Rec. Doc. 3603 (D.S.C. Aug. 22, 2023).
- 40. PRELIMINARY APPROVAL ORDER, *Camden v. 3M*, No.18-2873, Rec. Doc. 3626 (D.S.C. Aug. 29, 2023).
- 41. <u>www.PFASWaterSettlement.com</u>, including, particularly:
 - . DuPont Class Notice (Long Form)
 - . 3M Class Notice (Long Form)
 - . DuPont Summary Notice (Short Form)
 - . 3M Summary Notice (Short Form)
 - . Frequently Asked Questions (DuPont)
 - . Frequently Asked Questions (3M)
 - . DuPont Allocation Process ¹

¹ No.18-2873, Rec. Doc. 3393-2 at p.76.

- . 3M Allocation Procedures
- . DuPont Public Water System Settlement Claims Form (and Addendum X)
- . DuPont Public Water System Settlement Supplemental Claims Form
- . DuPont Public Water System Settlement Special Needs Claims Form
- . DuPont Public Water System Settlement Testing Compensation Claims Form
- . 3M Public Water System Settlement Phase One Claims Form
- . 3M Public Water System Settlement Phase Two Claims Form
- . 3M Public Water System Settlement Claims Form Addendum X
- . 3M Water System Settlement Phase One Supplemental Claims Form
- . 3M Water System Settlement Phase Two Supplemental Claims Form
- . 3M Public Water System Settlement Phase One Special Needs Claims Form
- . 3M Public Water System Settlement Phase Two Special Needs Claims Form
- . 3M Public Water System Settlement Testing Compensation Claims Form
- . DuPont Estimated Allocation Range Table
- . 3M Estimated Allocation Range Table
- . PWS Registration User Guide
- . Duo Multi-Factor Authentication User Guide
- 42. ORDER AND OPINION (re Government Contractor Defense) [Rec Doc 2601] (Sept. 16, 2022)
- 43. MEMORANDUM IN SUPPORT OF MOTION FOR PRELIMINARY APPROVAL, *Camden v. DuPont*, No.23-3230, Rec. Doc. 4 (D.S.C. filed July 10, 2023), including:
 - . Declaration of Scott Summy, Rec. Doc. 4-3 (signed July 9, 2023 and filed July 10, 2023)
 - . Declaration of Michael London, Rec. Doc. 4-4 (July 10, 2023)
 - . Declaration of Paul Napoli, Rec. Doc. 4-5 (July 10, 2023)
 - . Declaration of Layn Phillips, Rec. Doc. 4-6 (signed July 9, 2023 and filed July 10, 2023)
 - . Declaration of Elizabeth Fegan, Rec. Doc. 4-7 (signed July 8, 2023 and filed July 10, 2023)
- 44. MOTION AND MEMORANDUM IN SUPPORT OF PRELIMINARY APPROVAL, *Camden v. 3M*, No.18-2873, Rec. Docs. 3370 and 3370-1 (D.S.C. filed July 3, 2023).

- 45. ORDER AND REASONS (Aggregate Common Benefit Fee and Costs Award), *In re Deepwater Horizon*, MDL No. 2179, Rec. Doc. 21849 [2016 U.S.Dist.LEXIS 147378] (E.D.La. Oct. 25, 2016).
- 46. The Laffey Matrix (http://www.laffeymatrix.com/see.html) (as of Oct. 5, 2023)
- 47. The Fitzpatrick Matrix (2013-2021)
- 48. Bloomberg Law analysis of Bankruptcy Dockets. (*See* "Rising Rates Are Law Firms' Salve Amid Layoffs, Pay Cuts" by Roy Strom, <u>Bloomberg Law</u> (Jan. 19, 2023) (found at https://news.bloomberglaw.com/business-and-practice/rising-rates-are-law-firms-salve-as-layoffs-and-pay-cuts-surge as of Sept. 26, 2023))
- 49. ELM Solutions 2022 Real Rate Report (Walters Kluwer)
- 50. DECLARATION OF RICHARD M. PEARL, City of Long Beach v. Monsanto, No.16-3493, Rec. Doc. 300-6 (June 24, 2022).
- 51. DECLARATION OF MARK MAO, *Brown, et al v. Google,* No.20-3664, Rec. Docs. 597 and 597-1 (N.D.Cal. June 3, 2022).
- 52. DECLARATION OF BRADLEY J. EDWARDS, *Doe v. Deutsche Bank*, No.22-10018, Rec. Doc. 105 (S.D.N.Y. Sept. 15, 2023).
- 53. DECLARATION OF SIGRID S. MCCAWLEY, *Doe v. Deutsche Bank*, No.22-10018, Rec. Doc. 106 (S.D.N.Y. Sept. 15, 2023).
- 54. CERTIFICATION OF NEAL KUMAR KATYAL, *In re LTL Management*, No.21-30589, Rec. Doc. 2240-1 (D.N.J. Bankruptcy May 4, 2022).
- 55. OBJECTION OF THE TRUSTEE TO RETENTION OF HOGAN LOVELLS, *In re LTL Management*, No.21-30589, Rec. Doc. 2324 (D.N.J. Bankruptcy May 4, 2022).
- 56. ORDER AUTHORIZING RETENTION OF HOGAN LOVELLS, *In re LTL Management*, No.21-30589, Rec. Doc. 2508 (June 15, 2022).
- 57. DECLARATION OF VINCENT SERRA, *Commissioner of Public Works v. Costco*, No.21-0042, Rec. Doc. 123-3 (D.S.C. signed Dec. 7, 2021 and filed Dec. 13, 2021).
- 58. ORDER AND OPINION, Commissioner of Public Works v. Costco, No.21-0042, Rec. Doc. 133 (D.S.C. Jan. 24, 2022).
- 59. FEE APPLICATION, *In re Kidde-Fenwal*, No.23-10638, Rec. Doc. 392 (D.Del. Bankruptcy filed Sept. 1, 2023).
- 60. DECLARATION OF ROBERT KLONOFF, *In re Juul Labs*, No.19-2913, Rec. Doc. 4056-2 (N.D.Cal. June 23, 2023).

- 61. "Will Billing Rates for Elite Firms Rise More in 2020?" by Samantha Stokes, <u>The American Lawyer</u> (July 30, 2020) (found at https://www.law.com/americanlawyer/2020/07/30/will-billing-rates-for-elite-firms-rise-more-in-2020/ as of Oct. 6, 2023).
- 62. DEBTOR'S APPLICATION FOR RETENTION OF KIRKLAND & ELLIS, *In re J.C. Penny Co.*, No.20-20182, Rec. Doc. 684 (S.D.Tex. Bankruptcy filed June 11, 2020).
- 63. ORDER AUTHORIZING RETENTION OF KIRKLAND & ELLIS, *In re J.C. Penny Co.*, No.20-20182, Rec. Doc. 962 (S.D.Tex. Bankruptcy July 2, 2020).
- 64. THIRD MONTHLY FEE STATEMENT, *In re J.C. Penny Co.*, No.20-20182, Rec. Doc. 2180 (S.D.Tex. Bankruptcy filed Dec. 14, 2020).
- 65. "Legal Fees Cross New Mark: \$1,500 an Hour" by Sara Randazzo, <u>Wall Street Journal</u> (Feb. 9, 2016) (available at https://www.wsj.com/articles/legal-fees-reach-new-pinnacle-1-500-an-hour-1454960708)
- 66. "Texas Lawyers Hit \$2,000 an Hour" by Mark Curriden, <u>The Texas Lawbook</u> (Sept. 25, 2023) (https://texaslawbook.net/texas-lawyers-hit-2000-an-hour/)
- 67. DECLARATION OF JOHN C. COFFEE, JR., *In re Enron*, No.01-3624, Rec. Doc. 5821 (S.D.Tex. filed Jan. 4, 2008).
- 68. DECLARATION OF WILLIAM B. RUBENSTEIN, *National Veterans Legal Services v. United States*, No.16-745, Rec. Doc. 160-2 (D.D.C. filed Oct. 3, 2023).
- 69. SUPPLEMENTAL DECLARATION OF BRIAN FITZPATRICK, *National Veterans Legal Services v. United States*, No.16-745, Rec. Doc. 160-1 (D.D.C. filed Oct. 3, 2023).
- 70. DECLARATION OF WILLIAM B. RUBENSTEIN, *In re Twitter*, No.16-5314, Rec. Doc. 662-7 (N.D.Cal. filed Oct. 13, 2022).

Additional Rate Information and Analysis

In the *Juul* MDL,¹ the average billing rates for each category of time-keepers were recently reported as:

Partners	Of Counsel	Associates	Staff /Contract Attys	Paralegals/Staff
\$819	\$775	\$501	\$351 / \$371	\$324

The highest rates among the five highest-billing timekeepers at the co-lead law firms were:

Partners	Of Counsel	Associates	Staff and Contract Attys
\$1,100	\$750	\$750	\$475

In the *Volkswagen Clean Diesel* MDL, the Court, in 2017, accepted class counsel's hourly fees at rates as high as \$1,600 for partners and \$790 for associates.²

In Commissioners of Public Works v. Costco, ³ this Court approved, in 2022:

Partners	Of Counsel	Staff Attorneys	Associates	Paralegals
\$895 - \$1,325	\$1,175	\$425	\$400 - \$450	\$275 - \$350

The mean rates reported by ELM for all lawyers (irrespective of skill, reputation, experience, or the type of case) have increased from \$705/hr. for Partners in 2020, to \$749/hr. in 2022; for Associates from \$503 in 2020 to \$546 in 2022; and for Paralegals from \$232 in 2020 to \$247 in 2022.⁴

⁴ See ELM SOLUTIONS 2022 REAL RATE REPORT (Walters Kluwer), p.9. The Report also (at p.124) reflects rates for Environmental lawyers practicing in New York, Los Angeles and Washington DC:

City	Level	2020	2021	2022
Los Angeles	Partner	\$557	\$568	\$753
New York	Partner	\$590	\$656	\$616
	Associate	\$432	\$502	\$382
Washington DC	Partner	\$744	\$745	\$812
-	Associate	\$475	\$543	\$567

(Excerpts from the ELM 2022 Report are attached as ADDENDUM G)

¹ See DECLARATION OF ROBERT KLONOFF, *In re Juul Labs*, No.19-2913, Rec. Doc. 4056-2 (N.D.Cal. June 23, 2023), at p.26, ¶47 and p.55, ¶92.

 $^{^2}$ See Order, In re Volkswagen, No.15-2672, Rec. Doc. 3053 [2017 WL 1047834] (N.D.Cal. Mar. 17, 2017) at p.8 ("The blended average hourly billing rate is \$529 per hour for all work performed and projected, with billing rates ranging from \$275 to \$1600 for partners, \$150 to \$790 for associates, and \$80 to \$490 for paralegals").

³ See Exhibit A to the DECLARATION OF VINCENT SERRA, filed in *Commissioner of Public Works v. Costco*, No.21-0042, Rec. Doc. 123-3, at 5 (D.S.C. signed Dec. 7, 2021 and filed Dec. 13, 2021), approved in: ORDER AND OPINION, No.21-0042, Rec. Doc. 133 (D.S.C. Jan. 24, 2022) at p.14.

The current Laffey Matrix ⁵ rates produce a blended rate of \$654.33 / hr. ⁶

• In *Allura*, Judge Norton accepted rates for class counsel that were conservatively based on adjusted Laffey Matrix rates, (which the Court found comparable to the rates charged in South Carolina), despite the fact that the case was national in scope and required construction and product defect class action specialists from across the country who typically charge higher rates.⁷

The Fitzpatrick Matrix's 8 most recent rates, from 2021, produce a blended rate of approximately \$600 / hr.9

⁵ See http://www.laffeymatrix.com/see.html (as of Oct. 5, 2023) (attached as ADDENDUM D). The Fourth Circuit has noted that the Laffey Matrix is a useful starting point to determine fees, at least with respect to services performed by attorneys located in the DC area, (Newport News Shipbuilding and Dry Dock Co. v. Holiday, 591 F.3d 219 (4th Cir. 2009); Grissom v. Mills Corp., 549 F.3d 313, 322 (4th Cir. 2008)), and District Courts within the Fourth Circuit have relied upon the Matrix as a basis for the approval of fees. See, e.g., In re Allura Cement Siding Lit., No.19-2886, 2021 U.S.Dist.LEXIS 96931, 2021 WL 2043531 (D.S.C. May 21, 2021); Brown v. Transurban USA, Inc., 318 F.R.D. 560, 575- 576 (E.D.Va. Sept. 29, 2016) (citing In re NeuStar, No.14-885, 2015 U.S.Dist.LEXIS 165320, 2015 WL 8484438, at fn.6 (E.D.Va. Dec. 8, 2015)).

⁶ See ADDENDUM D.

⁷ <u>In re Allura Cement Siding Lit.</u>, No.19-2886, 2021 U.S.Dist.LEXIS 96931, 2021 WL 2043531 (D.S.C. May 21, 2021).

⁸ As the District of Columbia Circuit explains in DL v. D.C., 924 F.3d 585, 589-590 (D.C.Cir. 2019), the Laffey Matrix was originally developed to standardized fee schedule, derived originally from the survey of the billing rates of Washington DC attorneys engaged in an active litigation practice in Federal Court. The U.S. Attorney's Office maintained one version of the matrix, relying on the original 1983 base data updated through a Bureau of Labor Statistics inflation index that tracks regional price increases. Some plaintiffs' attorneys argued that this index failed to capture the true rate of inflationary change and began advancing a version of the 1989 Laffey data updated with a different Bureau of Labor Statistics index called the Legal Services Index (LSI), which estimates price increases for the legal market nationwide. In 2015, the Government started to replace the Laffey datasets by using the annual Survey of Law Firm Economics, published by ALM Legal Intelligence (ALM), in conjunction with the National Law Journal. Following the DL v. DC decision in 2019, the U.S. Attorney's Office created a new matrix, known as the "Fitzpatrick Matrix". As described in EXPLANATORY NOTE 5: "The data for this matrix was gathered from the dockets of cases litigated in the U.S. District Court for the District of Columbia using the following search in Bloomberg Law: keywords ('motion n/5 fees AND attorney!' under 'Dockets Only') + filing type ('brief,' 'motion,' or 'order') + date ('May 31, 2013 – May 31, 2020' under 'Entries (Docket Key Only)')." For matters in which a prevailing party agrees to payment pursuant to the Fitzpatrick Matrix, the U.S. Attorney's Office for the District of Columbia will not request that a prevailing party offer the additional evidence in support of his or her billing rate. As Professor Fitzpatrick himself makes clear: "The Matrix is a settlement tool, designed to minimize fee disputes with the Department. In particular, the Matrix contemplates that parties will use non-Matrix rates when warranted; the Department simply agreed not to oppose any fee-shifting request based on the rates in the Matrix." SUPPLEMENTAL DECLARATION OF BRIAN FITZPATRICK, National Veterans Legal Services v. United States, No.16-745, Rec. Doc. 160-1 (D.D.C. filed Oct. 3, 2023) at pp.2-3 ¶5 (citing EXPLANATORY NOTES 3 and 10). The Fitzpatrick Matrix is submitted herewith as ADDENDUM E.

⁹ Taking the 2021 rates for Paralegals, 3-Year Attorneys, 6-Year Attorneys, 9-Year Attorneys, 12-Year Attorneys, 15-Year Attorneys, 18-Year Attorneys, 21-Year Attorneys, 24-Year Attorneys, 27-Year Attorneys, 30-Year Attorneys, and 33-Year Attorneys. *See* ADDENDUM E.

One of the Lead Counsel Firms in this MDL, for example, was recently involved in a series of public entity PCB contamination cases with other class action / MDL firms, achieving a class settlement in the Central District of California. Approving a percentage-of-benefit fee request with a lodestar-type cross-check, the Court accepted class counsel rates of: 10

Partner	\$1,000 - \$1,100
Associate	\$500 - \$900
Staff Attorney	\$395
Paralegal	\$250

In support, fee expert Richard Pearl related information from the *Southern California Gas Leak Litigation*, in which the Superior Court of Los Angeles approved rates of: ^{11, 12}

25+ Years	\$975 - \$1,200
5 – 25 Years	\$510 - \$1,045
Staff Attys / 1-5 Yrs	\$395 - \$550

-and- 13

Partners / Of Counsel / Special Counsel	\$600 - \$1,200
Associates	\$370 - \$650
Paralegals / Law Clerks	\$185 - \$420

Mr. Pearl also notes that: In 2021, Munger, Tolles & Olson billed a 31-year attorney at \$1,725 per hour and a 12-year attorney at \$995 per hour. In 2019, Pearson Simon & Warshaw, a plaintiff class action firm, billed attorneys with 23-38 years of experience at \$1,150 per hour; and that rates have generally increased at least 10-12% since 2019.¹⁴

¹⁰ See ORDER RE: FINAL APPROVAL OF CLASS ACTION SETTLEMENT, City of Long Beach v. Monsanto, No.16-3493, Rec. Doc. 311 (C.D.Cal. Nov. 19, 2022), at p.26; and Exhibit B to the DECLARATION OF RICHARD M. PEARL, Rec. Doc. 300-6 (June 24, 2022).

¹¹ See DECLARATION OF RICHARD M. PEARL, City of Long Beach v. Monsanto, No.16-3493, Rec. Doc. 300-6 (June 24, 2022), at ¶16.

¹² As noted in Footnote 8 to the Declaration, many class counsel in securities and/or consumer cases only blend the law firm partner, of counsel/special counsel, and associate rates, while submitting paralegal, law clerk, and staff or contract attorney rates separately. Where, as here, all of these rates are being combined together into one blended rate, that number is obviously going to be lower.

¹³ Some of the firms broke down their rates primarily according to their years in practice, while other firms broke down primarily by Partners, Associates, etc.

 $^{^{14}}$ See DECLARATION OF RICHARD M. PEARL, City of Long Beach v. Monsanto, No.16-3493, Rec. Doc. 300-6 (June 24, 2022), at ¶17.

In Hayes v. Magnachip Semiconductor, the Northern District of California approved a blended rate of \$600 per hour for a Lead Class Counsel in 2016, 15 and in Coleman v. Newsom, the Eastern District of California approved a blended rate of \$775 per hour for a law firm appointed as a neutral expert in 2019. 16

Although the ultimate Fourth Circuit Lumber Liquidators MDL decision accepting a blended rate of \$524/hr was handed down in 2022, 17 the rate was actually originally accepted by the District Court in 2018, while looking to the Vienna Metro Matrix rates, which had been established all the way back in 2011.¹⁸

In McCurley, Judge Childs approved attorney rates ranging from \$300 - \$850 / hr. in 2018. 19

¹⁸ See Lumber Liquidators, supra, 2020 U.S.Dist.LEXIS 181103 at *76 ("the requested average billing rate of approximately \$524 per hour results, which is in accordance with, and does not exceed the billing rates provided in, the Vienna matrix, reveals an aggregate lodestar of nearly \$12.2 million which exceeds the \$10.08 million award requested"). This Matrix, which Courts have followed in the Eastern District of Virginia, reflects the following hourly rates from 2011:

Year of Experience	Paralegal	1-3	4-7	8-10	11-19	20+
Hourly Rate	\$130-350	\$250-435	\$350-600	\$465-770	\$520-770	\$505-820

See Vienna Metro LLC v. Pulte Home Corp., No.10-0002, 2011 U.S.Dist.LEXIS 168240 (E.D.Va. Aug. 24, 2011).

¹⁵ See Hayes v. Magnachip, No.14-01160, 2016 WL 6902856, 2016 U.S.Dist.LEXIS 162120 (N.D.Cal. Nov. 21, 2016). (*Note* that only the rates of the Pomerantz firm, and not all firms, were "blended")

¹⁶ See Coleman v. Newsom, No.90-0520, 2019 WL 525093, 2019 U.S.Dist.LEXIS 22028 (E.D.Cal. Feb. 11, 2019).

¹⁷ See Cantu-Guerroro v. Lumber Liquidators, 27 F.4th 291, 300 (4th Cir. 2022) ("Lumber Liquidators II"). Initially, in Lumber Liquidators, a percentage-of-benefit award of 28%, in the amount of \$10.08 million, was awarded, on November 15, 2018. In conducting a cross-check, the District Court used a blended rate of \$524/hr, which resulted in a Lodestar of \$12.5 million, and hence supported the reasonableness of the percentage-based award. (Indeed, the District Court noted that the "negative multiplier" was "much smaller than multipliers which have been found reasonable in similar cases. See, e.g., Jones v. Dominion Res. Servs., 601 F.Supp.2d 756, 766 (S.D.W.Va. 2009) (collecting cases) ('Courts have generally held that lodestar multipliers falling between 2 and 4.5 demonstrate a reasonable attorneys' fee')"] That fee award was vacated and remanded by the Fourth Circuit for further consideration in light of CAFA's coupon settlement provisions. Lumber Liquidators I, 952 F.3d 471, 491-492 (4th Cir. 2020). On remand, the District Court applied the pure Lodestar method, rather than a percentage-of-benefit, and awarded the same \$10.08 million that had been originally requested. Again, the award was supported by a \$524/hr blended rate, which, (after the deduction of several hours from the rough cross-check numbers), generated a Lodestar of \$12.2 million. Lumber Liquidators, No.15-2627, 2020 WL 5757504, 2020 U.S.Dist.LEXIS 181103 (E.D.Va. Sept. 4, 2020). Which was affirmed by the Fourth Circuit. Lumber Liquidators II, supra, 27 F.4th at 300-301.

¹⁹ McCurley v. Flowers Foods, Inc., No.16-0194, 2018 U.S.Dist.LEXIS 226234 (D.S.C. Sept. 10, 2018).

In *Phillips*, Judge Tilley in the Middle District of North Carolina approved, in 2016: ²⁰

Partner	\$640 - \$880
Associate	\$375 - \$550

In *NeuStar*, Judge Cacheris in the Eastern District of Virginia approved the following rates in 2015:²¹

Partner	\$800 - \$975
Associate	\$420 - \$700
Paralegal	\$260 - \$310

In *Savani*, Judge Childs relied on a range of \$500 - \$650 / hr., supported by Professor John Freeman, in approving a class fee request under a Lodestar-type cross-check. ²²

In addition to accepting an MDL-wide blended rate of \$623.05 in *NFL Concussion*, the Court separately approved a blended rate of \$861.28 for the Lead Counsel Firm.²³

In 2021, the blended rates for successful class counsel in the Northern District of California ranged from \$455 - \$850, with a median of \$617.²⁴

In 2020, a fee request, approved in pertinent part, in connection with a sanctions order, reflected:²⁵

Partner Rates	\$725 - \$1,950
Associate Rates	\$75 - \$950
Paralegal Rates	\$225 - \$380

 $^{^{20}}$ Phillips v. Triad Guar. Inc., No.09-71, 2016 U.S.Dist.LEXIS 60950, 2016 WL 2636289 (M.D.N.C. May 9, 2016).

²¹ In re NeuStar, No.14-885, 2015 U.S.Dist.LEXIS 165320, 2015 WL 8484438 (E.D.Va. Dec. 8, 2015).

²² Savani v. URS Professional Solutions, 121 F.Supp.3d 564, 575–576 (D.S.C. 2015).

²³ See OPINION, NFL Concussion Injury Litig., No.12-02323, Rec. Doc. 10019 (E.D. Pa. May 24, 2018), pp.20-21 (approving lodestar for the Lead Counsel firm of \$18,124,869.10, based on 21,044 hours – an effective firm rate of \$861.28/hr).

 $^{^{24}}$ Declaration of William B. Rubenstein, *In re Twitter*, No.16-5314, Rec. Doc. 662-7 (N.D.Cal. filed Oct. 13, 2022) at p.26 \P 34.

²⁵ See Exhibit A to the DECLARATION OF MARK MAO, Brown, et al v. Google, No.20-3664, Rec. Doc. 597-1 (N.D.Cal. June 3, 2022) and Order Approving Fees, Brown v. Google, 2022 WL 2789897, 2022 U.S.Dist.LEXIS 125738 (N.D.Cal. July 15, 2022).

In a different case, one of the same firms, along with a second firm, filed a fee petition in connection with the proposed settlement of a class action, reflecting: ²⁶

Partner Rates	\$1,080 - \$2,110
Associate Rates	\$650 - \$860
Staff Attorney Rates	\$430 - \$500
Paralegal Rates	\$150 - \$380

 26 See Declaration of Bradley J. Edwards and Declaration of Sigrid S. McCawley, Doe v. Deutsche Bank, No.22-10018, Rec. Docs. 105 and 106 (S.D.N.Y. Sept. 15, 2023).

LAFFEY MATRIX

History

Case Law

See the Matrix

Contact us

Home

			Vears Out	of Law Scho	nol *		
Year	Adjustmt Factor**	Paralegal/ Law Clerk	1-3	4-7	8-10	11-19	20 +
6/01/23- 5/31/24	1.059295	\$239	\$437	\$538	\$777	\$878	\$1057
6/01/22- 5/31/23	1.085091	\$225	\$413	\$508	\$733	\$829	\$997
6/01/21- 5/31/22	1.006053	\$208	\$381	\$468	\$676	\$764	\$919
6/01/20- 5/31/21	1.015894	\$206	\$378	\$465	\$672	\$759	\$914
6/01/19- 5/31/20	1.0049	\$203	\$372	\$458	\$661	\$747	\$899
6/01/18- 5/31/19	1.0350	\$202	\$371	\$455	\$658	\$742	\$894
6/01/17- 5/31/18	1.0463	\$196	\$359	\$440	\$636	\$717	\$864
6/01/16- 5/31/17	1.0369	\$187	\$343	\$421	\$608	\$685	\$826
6/01/15- 5/31/16	1.0089	\$180	\$331	\$406	\$586	\$661	\$796
6/01/14- 5/31/15	1.0235	\$179	\$328	\$402	\$581	\$655	\$789
6/01/13- 5/31/14	1.0244	\$175	\$320	\$393	\$567	\$640	\$771
6/01/12- 5/31/13	1.0258	\$170	\$312	\$383	\$554	\$625	\$753
6/01/11- 5/31/12	1.0352	\$166	\$305	\$374	\$540	\$609	\$734
6/01/10- 5/31/11	1.0337	\$161	\$294	\$361	\$522	\$589	\$709
6/01/09- 5/31/10	1.0220	\$155	\$285	\$349	\$505	\$569	\$686
6/01/08- 5/31/09	1.0399	\$152	\$279	\$342	\$494	\$557	\$671
6/01/07-5/31/08	1.0516	\$146	\$268	\$329	\$475	\$536	\$645
6/01/06-5/31/07	1.0256	\$139	\$255	\$313	\$452	\$509	\$614
6/1/05-5/31/06	1.0427	\$136	\$249	\$305	\$441	\$497	\$598
6/1/04-5/31/05	1.0455	\$130	\$239	\$293	\$423	\$476	\$574
6/1/03-6/1/04	1.0507	\$124	\$228	\$280	\$405	\$456	\$549
6/1/02-5/31/03	1.0727	\$118	\$217	\$267	\$385	\$434	\$522
6/1/01-5/31/02	1.0407	\$110	\$203	\$249	\$359	\$404	\$487
6/1/00-5/31/01	1.0529	\$106	\$195	\$239	\$345	\$388	\$468
6/1/99-5/31/00	1.0491	\$101	\$185	\$227	\$328	\$369	\$444
6/1/98-5/31/99	1.0439	\$96	\$176	\$216	\$312	\$352	\$424
6/1/97-5/31/98	1.0419	\$92	\$169	\$207	\$299	\$337	\$406
6/1/96-5/31/97	1.0396	\$88	\$162	\$198	\$287	\$323	\$389
6/1/95-5/31/96	1.032	\$85	\$155	\$191	\$276	\$311	\$375

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6/1/94-5/31/95 1.0237 \$82 \$151 \$185 \$267 \$301 \$363

The methodology of calculation and benchmarking for this Updated Laffey Matrix has been approved in a number of cases. See, e.g., DL v. District of Columbia, 267 F.Supp.3d 55, 69 (D.D.C. 2017)

- * $\ddot{\imath}_{\xi}$ ½Years Out of Law School $\ddot{\imath}_{\xi}$ ½ is calculated from June 1 of each year, when most law students graduate. $\ddot{\imath}_{\xi}$ ½1-3" includes an attorney in his 1st, 2nd and 3rd years of practice, measured from date of graduation (June 1). $\ddot{\imath}_{\xi}$ ½4-7" applies to attorneys in their 4th, 5th, 6th and 7th years of practice. An attorney who graduated in May 1996 would be in tier $\ddot{\imath}_{\xi}$ ½1-3" from June 1, 1996 until May 31, 1999, would move into tier $\ddot{\imath}_{\xi}$ ½4-7" on June 1, 1999, and tier $\ddot{\imath}_{\xi}$ ½8-10" on June 1, 2003.
- ** The Adjustment Factor refers to the nation-wide Legal Services Component of the Consumer Price Index produced by the Bureau of Labor Statistics of the United States Department of Labor.

www.laffeymatrix.com/see.html 2/2

THE FITZPATRICK MATRIX

Hourly Rates (\$) for Legal Fees for Complex Federal Litigation in the District of Columbia

Years Exp. / Billing Yr.	2013	2014	2015	2016	2017	2018	2019	2020	2021
35+	535	563	591	619	647	675	703	731	736
34	534	562	590	618	646	674	702	729	734
33	532	560	588	616	644	672	700	728	733
32	530	558	586	614	642	670	698	726	730
31	527	555	583	611	639	667	695	723	728
30	524	552	580	608	636	664	692	720	725
29	521	549	577	605	633	661	689	717	721
28	517	545	573	601	629	657	685	713	717
27	512	540	568	596	624	652	680	708	713
26	508	536	564	592	620	648	676	704	708
25	502	530	558	586	614	642	670	698	703
24	497	525	553	581	609	637	665	693	697
23	491	519	547	575	603	630	658	686	691
22	484	512	540	568	596	624	652	680	684
21	477	505	533	561	589	617	645	673	677
20	470	498	526	553	581	609	637	665	670
19	462	490	518	546	574	602	630	658	662
18	453	481	509	537	565	593	621	649	653
17	445	473	500	528	556	584	612	640	645
16	435	463	491	519	547	575	603	631	635
15	426	454	482	510	538	566	593	621	626
14	416	443	471	499	527	555	583	611	615
13	405	433	461	489	517	545	573	601	605
12	394	422	450	478	506	534	562	590	594
11	382	410	438	466	494	522	550	578	582
10	371	399	427	455	483	510	538	566	570
9	358	386	414	442	470	498	526	554	558
8	345	373	401	429	457	485	513	541	545
7	332	360	388	416	444	472	500	528	532
6	319	347	375	403	431	458	486	514	518
5	305	332	360	388	416	444	472	500	504
4	290	318	346	374	402	430	458	486	489
3	275	303	331	359	387	415	443	471	474
2	260	287	315	343	371	399	427	455	458
1	244	272	300	328	356	384	412	439	442
0	227	255	283	311	339	367	395	423	426
P*	130	140	150	160	169	179	189	199	200

^{* =} Paralegals/Law Clerks

Addendum E

Explanatory Notes

- 1. This matrix of hourly rates for attorneys of varying experience levels and paralegals/law clerks has been prepared to assist with resolving requests for attorney's fees in complex civil cases in District of Columbia federal courts handled by the Civil Division of the United States Attorney's Office for the District of Columbia. It has been developed to provide "a reliable assessment of fees charged for complex federal litigation in the District [of Columbia]," as the United States Court of Appeals for the District of Columbia Circuit urged. DL v. District of Columbia, 924 F.3d 585, 595 (D.C. Cir. 2019). The matrix has not been adopted by the Department of Justice generally for use outside the District of Columbia, nor has it been adopted by other Department of Justice components.
- 2. The matrix is intended for use in cases in which a fee-shifting statute permits the prevailing party to recover "reasonable" attorney's fees. *E.g.*, 42 U.S.C. § 2000e-5(k) (Title VII of the 1964 Civil Rights Act); 5 U.S.C. § 552(a)(4)(E) (Freedom of Information Act); 28 U.S.C. § 2412(b). A "reasonable fee" is a fee that is sufficient to attract an adequate supply of capable counsel for meritorious cases. *Perdue v. Kenny A. ex rel. Winn*, 559 U.S. 542, 552 (2010). The matrix is not intended for use in cases in which the hourly rate is limited by statute. *E.g.*, 28 U.S.C. § 2412(d).
- 3. For matters in which a prevailing party agrees to payment pursuant to this fee matrix, the United States Attorney's Office will not request that a prevailing party offer the additional evidence that the law otherwise requires. See, e.g., Eley v. District of Columbia, 793 F.3d 97, 104 (D.C. Cir. 2015) (quoting Covington v. District of Columbia, 57 F.3d 1101, 1109 (D.C. Cir. 1995) (requiring "evidence that [the] 'requested rates are in line with those prevailing in the community for similar services'")).
- 4. The years in the column on the left refer to an attorney's years of experience practicing law. Normally, an attorney's experience will be calculated based on the number of years since an attorney graduated from law school. If the year of law school graduation is unavailable, the year of bar passage should be used instead. Thus, an attorney who graduated from law school in the same year as the work for which compensation is sought has 0 years of experience. For all work beginning on January 1 of the calendar year following graduation (or bar admission), the attorney will have 1 year of experience. (For example, an attorney who graduated from law school on May 30 will have 0 years of experience until December 31 of that same calendar year. As of January 1, all work charged will be computed as performed by an attorney with 1 year of experience.) Adjustments may be necessary if an attorney did not follow a typical career progression or was effectively performing law clerk work. See, e.g., EPIC v. Dep't of Homeland Sec., 999 F. Supp. 2d 61, 70-71 (D.D.C. 2013) (attorney not admitted to bar compensated at "Paralegals & Law Clerks" rate).
- 5. The data for this matrix was gathered from the dockets of cases litigated in the U.S. District Court for the District of Columbia using the following search in Bloomberg Law: keywords ("motion n/5 fees AND attorney!" under "Dockets Only") + filing type ("brief," "motion," or "order") + date ("May 31, 2013 May 31, 2020" under "Entries (Docket Key Only)"). This returned a list of 781 cases. Of those, cases were excluded if there was no motion for fees filed, the motions for fees lacked necessary information, or the motions involved fees not based on hourly rates, involved rates explicitly or implicitly based on an existing fee matrix, involved rates explicitly or implicitly subject to statutory fee caps (e.g., cases subject to the Equal Access to Justice Act (EAJA), 28 U.S.C. § 2412(d)), or used lower rates prescribed by case law (e.g., Eley, 793 F.3d at 105 (Individuals with Disabilities in Education Act

- cases)). After these excisions, 86 cases, many of which included data for multiple billers (and 2 of which only provided hourly rate data for paralegals), remained.
- 6. The cases used to generate this matrix constitute complex federal litigation—which caselaw establishes as encompassing a broad range of matters tried in federal court. *E.g.*, *Reed v. District of Columbia*, 843 F.3d 517, 527-29 (D.C. Cir. 2016) (Tatel, J., concurring) (noting that cases arising under the Freedom of Information Act, Title VII, the Americans with Disabilities Act, Constitutional Amendments, antitrust statutes, and others have been deemed complex, and even "relatively small" cases can constitute complex federal litigation, as they too require "specialized legal skills" and can involve "complex organizations," such as "large companies"); *Miller v. Holzmann*, 575 F. Supp. 2d 2, 14-16, 17 (D.D.C. 2008) (prevailing market rates for complex federal litigation should be determined by looking to "a diverse range of cases"). That the attorneys handling these cases asked the court to award the specified rates itself demonstrates that the rates were "'adequate to attract competent counsel, [while] not produc[ing] windfalls to attorneys." *West v. Potter*, 717 F.3d 1030, 1033 (D.C. Cir. 2013) (quoting *Blum v. Stenson*, 465 U.S. 886, 897 (1984)). As a consequence, the resulting analysis yields the "prevailing market rate[] in the relevant community" for complex litigation undertaken in federal courts in the District of Columbia. *See Blum*, 465 U.S. at 895.
- 7. From these 86 complex federal cases, the following information was recorded for 2013 and beyond: hourly rate, the calendar year the rate was charged, and the number of years the lawyer was out of law school when the rate was charged (or, if law school graduation year was unavailable, years since bar passage), as defined above. If the graduation or bar passage year was not stated in a motion or its exhibits, then the lawyer's biography was researched on the internet. Although preexisting fee matrices for the District of Columbia provide for mid-year rate changes, very few lawyers in the data submitted rates that changed within a calendar year. For this reason, the matrix was modeled using one rate for each calendar year. On the occasions when a lawyer expressed an hourly rate as a range or indicated the rate had increased during the year, the midpoint of the two rates was recorded for that lawyer-year.
- 8. The matrix of attorney rates is based on 675 lawyer-year data points (one data point for each year in which a lawyer charged an hourly rate) from 419 unique lawyers from 84 unique cases. The lawyer-year data points spanned from years 2013 to 2020, from \$100 to \$1250, and from less than one year of experience to 58 years.
- 9. Paralegal/law clerk rates were also recorded. The following titles in the fee motions were included in the paralegal/law clerk data: law clerk, legal assistant, paralegal, senior legal assistant, senior paralegal, and student clerk. The paralegal/law clerk row is based on 108 paralegal-year data points from 42 unique cases. They spanned from 2013 to 2019 and from \$60 to \$290. (It is unclear how many unique persons are in the 108 data points because paralegals were not always identified by name.)
- 10. The matrix was created with separate regressions for the lawyer data and the paralegal data. For the paralegal data, simple linear least-squares regression was used with the dependent variable hourly rate and the independent variable the year the rate was charged subtracted from 2013; years were

combined into one variable and subtracted from 2013 rather than modeled as separate indicator variables to constrain annual inflation to a constant, positive number. The resulting regression formula was rate = 129.8789 + 9.902107 * (year-2013). For the lawyer data, least-squares regression was used with the dependent variable hourly rate and independent variables the year the rate was charged and the number of years of experience of the lawyer when the rate was charged. The year the rate was charged was subtracted from 2013 and modeled linearly as with the paralegal data. The number of years out of law school (or since year of bar passage) was modeled with both linear and squared terms, as is common in labor economics to account for non-linear wage growth (e.g., faster growth earlier in one's career than at the end of one's career). See, e.g., Jacob Mincer, Schooling, Experience, and Earnings (1974). The resulting regression formula was rate = 227.319 + 16.54492 * experience - 0.2216217 * experience ^ 2 + 27.97634 * (year-2013). Regressions were also run with log transformed rates and with a random-effect model (to account for several lawyers appearing more than once in the data), but both alternatives resulted in mostly lower rates than those reflected here; in order to minimize fee disputes, these models were therefore rejected in favor of the more generous untransformed, fixed-effect model. Rates from one case comprised 20% of the data; the regression was also run without that case, but the resulting rates were mostly lower and therefore rejected, again to minimize fee disputes.

- 11. The data collected for this matrix runs through 2020. To generate rates in 2021, an inflation adjustment (rounded to the nearest whole dollar) was added. The United States Attorney's Office determined that, because courts and many parties have employed the legal services index of the Consumer Price Index to adjust attorney hourly rates for inflation, this matrix will do likewise. *E.g., Salazar v. District of Columbia*, 809 F.3d 58, 64-65 (D.C. Cir. 2015); *Eley*, 793 F.3d at 101-02; *DL*, 924 F.3d at 589-90.
- 12. This matrix was researched and prepared by Brian Fitzpatrick, the Milton R. Underwood Chair in Free Enterprise and Professor of Law at Vanderbilt Law School, with the help of his students.

Addendum F

From Bloomberg Law analysis of Bankruptcy Dockets

(*See* "Rising Rates Are Law Firms' Salve Amid Layoffs, Pay Cuts" by Roy Strom, <u>Bloomberg Law</u> (Jan. 19, 2023) (found at https://news.bloomberglaw.com/business-and-practice/rising-rates-are-law-firms-salve-as-layoffs-and-pay-cuts-surge as of Sept. 26, 2023))

Law firms were expected to raise rates around 8 means average this year, and many appear to be following through.

Firm	Top-Paid Partner New	Top-Paid Partner Old	% Change
Mayer Brown	\$1,940	\$1,635	18.7%
Cole Schotz	\$1,200	\$1,050	14.3%
Ice Miller	\$1,110	\$975	13.8%
Kirkland & Ellis	\$2,245	\$1,995	12.5%
Akin Gump	\$2,145	\$1,995	7.5%
Latham & Watkins	\$2,230	\$2,075	7.5%
Weil Gotshal	\$2,095	\$1,950	7.4%
Paul Weiss	\$2,175	\$2,025	7.4%
Paul Hastings	\$2,075	\$1,935	7.2%
Brown Rudnick	\$2,250	\$2,100	7.1%
Freshfields	\$1,995	\$1,925	3.6%
Average			9.7%

Source: Bloomberg Law analysis of bankruptcy dockets.

Note: Some rates are "firm-wide," while others pertain only to an individual

bankruptcy matter.

Associate Rates RISING Date Filed 10/15/23 Entry Number 3795-10 Page 62 of 94

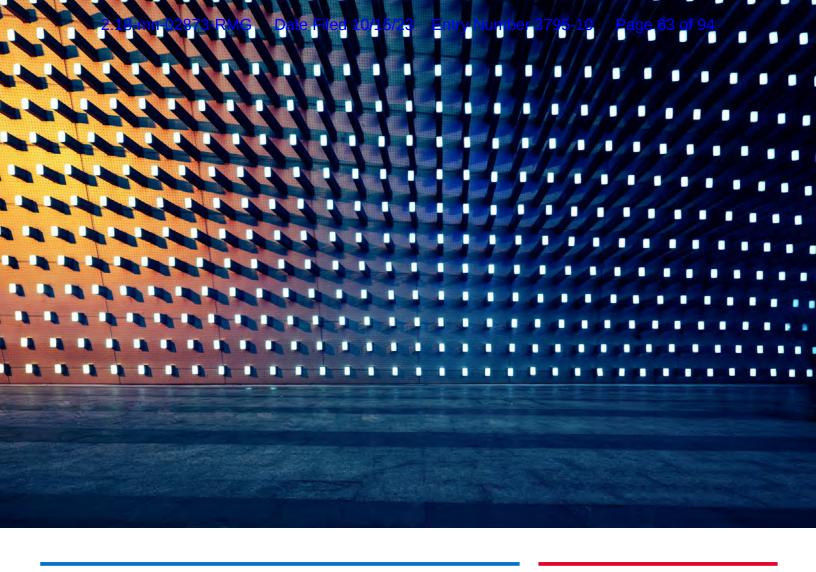
Law firms have told bankruptcy courts their associates will cost 9% more on average in 2023.

Firm	Top-Paid Associate New	Top-Paid Associate Old	% Change
Akin Gump	\$1,250	\$1,045	19.6%
Weil Gotshal	\$1,345	\$1,200	12.1%
Kirkland & Ellis	\$1,395	\$1,245	12.0%
Mayer Brown	\$1,075	\$970	10.8%
Ice Miller	\$665	\$610	9.0%
Cole Schotz	\$730	\$670	9.0%
Paul Weiss	\$1,380	\$1,280	7.8%
Latham & Watkins	\$1,400	\$1,300	7.7%
Paul Hastings	\$1,320	\$1,230	7.3%
Freshfields	\$1,375	\$1,325	3.8%
Brown Rudnick	\$975	\$975	0.0%
Average			9.0%

Source: Bloomberg Law analysis of bankruptcy dockets

Note: Some rates are "firm-wide," while others pertain only to an individual

bankruptcy matter.



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Addendum G





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Report Use Considerations

2022 Real Rate Report

- · Examines law firm rates over time
- Identifies rates by location, experience, firm size, areas of expertise, industry, and timekeeper role (i.e., partner, associate, and paralegal)
- · Itemizes variables that drive rates up or down

All the analyses included in the report derive from the actual rates charged by law firm professionals as recorded on invoices submitted and approved for payment.

Examining real, approved rate information, along with the ranges of those rates and their changes over time, highlights the role these variables play in driving aggregate legal cost and income. The analyses can energize questions for both corporate clients and law firm principals.

Clients might ask whether they are paying the right amount for different types of legal services, while law firm principals might ask whether they are charging the right amount for legal services and whether to modify their pricing approach.

Some key factors¹ that drive rates²:

Attorney location - Lawyers in urban and major metropolitan areas tend to charge more when compared with lawyers in rural areas or small towns.

Litigation complexity - The cost of representation will be higher if the case is particularly complex or time-consuming; for example, if there are a large number of documents to review, many witnesses to depose, and numerous procedural steps, the case is likely to cost more (regardless of other factors like the lawyer's level of experience).

Years of experience and reputation - A more experienced, higher-profile lawyer is often going to charge more, but absorbing this higher cost at the outset may make more sense than hiring a less expensive lawyer who will likely take time and billable hours to come up to speed on unfamiliar legal and procedural issues.

Overhead - The costs associated with the firm's support network (paralegals, clerks, and assistants), document preparation, consultants, research, and other expenses.

Firm size – The rates can increase if the firm is large and has various timekeeper roles at the firm. For example, the cost to work with an associate or partner at a larger firm will be higher compared to a firm that has one to two associates and a paralegal.

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¹ David Goguen, J.D., University of San Francisco School of Law (2020) Guide to Legal Services Billing Retrieved from: https://www.lawyers.com/legal-info/research/guide-to-legal-services-billing-rates.html

² Source: 2018 RRR. Factor order validated in multiple analyses since 2010

Section I: High-Level Data Cuts

Partners, Associates, and Paralegals By Role

2022 - Real Rates

Trend Analysis - Mean

Role	n	First Quartile	Median	Third Quartile	2022	2021	2020
Partner	10592	\$430	\$653	\$969	\$749	\$738	\$705
Associate	9930	\$329	\$485	\$703	\$546	\$541	\$503
Paralegal	4215	\$150	\$225	\$325	\$247	\$244	\$232

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Section III: Practice Area Analysis

Environmental

By City

2022 — Real Rates for Associate and Partner

Trend Analysis - Mean

City	Role	n	First Quartile	Median	Third Quartile	2022	2021	2020
Los Angeles CA	Partner	11	\$515	\$550	\$663	\$753	\$568	\$557
New York NY	Partner	27	\$414	\$525	\$616	\$616	\$656	\$590
	Associate	26	\$298	\$340	\$400	\$382	\$502	\$432
Washington DC	Partner	14	\$660	\$803	\$957	\$812	\$745	\$744
	Associate	18	\$400	\$565	\$695	\$567	\$543	\$475

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Boston MA

By Practice Area and Firm Size

2022 — Real Rates for Associate and Partner

Trend Analysis - Mean

Practice Area	Firm Size	Role	n	First Quartile	Median	Third Quartile	2022	2021	2020
Commercial	More Than 1,000 Lawyers	Associate	14	\$695	\$818	\$977	\$831	\$787	\$767
Corporate: Other	51-200 Lawyers	Associate	16	\$301	\$450	\$586	\$447	\$455	\$455
	More Than 1,000 Lawyers	Partner	15	\$818	\$902	\$1,033	\$961	\$1,035	\$831
Finance and Securities: Investments and Other Financial Instruments	501-1,000 Lawyers	Partner	15	\$1,016	\$1,230	\$1,506	\$1,226	\$1,134	\$998
		Associate	13	\$526	\$645	\$698	\$680	\$654	\$635
	More Than 1,000 Lawyers	Partner	13	\$1,118	\$1,300	\$1,498	\$1,313	\$1,189	\$1,085
		Associate	32	\$650	\$775	\$1,000	\$817	\$799	\$725
Insurance Defense: Other	51-200 Lawyers	Partner	14	\$220	\$278	\$400	\$470	\$484	\$521
Insurance Defense: Property Damage	51-200 Lawyers	Partner	12	\$219	\$220	\$325	\$266	\$270	\$251
Intellectual Property: Patents	201-500 Lawyers	Partner	13	\$550	\$737	\$861	\$709	\$725	\$687

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Chicago ILBy Practice Area and Firm Size

2022 — Real Rates for Associate and Partner

Trend Analysis - Mean

2022 — Real Rates for Associate and Partner							Trend Analysis		- Mean
Practice Area	Firm Size	Role	n	First Quartile	Median	Third Quartile	2022	2021	2020
Commercial	201-500 Lawyers	Partner	20	\$453	\$706	\$1,025	\$766	\$707	\$692
	501-1,000 Lawyers	Partner	24	\$703	\$772	\$978	\$839	\$771	\$736
		Associate	30	\$330	\$462	\$578	\$497	\$458	\$470
	More Than 1,000 Lawyers	Partner	42	\$904	\$1,096	\$1,390	\$1,141	\$1,028	\$1,082
		Associate	36	\$585	\$705	\$871	\$721	\$689	\$698
Corporate: Mergers, Acquisitions and Divestitures	More Than 1,000 Lawyers	Partner	12	\$1,157	\$1,306	\$1,522	\$1,307	\$942	\$1,032
		Associate	18	\$601	\$782	\$955	\$790	\$553	\$748
Corporate: Other	201-500 Lawyers	Partner	54	\$712	\$902	\$1,023	\$884	\$847	\$833
		Associate	77	\$487	\$573	\$732	\$592	\$545	\$567
	501-1,000 Lawyers	Partner	22	\$765	\$970	\$1,135	\$979	\$890	\$785
		Associate	13	\$503	\$535	\$669	\$606	\$525	\$525
	More Than 1,000 Lawyers	Partner	103	\$760	\$925	\$1,280	\$1,035	\$1,021	\$983
		Associate	87	\$520	\$648	\$728	\$648	\$589	\$602
Corporate: Regulatory and Compliance	201-500 Lawyers	Partner	15	\$584	\$835	\$953	\$792	\$747	\$771
	More Than 1,000 Lawyers	Partner	30	\$823	\$1,027	\$1,124	\$999	\$884	\$898
		Associate	26	\$404	\$651	\$758	\$616	\$648	\$657
Corporate: Tax	More Than 1,000 Lawyers	Partner	30	\$920	\$1,030	\$1,225	\$1,050	\$1,036	\$1,021

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Chicago ILBy Practice Area and Firm Size

2022 — Real Rates for Associate and Partner

Trend Analysis - Mean

ssociate and Partner							Trend Analysis	
Firm Size	Role	n	First Quartile	Median	Third Quartile	2022	2021	2020
More Than 1,000 Lawyers	Associate	13	\$601	\$692	\$856	\$708	\$716	\$644
More Than 1,000 Lawyers	Partner	11	\$733	\$870	\$1,213	\$988	\$1,012	\$813
501-1,000 Lawyers	Associate	12	\$310	\$333	\$384	\$344	\$379	\$338
201-500 Lawyers	Partner	12	\$376	\$520	\$971	\$662	\$596	\$665
501-1,000 Lawyers	Partner	29	\$475	\$561	\$725	\$596	\$555	\$553
	Associate	24	\$339	\$387	\$465	\$422	\$372	\$391
More Than 1,000 Lawyers	Partner	20	\$627	\$720	\$953	\$866	\$892	\$808
	Associate	20	\$413	\$530	\$617	\$552	\$594	\$555
501-1,000 Lawyers	Associate	16	\$548	\$592	\$740	\$636	\$598	\$548
201-500 Lawyers	Associate	11	\$512	\$560	\$627	\$574	\$553	\$459
501-1,000 Lawyers	Partner	14	\$825	\$945	\$1,079	\$977	\$963	\$916
	Associate	11	\$552	\$600	\$762	\$666	\$678	\$599
More Than 1,000 Lawyers	Partner	73	\$1,173	\$1,295	\$1,544	\$1,348	\$1,273	\$1,220
	Associate	69	\$715	\$851	\$995	\$854	\$819	\$730
50 Lawyers or Fewer	Partner	42	\$245	\$300	\$335	\$291	\$282	\$268
51-200 Lawyers	Partner	14	\$193	\$195	\$228	\$209	\$229	\$231
50 Lawyers or Fewer	Partner	38	\$265	\$290	\$327	\$284	\$274	\$269
	More Than 1,000 Lawyers More Than 1,000 Lawyers 501-1,000 Lawyers 501-1,000 Lawyers More Than 1,000 Lawyers 501-1,000 Lawyers 201-500 Lawyers 501-1,000 Lawyers	More Than 1,000 Lawyers More Than 1,000 Lawyers Sol-1,000 Lawyers Sol-1,000 Lawyers Formal Partner Associate Associate More Than 1,000 Lawyers Associate Associate Sol-1,000 Lawyers Associate Associate Sol-1,000 Lawyers Associate Sol-1,000 Lawyers Associate Sol-1,000 Lawyers Associate Associate Tolon Partner Associate Associate Associate Associate Associate Partner Associate Partner Associate Partner Associate Partner Associate	Firm Size Role n More Than 1,000 Lawyers Associate 13 More Than 1,000 Lawyers Partner 11 501-1,000 Lawyers Partner 12 201-500 Lawyers Partner 29 Associate 24 More Than 1,000 Lawyers Partner 20 501-1,000 Lawyers Associate 20 501-1,000 Lawyers Associate 11 501-1,000 Lawyers Partner 14 Associate 11 More Than 1,000 Lawyers Partner 14 Associate 11 More Than 1,000 Lawyers Partner 42 50 Lawyers or Fewer Partner 42 50 Lawyers or Fewer Partner 42 50 Lawyers or Fewer Partner 42	Firm Size Role n First Quartile More Than 1,000 Lawyers Associate 13 \$601 More Than 1,000 Lawyers Partner 11 \$733 501-1,000 Lawyers Partner 12 \$376 501-1,000 Lawyers Partner 29 \$475 Associate 24 \$339 More Than 1,000 Lawyers Partner 20 \$627 Associate 20 \$413 501-1,000 Lawyers Associate 16 \$548 201-500 Lawyers Associate 11 \$512 501-1,000 Lawyers Partner 14 \$825 Associate 11 \$552 More Than 1,000 Lawyers Partner 73 \$1,173 Associate 69 \$715 50 Lawyers or Fewer Partner 42 \$245 51-200 Lawyers or Fewer Partner 42 \$193 50 Lawyers or Fewer Partner 42 \$245	Firm Size Role n First Quartile Varieties Median More Than 1,000 Lawyers Associate 13 \$601 \$692 More Than 1,000 Lawyers Partner 11 \$733 \$870 501-1,000 Lawyers Partner 12 \$310 \$333 201-500 Lawyers Partner 29 \$475 \$561 Associate 24 \$339 \$387 More Than 1,000 Lawyers Partner 20 \$627 \$720 Associate 20 \$413 \$530 501-1,000 Lawyers Associate 11 \$512 \$560 501-1,000 Lawyers Partner 14 \$825 \$945 Associate 11 \$552 \$600 More Than 1,000 Lawyers Partner 73 \$1,173 \$1,295 Associate 69 \$715 \$851 50 Lawyers or Fewer Fewer Partner 14 \$193 \$195 50 Lawyers or Partner 14 \$193 \$195	Firm Size Role n First Quartile Quartile Median Quartile More Than 1,000 Lawyers Associate 11 \$601 \$692 \$856 More Than 1,000 Lawyers Partner 11 \$733 \$870 \$1,213 501-1,000 Lawyers Associate 12 \$310 \$333 \$384 201-500 Lawyers Partner 12 \$376 \$520 \$971 501-1,000 Lawyers Partner 29 \$475 \$561 \$725 Associate 24 \$339 \$387 \$465 More Than 1,000 Lawyers Associate Lawyers 20 \$627 \$720 \$953 501-1,000 Lawyers Associate Lawyers 11 \$512 \$560 \$627 501-1,000 Lawyers Associate Lawyers 14 \$825 \$945 \$1,079 Associate Lawyers Associate Lawyers 14 \$825 \$945 \$1,079 501-1,000 Lawyers Associate Lawyers 14 \$825 \$945 \$1,079 Associate Lawyers Associate	Firm Size Role n First Quartile Variable Median Quartile Variable 2022 More Than 1,000 Lawyers Associate 13 \$601 \$692 \$856 \$708 More Than 1,000 Lawyers Partner 1,000 11 \$733 \$870 \$1,213 \$988 501-1,000 Lawyers Partner 212 \$310 \$333 \$384 \$344 201-500 Lawyers Partner 29 \$475 \$561 \$725 \$596 Associate 24 \$339 \$387 \$465 \$422 More Than 1,000 Lawyers Partner 20 \$627 \$720 \$953 \$866 Associate 20 \$413 \$530 \$617 \$552 501-1,000 Lawyers Associate 20 \$413 \$530 \$617 \$552 501-1,000 Lawyers 3 Associate 20 \$413 \$530 \$627 \$574 501-1,000 Lawyers 4 11 \$512 \$560 \$627 \$574 501-1,000 Lawyers 5 24 \$825 \$945 \$1,079 \$977	Firm Size Role n First Quartile Quartile Quartile Quartile 2022 2021 More Than 1,000 Lawyers 13 \$601 \$692 \$856 \$708 \$716 More Than 1,000 Lawyers Partner 11 \$733 \$870 \$1,213 \$988 \$1,012 501-1,000 Lawyers Associate 12 \$310 \$333 \$384 \$344 \$379 201-500 Lawyers Partner 12 \$376 \$520 \$971 \$662 \$596 501-1,000 Lawyers Partner 29 \$475 \$561 \$725 \$596 \$555 Associate 24 \$339 \$387 \$465 \$422 \$372 More Than 1,000 Lawyers Partner 20 \$627 \$720 \$953 \$866 \$892 501-1,000 Lawyers Associate 16 \$548 \$592 \$740 \$636 \$598 201-500 Lawyers Associate 11 \$512 \$660 \$627 \$574 \$553 501

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Chicago ILBy Practice Area and Firm Size

2022 — Real Rates for Associate and Partner

Trend Analysis - Mean

Practice Area	Firm Size	Role	n	First Quartile	Median	Third Quartile	2022	2021	2020
Insurance Defense: Property Damage	50 Lawyers or Fewer	Associate	32	\$215	\$248	\$268	\$229	\$205	\$215
Intellectual Property: Patents	51-200 Lawyers	Partner	14	\$428	\$493	\$548	\$480	\$485	\$473

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Los Angeles CABy Practice Area and Firm Size

2022 — Real Rates for Associate and Partner

Trend Analysis - Mean

ssociate and	Partner			irend	- Mean			
Firm Size	Role	n	First Quartile	Median	Third Quartile	2022	2021	2020
501-1,000 Lawyers	Partner	22	\$729	\$866	\$992	\$889	\$801	\$777
	Associate	34	\$619	\$740	\$842	\$727	\$648	\$568
More Than 1,000 Lawyers	Partner	32	\$881	\$1,058	\$1,199	\$1,054	\$1,073	\$1,110
	Associate	49	\$611	\$845	\$1,030	\$828	\$796	\$787
More Than 1,000 Lawyers	Associate	22	\$486	\$486	\$643	\$587	\$588	\$540
50 Lawyers or Fewer	Partner	13	\$396	\$428	\$574	\$478	\$424	\$442
51-200 Lawyers	Partner	25	\$525	\$645	\$743	\$676	\$711	\$728
201-500 Lawyers	Partner	29	\$582	\$747	\$912	\$757	\$731	\$715
	Associate	24	\$412	\$500	\$660	\$538	\$489	\$474
501-1,000 Lawyers	Partner	35	\$659	\$830	\$1,139	\$929	\$870	\$870
	Associate	35	\$550	\$743	\$856	\$729	\$676	\$652
More Than 1,000 Lawyers	Partner	74	\$965	\$1,220	\$1,370	\$1,183	\$1,120	\$1,051
	Associate	91	\$615	\$745	\$944	\$781	\$783	\$745
501-1,000 Lawyers	Partner	13	\$795	\$910	\$1,103	\$965	\$881	\$875
	Associate	15	\$468	\$550	\$715	\$600	\$608	\$634
More Than 1,000 Lawyers	Partner	28	\$877	\$1,080	\$1,224	\$1,083	\$993	\$1,003
	Associate	41	\$610	\$775	\$945	\$763	\$719	\$732
	More Than 1,000 Lawyers More Than 1,000 Lawyers 50 Lawyers or Fewer 51-200 Lawyers 201-500 Lawyers 501-1,000 Lawyers More Than 1,000 Lawyers	501-1,000 LawyersPartnerAssociateAssociateMore Than 1,000 LawyersAssociate50 Lawyers or FewerPartner51-200 LawyersPartner201-500 LawyersPartnerAssociateAssociate501-1,000 LawyersPartnerAssociateAssociateMore Than 1,000 LawyersPartnerAssociateAssociateMore Than 1,000 LawyersPartnerAssociateAssociate	Firm Size Role n 501-1,000 Lawyers Partner 22 Associate 34 More Than 1,000 Lawyers Partner 32 Associate 49 More Than 1,000 Lawyers or Fewer Partner 13 51-200 Lawyers Partner 25 201-500 Lawyers Partner 29 Associate 24 501-1,000 Lawyers Partner 35 Associate 35 More Than 1,000 Lawyers Partner 74 Associate 91 501-1,000 Lawyers Partner 13 Associate 15 More Than 1,000 Lawyers Partner 28 Associate 15	Firm Size Role n First Quartile Quartile Quartile 501-1,000 Lawyers Partner 22 \$729 Associate 34 \$619 More Than 1,000 Lawyers Partner 32 \$881 More Than 1,000 Lawyers or Fewer Associate 22 \$486 50 Lawyers or Fewer Partner 13 \$396 51-200 Lawyers Partner 25 \$525 201-500 Lawyers Partner 29 \$582 Associate 24 \$412 501-1,000 Lawyers Partner 35 \$659 Associate 35 \$550 More Than 1,000 Lawyers Partner 74 \$965 Associate 13 \$795 Associate 15 \$468 More Than 1,000 Lawyers Partner 28 \$877 Associate 28 \$877	Firm Size Role n First Quartile Median 501-1,000 Lawyers Partner 22 \$729 \$866 Associate 34 \$619 \$740 More Than 1,000 Lawyers Partner 32 \$881 \$1,058 More Than 1,000 Lawyers Associate 22 \$486 \$486 50 Lawyers or Fewer Partner 13 \$396 \$428 51-200 Lawyers Partner 25 \$525 \$645 201-500 Lawyers Partner 29 \$582 \$747 Associate 24 \$412 \$500 501-1,000 Lawyers Partner 35 \$659 \$830 More Than 1,000 Lawyers Partner 74 \$965 \$1,220 Associate 91 \$615 \$745 501-1,000 Lawyers Partner 13 \$795 \$910 Associate 15 \$468 \$550 More Than 1,000 Lawyers Partner 28 \$877 \$1,080 <t< td=""><td>Firm Size Role n First Quartile Quartile Median Quartile Third Quartile 501-1,000 Lawyers Partner 22 \$729 \$866 \$992 Associate 34 \$619 \$740 \$842 More Than 1,000 Lawyers Partner 32 \$881 \$1,058 \$1,199 Associate 49 \$611 \$845 \$1,030 More Than 1,000 Lawyers Partner Pewer 13 \$396 \$428 \$574 51-200 Lawyers Partner Pewer 25 \$525 \$645 \$743 201-500 Lawyers Partner Partner 29 \$582 \$747 \$912 Associate 24 \$412 \$500 \$660 501-1,000 Lawyers Partner 35 \$659 \$830 \$1,139 Associate 91 \$615 \$743 \$856 More Than 1,000 Lawyers 13 \$795 \$910 \$1,103 Associate 15 \$468 \$550 \$715 <</td><td>Firm Size Role n First Quartile Quartile Quartile Quartile Third Quartile 2022 501-1,000 Lawyers Partner 22 \$729 \$866 \$992 \$889 More Than 1,000 Lawyers Partner 1,000 Lawyers 32 \$881 \$1,058 \$1,199 \$1,054 More Than 1,000 Lawyers Associate 1,000 Lawyers or Partner Fewer 22 \$486 \$486 \$643 \$587 50 Lawyers or Pertner Fewer 13 \$396 \$428 \$574 \$478 51-200 Lawyers Or Partner Lawyers 25 \$525 \$645 \$743 \$676 201-500 Lawyers Or Partner Lawyers 29 \$582 \$747 \$912 \$757 Associate Lawyers 35 \$659 \$830 \$1,139 \$929 More Than 1,000 Lawyers 74 \$965 \$1,220 \$1,370 \$1,183 501-1,000 Lawyers 28 \$550 \$745 \$944 \$781 501-1,000 Lawyers 28 \$8795 \$910 \$1,103 \$965 501</td><td> Partner Partner Partner Partner Partner Partner Lawyers Partner Lawyers Partner Partner Lawyers Partner Part</td></t<>	Firm Size Role n First Quartile Quartile Median Quartile Third Quartile 501-1,000 Lawyers Partner 22 \$729 \$866 \$992 Associate 34 \$619 \$740 \$842 More Than 1,000 Lawyers Partner 32 \$881 \$1,058 \$1,199 Associate 49 \$611 \$845 \$1,030 More Than 1,000 Lawyers Partner Pewer 13 \$396 \$428 \$574 51-200 Lawyers Partner Pewer 25 \$525 \$645 \$743 201-500 Lawyers Partner Partner 29 \$582 \$747 \$912 Associate 24 \$412 \$500 \$660 501-1,000 Lawyers Partner 35 \$659 \$830 \$1,139 Associate 91 \$615 \$743 \$856 More Than 1,000 Lawyers 13 \$795 \$910 \$1,103 Associate 15 \$468 \$550 \$715 <	Firm Size Role n First Quartile Quartile Quartile Quartile Third Quartile 2022 501-1,000 Lawyers Partner 22 \$729 \$866 \$992 \$889 More Than 1,000 Lawyers Partner 1,000 Lawyers 32 \$881 \$1,058 \$1,199 \$1,054 More Than 1,000 Lawyers Associate 1,000 Lawyers or Partner Fewer 22 \$486 \$486 \$643 \$587 50 Lawyers or Pertner Fewer 13 \$396 \$428 \$574 \$478 51-200 Lawyers Or Partner Lawyers 25 \$525 \$645 \$743 \$676 201-500 Lawyers Or Partner Lawyers 29 \$582 \$747 \$912 \$757 Associate Lawyers 35 \$659 \$830 \$1,139 \$929 More Than 1,000 Lawyers 74 \$965 \$1,220 \$1,370 \$1,183 501-1,000 Lawyers 28 \$550 \$745 \$944 \$781 501-1,000 Lawyers 28 \$8795 \$910 \$1,103 \$965 501	Partner Partner Partner Partner Partner Partner Lawyers Partner Lawyers Partner Partner Lawyers Partner Part

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Los Angeles CABy Practice Area and Firm Size

2022 — Real Rates for Associate and Partner

Trend Analysis - Mean

2022 — Real Rates for A	Trend Analysis - Mea								
Practice Area	Firm Size	Role	n	First Quartile	Median	Third Quartile	2022	2021	2020
Employment and Labor: Other	501-1,000 Lawyers	Partner	33	\$567	\$677	\$870	\$748	\$653	\$612
		Associate	32	\$325	\$380	\$525	\$459	\$479	\$471
	More Than 1,000 Lawyers	Partner	25	\$705	\$935	\$1,068	\$928	\$838	\$827
		Associate	12	\$398	\$426	\$537	\$501	\$561	\$608
Finance and Securities: Investments and Other Financial Instruments	501-1,000 Lawyers	Partner	13	\$676	\$950	\$1,037	\$999	\$842	\$798
	More Than 1,000 Lawyers	Partner	40	\$1,210	\$1,309	\$1,434	\$1,332	\$1,283	\$1,236
		Associate	76	\$845	\$1,017	\$1,135	\$992	\$958	\$882
Finance and Securities: Loans and Financing	50 Lawyers or Fewer	Associate	15	\$265	\$285	\$434	\$344	\$394	\$367
	201-500 Lawyers	Associate	11	\$500	\$540	\$638	\$563	\$417	\$344
	501-1,000 Lawyers	Associate	13	\$550	\$645	\$930	\$689	\$683	\$614
Insurance Defense: Auto and Transportation	50 Lawyers or Fewer	Partner	22	\$250	\$250	\$265	\$280	\$238	\$239
Insurance Defense: Other	50 Lawyers or Fewer	Partner	30	\$249	\$252	\$265	\$274	\$317	\$431
		Associate	46	\$215	\$225	\$235	\$220	\$211	\$204
	51-200 Lawyers	Partner	17	\$230	\$250	\$265	\$283	\$247	\$266
		Associate	20	\$170	\$170	\$200	\$190	\$195	\$196
Intellectual Property: Patents	More Than 1,000 Lawyers	Partner	11	\$982	\$1,046	\$1,209	\$1,128	\$1,077	\$1,025
		Associate	38	\$670	\$765	\$891	\$771	\$722	\$638

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New York NY

By Practice Area and Firm Size

2022 — Real Rates for Associate and Partner

Trend Analysis - Mean

2022 — Real Rates for As	ssociate and	Partner					irena	Analysis	- iviear
Practice Area	Firm Size	Role	n	First Quartile	Median	Third Quartile	2022	2021	2020
Bankruptcy and Collections	50 Lawyers or Fewer	Partner	11	\$333	\$390	\$450	\$411	\$402	\$394
	201-500 Lawyers	Partner	15	\$414	\$604	\$668	\$589	\$555	\$519
		Associate	15	\$300	\$334	\$412	\$365	\$350	\$338
Commercial	50 Lawyers or Fewer	Partner	17	\$330	\$458	\$535	\$486	\$449	\$515
	201-500 Lawyers	Partner	28	\$525	\$609	\$790	\$680	\$773	\$764
		Associate	21	\$378	\$428	\$486	\$438	\$494	\$522
	501-1,000 Lawyers	Partner	72	\$993	\$1,414	\$1,725	\$1,347	\$1,240	\$1,320
		Associate	96	\$565	\$870	\$1,086	\$819	\$613	\$760
	More Than 1,000 Lawyers	Partner	45	\$1,149	\$1,331	\$1,558	\$1,346	\$1,266	\$1,209
		Associate	39	\$646	\$826	\$1,023	\$827	\$799	\$777
Corporate: Antitrust and Competition	501-1,000 Lawyers	Associate	37	\$597	\$721	\$968	\$783	\$791	\$727
Corporate: Governance	501-1,000 Lawyers	Partner	37	\$1,457	\$1,560	\$1,731	\$1,560	\$1,482	\$1,380
		Associate	53	\$623	\$868	\$1,046	\$840	\$749	\$725
	More Than 1,000 Lawyers	Associate	12	\$564	\$640	\$787	\$686	\$650	\$654
Corporate: Mergers, Acquisitions and Divestitures	501-1,000 Lawyers	Partner	52	\$1,410	\$1,650	\$1,698	\$1,556	\$1,393	\$1,309
Divestitures		Associate	116	\$723	\$955	\$1,160	\$929	\$799	\$736
	More Than 1,000 Lawyers	Partner	43	\$1,350	\$1,650	\$1,757	\$1,521	\$1,499	\$1,290

New York NY

By Practice Area and Firm Size

2022 — Real Rates for Associate and Partner

Trend Analysis - Mean

2022 — Real Rates for As	sociate and	Partner					irena	Analysis	- iviear
Practice Area	Firm Size	Role	n	First Quartile	Median	Third Quartile	2022	2021	2020
Corporate: Mergers, Acquisitions and Divestitures	More Than 1,000 Lawyers	Associate	80	\$649	\$917	\$1,130	\$899	\$926	\$834
Corporate: Other	50 Lawyers or Fewer	Partner	40	\$368	\$515	\$611	\$490	\$528	\$499
		Associate	29	\$235	\$350	\$375	\$317	\$360	\$344
	51-200 Lawyers	Partner	36	\$450	\$583	\$705	\$617	\$642	\$597
	201-500 Lawyers	Partner	64	\$560	\$894	\$1,147	\$919	\$795	\$853
		Associate	52	\$355	\$522	\$694	\$574	\$498	\$517
	501-1,000 Lawyers	Partner	183	\$1,271	\$1,515	\$1,744	\$1,436	\$1,286	\$1,230
		Associate	226	\$701	\$855	\$1,100	\$875	\$776	\$727
	More Than 1,000 Lawyers	Partner	140	\$1,210	\$1,550	\$1,720	\$1,454	\$1,302	\$1,252
		Associate	198	\$667	\$875	\$1,105	\$882	\$837	\$808
Corporate: Partnerships and Joint Ventures	501-1,000 Lawyers	Partner	41	\$1,341	\$1,564	\$1,760	\$1,516	\$1,267	\$1,300
		Associate	71	\$713	\$970	\$1,182	\$927	\$821	\$788
Corporate: Regulatory and Compliance	51-200 Lawyers	Partner	11	\$474	\$604	\$720	\$593	\$558	\$660
		Associate	15	\$454	\$640	\$684	\$678	\$443	\$464
	201-500 Lawyers	Partner	19	\$638	\$694	\$880	\$777	\$712	\$812
		Associate	15	\$396	\$513	\$638	\$616	\$483	\$426
	501-1,000 Lawyers	Partner	48	\$928	\$1,335	\$1,560	\$1,294	\$1,204	\$1,185

New York NY

By Practice Area and Firm Size

2022 — Real Rates for Associate and Partner

Trend Analysis - Mean

2022 — Real Rates for As	ssociate and	Partner					Irend	Analysis	s - Mear
Practice Area	Firm Size	Role	n	First Quartile	Median	Third Quartile	2022	2021	2020
Corporate: Regulatory and Compliance	501-1,000 Lawyers	Associate	59	\$500	\$747	\$926	\$768	\$784	\$721
	More Than 1,000 Lawyers	Partner	28	\$884	\$1,170	\$1,386	\$1,165	\$1,064	\$1,034
		Associate	36	\$570	\$725	\$760	\$701	\$704	\$681
Corporate: Tax	501-1,000 Lawyers	Partner	16	\$927	\$1,225	\$1,568	\$1,235	\$1,106	\$1,146
	More Than 1,000 Lawyers	Partner	30	\$1,000	\$1,210	\$1,553	\$1,243	\$1,220	\$1,179
		Associate	28	\$690	\$879	\$1,003	\$945	\$857	\$797
Employment and Labor: Discrimination, Retaliation and Harassment / EEO	More Than 1,000 Lawyers	Associate	11	\$385	\$390	\$487	\$430	\$444	\$416
Employment and Labor: Other	201-500 Lawyers	Partner	33	\$450	\$493	\$689	\$621	\$585	\$651
	501-1,000 Lawyers	Partner	81	\$472	\$573	\$891	\$751	\$688	\$663
		Associate	54	\$325	\$440	\$635	\$538	\$542	\$469
	More Than 1,000 Lawyers	Partner	23	\$700	\$918	\$1,090	\$975	\$920	\$951
		Associate	28	\$450	\$498	\$685	\$629	\$531	\$634
Environmental	51-200 Lawyers	Partner	12	\$348	\$455	\$519	\$443	\$450	\$444
Finance and Securities: Debt/Equity Offerings	501-1,000 Lawyers	Partner	31	\$1,269	\$1,650	\$1,734	\$1,448	\$1,220	\$1,159
		Associate	30	\$713	\$955	\$1,178	\$927	\$685	\$674
	More Than 1,000 Lawyers	Partner	15	\$1,067	\$1,332	\$1,810	\$1,368	\$883	\$1,072
		Associate	29	\$438	\$621	\$1,108	\$754	\$597	\$662

New York NY

By Practice Area and Firm Size

2022 — Real Rates for Associate and Partner

Trend Analysis - Mean

2022 — Real Rates for As	sociate and	i di tilci					Hend	is - Mear		
Practice Area	Firm Size	Role	n	First Quartile	Median	Third Quartile	2022	2021	2020	
Finance and Securities: Investments and Other Financial Instruments	51-200 Lawyers	Partner	13	\$650	\$749	\$894	\$799	\$844	\$848	
		Associate	20	\$500	\$614	\$736	\$620	\$558	\$582	
	201-500 Lawyers	Partner	36	\$1,109	\$1,111	\$1,111	\$1,090	\$1,034	\$963	
	501-1,000 Lawyers	Partner	127	\$1,070	\$1,405	\$1,766	\$1,413	\$1,396	\$1,282	
		Associate	227	\$685	\$835	\$1,095	\$881	\$894	\$793	
	More Than 1,000 Lawyers	Partner	73	\$950	\$1,229	\$1,605	\$1,269	\$1,266	\$1,155	
		Associate	68	\$531	\$782	\$972	\$769	\$748	\$679	
Finance and Securities: Loans and Financing	50 Lawyers or Fewer	Partner	14	\$627	\$806	\$890	\$798	\$686	\$592	
	201-500 Lawyers	Partner	58	\$1,200	\$1,475	\$1,620	\$1,342	\$1,309	\$1,222	
		Associate	90	\$633	\$760	\$950	\$748	\$745	\$750	
	501-1,000 Lawyers	Partner	83	\$1,170	\$1,520	\$1,759	\$1,462	\$1,362	\$1,277	
		Associate	104	\$735	\$955	\$1,119	\$917	\$864	\$776	
	More Than 1,000 Lawyers	Partner	100	\$1,268	\$1,479	\$1,675	\$1,441	\$1,398	\$1,352	
		Associate	129	\$750	\$940	\$1,108	\$934	\$922	\$873	
Finance and Securities: SEC Filings and Financial Reporting	501-1,000 Lawyers	Partner	15	\$1,692	\$1,737	\$1,786	\$1,648	\$1,491	\$1,378	
Finance and Securities: Securities and Banking Regulations	201-500 Lawyers	Partner	15	\$1,078	\$1,365	\$1,505	\$1,245	\$999	\$1,184	
		Associate	17	\$323	\$531	\$650	\$556	\$492	\$626	

New York NY

By Practice Area and Firm Size

2022 — Real Rates for Associate and Partner

Trend Analysis - Mean

2022 — Real Rates for A	ssociate and	Par ther					irena	s - Mean	
Practice Area	Firm Size	Role	n	First Quartile	Median	Third Quartile	2022	2021	2020
Finance and Securities: Securities and Banking Regulations	501-1,000 Lawyers	Partner	14	\$1,125	\$1,330	\$1,397	\$1,270	\$1,286	\$1,201
Insurance Defense: Auto and Transportation	51-200 Lawyers	Partner	15	\$178	\$185	\$220	\$195	\$187	\$176
		Associate	11	\$160	\$165	\$180	\$169	\$163	\$154
Insurance Defense: Other	50 Lawyers or Fewer	Partner	30	\$217	\$250	\$285	\$277	\$273	\$262
		Associate	22	\$185	\$195	\$230	\$235	\$214	\$183
	51-200 Lawyers	Partner	38	\$198	\$225	\$281	\$249	\$244	\$247
		Associate	25	\$175	\$180	\$209	\$197	\$202	\$182
	201-500 Lawyers	Partner	22	\$208	\$240	\$356	\$330	\$268	\$295
		Associate	13	\$195	\$270	\$526	\$370	\$294	\$299
Insurance Defense: Personal Injury/Wrongful Death	50 Lawyers or Fewer	Associate	36	\$157	\$160	\$169	\$160	\$160	\$152
Insurance Defense: Property Damage	50 Lawyers or Fewer	Partner	30	\$175	\$195	\$213	\$206	\$203	\$180
		Associate	21	\$150	\$160	\$165	\$168	\$163	\$149
	51-200 Lawyers	Partner	34	\$190	\$210	\$315	\$252	\$270	\$255
Intellectual Property: Patents	501-1,000 Lawyers	Partner	16	\$912	\$952	\$1,165	\$988	\$930	\$962
		Associate	22	\$523	\$599	\$877	\$661	\$588	\$601
	More Than 1,000 Lawyers	Partner	15	\$895	\$1,046	\$1,210	\$1,045	\$1,066	\$997
		Associate	20	\$739	\$820	\$915	\$801	\$743	\$686

New York NY

By Practice Area and Firm Size

2022 — Real Rates for Associate and Partner

Trend Analysis - Mean

Practice Area	Firm Size	Role	n	First Quartile	Median	Third Quartile	2022	2021	2020
Miscellaneous: General Advice & Counsel	More Than 1,000 Lawyers	Partner	11	\$1,550	\$1,695	\$1,875	\$1,684	\$1,585	\$1,427
Real Estate: Other	501-1,000 Lawyers	Associate	14	\$503	\$614	\$713	\$643	\$623	\$655

Philadelphia PABy Practice Area and Firm Size

2022 — Real Rates for Associate and Partner

Trend Analysis - Mean

2022 — Real Rates for As	ssociate and	te and Partner					Trend Analysis		- Mean
Practice Area	Firm Size	Role	n	First Quartile	Median	Third Quartile	2022	2021	2020
Bankruptcy and Collections	201-500 Lawyers	Partner	18	\$495	\$564	\$650	\$568	\$524	\$541
		Associate	17	\$300	\$375	\$485	\$393	\$311	\$304
Commercial	51-200 Lawyers	Partner	22	\$675	\$960	\$1,096	\$867	\$678	\$628
		Associate	16	\$373	\$425	\$486	\$446	\$390	\$347
	201-500 Lawyers	Partner	39	\$625	\$732	\$826	\$740	\$627	\$619
		Associate	48	\$407	\$437	\$503	\$447	\$357	\$348
	501-1,000 Lawyers	Partner	24	\$564	\$728	\$891	\$789	\$742	\$752
	More Than 1,000 Lawyers	Partner	13	\$864	\$945	\$1,285	\$1,049	\$919	\$921
		Associate	19	\$485	\$624	\$829	\$683	\$638	\$586
Corporate: Other	51-200 Lawyers	Partner	31	\$588	\$732	\$918	\$736	\$779	\$710
		Associate	31	\$389	\$425	\$500	\$439	\$429	\$410
	201-500 Lawyers	Partner	27	\$560	\$650	\$860	\$710	\$642	\$669
		Associate	30	\$396	\$428	\$455	\$431	\$374	\$342
	501-1,000 Lawyers	Partner	26	\$652	\$719	\$935	\$777	\$794	\$803
		Associate	19	\$409	\$488	\$535	\$466	\$433	\$476
	More Than 1,000 Lawyers	Partner	50	\$818	\$895	\$1,033	\$962	\$925	\$908
		Associate	49	\$444	\$530	\$568	\$553	\$530	\$523

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Philadelphia PABy Practice Area and Firm Size

2022 — Real Rates for Associate and Partner

Trend Analysis - Mean

Practice Area Firm Size Role n First Quartile Median Quartile Corporate: Regulatory and Compliance 501-1,000 Lawyers Associate 11 \$325 \$468 \$78 More Than 1,000 Lawyers 19 \$688 \$830 \$89 Employment and Labor: Other 501-1,000 Lawyers Partner Lawyers 19 \$525 \$585 \$64 Insurance Defense: Auto and Transportation Fewer Associate Associate	\$1 \$605 \$1 \$804 \$40 \$594 \$186	\$427 \$847 \$598 \$181	\$452 \$783 \$603
Lawyers	\$804 \$594 \$186	\$847 \$598	\$783 \$603
1,000 Lawyers 19 \$688 \$830 \$89 Employment and Labor: Other 501-1,000 Lawyers Partner 19 \$525 \$585 \$64 Insurance Defense: Auto and Transportation 50 Lawyers or Fewer Partner 39 \$178 \$185 \$20	\$594 00 \$186	\$598	\$603
OtherLawyers19\$525\$585\$64Insurance Defense: Auto and Transportation50 Lawyers or FewerPartnerFewer39\$178\$185\$20	00 \$186		
and Transportation Fewer 39 \$178 \$185 \$20		\$181	\$182
Associate	nn ¢178		4-0-
40 \$170 \$20	JO \$176	\$169	\$158
Insurance Defense: Other50 Lawyers or FewerPartner50 Lawyers or Fewer52 \$185 \$200 \$220	24 \$204	\$196	\$182
Associate 50 \$170 \$175 \$20	00 \$180	\$169	\$162
51-200 Partner Lawyers 21 \$175 \$180 \$20	00 \$192	\$200	\$233
Associate 15 \$160 \$163 \$18	36 \$170	\$161	\$166
201-500 Partner Lawyers 33 \$185 \$210 \$24	10 \$219	\$223	\$224
Associate 16 \$183 \$195 \$20	00 \$191	\$187	\$197
Insurance Defense: 50 Lawyers or Partner Fewer 33 \$180 \$194 \$20	00 \$194	\$191	\$191
Associate 34 \$171 \$180 \$18	37 \$178	\$172	\$174
51-200 Partner Lawyers 11 \$180 \$199 \$23	10 \$210	\$222	\$231
Associate 11 \$173 \$180 \$22	20 \$198	\$199	\$181
Intellectual Property:201-500AssociatePatentsLawyers13\$365\$420\$450	50 \$423	\$352	\$322
501-1,000 Partner Lawyers 12 \$660 \$760 \$82	25 \$785	\$660	\$730

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San Francisco CA

By Practice Area and Firm Size

2022 — Real Rates for Associate and Partner

Trend Analysis - Mean

2022 — Real Rates for As	ssociate and r	ai triei					irend Analys		- ivicai i
Practice Area	Firm Size	Role	n	First Quartile	Median	Third Quartile	2022	2021	2020
Commercial	51-200 Lawyers	Partner	11	\$420	\$500	\$720	\$602	\$562	\$633
	501-1,000 Lawyers	Partner	18	\$694	\$945	\$1,050	\$936	\$873	\$922
		Associate	14	\$356	\$480	\$738	\$561	\$518	\$403
Corporate: Mergers, Acquisitions and Divestitures	More Than 1,000 Lawyers	Partner	14	\$868	\$868	\$1,007	\$931	\$933	\$955
Corporate: Other	501-1,000 Lawyers	Partner	21	\$795	\$961	\$1,125	\$994	\$894	\$871
		Associate	12	\$662	\$829	\$1,014	\$808	\$716	\$592
	More Than 1,000 Lawyers	Partner	12	\$958	\$1,080	\$1,194	\$1,102	\$1,039	\$926
Corporate: Regulatory and Compliance	501-1,000 Lawyers	Partner	16	\$693	\$760	\$974	\$849	\$783	\$863
Employment and Labor: Other	501-1,000 Lawyers	Partner	18	\$486	\$585	\$636	\$594	\$608	\$560
	More Than 1,000 Lawyers	Partner	11	\$790	\$833	\$914	\$847	\$809	\$890
Finance and Securities: Investments and Other Financial Instruments	501-1,000 Lawyers	Associate	13	\$620	\$780	\$890	\$755	\$745	\$753
Insurance Defense: Other	50 Lawyers or Fewer	Partner	26	\$205	\$250	\$265	\$245	\$236	\$248
	201-500 Lawyers	Partner	41	\$255	\$280	\$285	\$331	\$356	\$397
Intellectual Property: Patents	501-1,000 Lawyers	Partner	11	\$978	\$1,266	\$1,383	\$1,177	\$1,040	\$1,075

Washington DCBy Practice Area and Firm Size

2022 — Real Rates for Associate and Partner

Trend Analysis - Mean

2022 — Real Rates for	r Associate and I	Partner					Trend	Analysis	- Mean
Practice Area	Firm Size	Role	n	First Quartile	Median	Third Quartile	2022	2021	2020
Commercial	201-500 Lawyers	Partner	39	\$749	\$820	\$1,026	\$882	\$778	\$717
		Associate	39	\$463	\$545	\$693	\$576	\$521	\$476
	501-1,000 Lawyers	Partner	50	\$712	\$850	\$1,150	\$972	\$873	\$911
	More Than 1,000 Lawyers	Partner	39	\$955	\$1,065	\$1,375	\$1,156	\$1,016	\$997
		Associate	27	\$634	\$837	\$1,046	\$842	\$698	\$643
Corporate: Mergers, Acquisitions and Divestitures	201-500 Lawyers	Partner	11	\$611	\$751	\$988	\$803	\$780	\$738
	More Than 1,000 Lawyer	Partner	22	\$1,061	\$1,286	\$1,369	\$1,224	\$1,142	\$1,010
		Associate	27	\$655	\$785	\$835	\$776	\$756	\$632
Corporate: Other	50 Lawyers or Fewer	Partner	25	\$495	\$618	\$761	\$606	\$585	\$583
		Associate	16	\$350	\$417	\$697	\$497	\$461	\$537
	51-200 Lawyers	Partner	29	\$752	\$826	\$884	\$821	\$839	\$798
	201-500 Lawyers	Partner	78	\$740	\$868	\$1,008	\$888	\$806	\$751
		Associate	64	\$453	\$562	\$680	\$577	\$550	\$478
	501-1,000 Lawyers	Partner	136	\$925	\$950	\$999	\$975	\$941	\$910
		Associate	182	\$670	\$695	\$695	\$668	\$650	\$581
	More Than 1,000 Lawyers	Partner	142	\$885	\$1,082	\$1,274	\$1,101	\$1,024	\$976
		Associate	117	\$536	\$703	\$915	\$751	\$702	\$641

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Washington DCBy Practice Area and Firm Size

2022 — Real Rates for Associate and Partner

Trend Analysis - Mean

2022 — Real Rates for A	330ciate and i	ui tiici					II CIIG	- iviear	
Practice Area	Firm Size	Role	n	First Quartile	Median	Third Quartile	2022	2021	2020
Corporate: Regulatory and Compliance	51-200 Lawyers	Partner	30	\$589	\$835	\$931	\$780	\$808	\$831
		Associate	30	\$395	\$455	\$590	\$489	\$501	\$505
	201-500 Lawyers	Partner	44	\$706	\$797	\$907	\$812	\$752	\$714
		Associate	41	\$476	\$553	\$672	\$573	\$541	\$498
	501-1,000 Lawyers	Partner	128	\$856	\$950	\$1,112	\$979	\$975	\$933
		Associate	143	\$561	\$646	\$717	\$659	\$621	\$595
	More Than 1,000 Lawyers	Partner	76	\$935	\$1,108	\$1,274	\$1,101	\$1,014	\$991
		Associate	79	\$503	\$647	\$824	\$669	\$651	\$615
Corporate: Tax	More Than 1,000 Lawyers	Partner	32	\$1,040	\$1,187	\$1,437	\$1,221	\$1,198	\$1,069
		Associate	38	\$529	\$780	\$1,036	\$825	\$739	\$715
Employment and Labor: Other	201-500 Lawyers	Partner	14	\$544	\$735	\$763	\$693	\$712	\$639
	501-1,000 Lawyers	Partner	24	\$498	\$662	\$1,065	\$814	\$800	\$739
		Associate	13	\$414	\$435	\$629	\$500	\$464	\$463
	More Than 1,000 Lawyers	Partner	29	\$616	\$783	\$845	\$796	\$715	\$811
		Associate	13	\$480	\$538	\$615	\$583	\$467	\$536
Finance and Securities: Investments and Other Financial Instruments	501-1,000 Lawyers	Partner	28	\$986	\$1,148	\$1,371	\$1,187	\$1,051	\$1,054
	More Than 1,000 Lawyers	Partner	23	\$982	\$1,178	\$1,375	\$1,184	\$1,200	\$1,036

Washington DCBy Practice Area and Firm Size

2022 — Real Rates for Associate and Partner

Practice Area	Firm Size	Role	n	First Quartile	Median	Third Quartile	2022	2021	2020
Finance and Securities: Loans and Financing	201-500 Lawyers	Partner	12	\$726	\$1,125	\$1,295	\$1,013	\$854	\$854
		Associate	14	\$400	\$512	\$650	\$582	\$528	\$498
Intellectual Property: Patents	201-500 Lawyers	Partner	18	\$904	\$989	\$1,032	\$931	\$901	\$730
	501-1,000 Lawyers	Partner	36	\$872	\$950	\$1,121	\$1,002	\$986	\$917
		Associate	37	\$689	\$740	\$1,003	\$776	\$690	\$649
	More Than 1,000 Lawyers	Partner	14	\$898	\$988	\$1,279	\$1,081	\$1,006	\$890
		Associate	20	\$697	\$775	\$841	\$757	\$658	\$614
Miscellaneous: General Advice & Counsel	More Than 1,000 Lawyers	Partner	12	\$1,321	\$1,400	\$1,496	\$1,394	\$1,260	\$1,162

Invoice Information

Data in Wolters Kluwer ELM Solutions' reference database and the 2022 Real Rate Report were taken from invoice line-item entries contained in invoices received and approved by participating companies.

Invoice data were received in the Legal Electronic Data Exchange Standard (LEDES) format (LEDES.org). The following information was extracted from those invoices and their line items:

- Law firm (which exists as a random number in the ELM Solutions reference database)
- Timekeeper ID (which exists as a random number in the ELM Solutions reference database)
- Matter ID (which exists as a random number in the ELM Solutions reference database)
- Timekeeper's position (role) within the law firm (partner, associate, paralegal, etc.)
- Uniform Task-Based Management System Code Set, Task Codes, and Activity Codes (UTBMS.com)
- · Date of service
- · Hours billed
- · Hourly rate billed
- Fees billed

Non-Invoice Information

To capture practice area details, the matter ID within each invoice was associated with matter profiles containing areas of work in the systems of each company. The areas of work were then systematically categorized into legal practice areas. Normalization of practice areas was done based on company mappings to system-level practice areas available in the ELM Solutions system and by naming convention.

The majority of analyses included in this report have been mapped to one of 11 practice areas, further divided into sub-areas and litigation/non-litigation (for more information on practice areas and sub-areas, please refer to pages 232-234).

To capture location and jurisdiction details, law firms and timekeepers were systematically mapped to the existing profiles within ELM Solutions systems, as well as with publicly available data sources for further validation and normalization. Where city location information is provided, it includes any address within that city's defined Core-Based Statistical Area (CBSA) as defined by the Office of Management and Budget (OMB). The CBSAs are urban centers with populations of 10,000 or more and include all adjacent counties that are economically integrated with that urban center.

Where the analyses focus on partners, associates, and paralegals, the underlying data occasionally included some sub-roles, such as "senior partner" or "junior associate." In such instances, those timekeeper sub-roles were placed within the broader partner, associate, and paralegal segments.

Demographics regarding law firm size, location, and lawyer years of experience were augmented by incorporating publicly available information.

Appendix: Data Methodology A Note on US Cities

Throughout the report, we have used city names to refer to CBSA and consistently used the principal city in the CBSA to refer to the entire area. The following are the shorthand city names used in this report and the corresponding CBSA designations, as defined by the OMB.

Principal City	CBSA Name
Akron, OH	Akron, OH
Albany, NY	Albany-Schenectady-Troy, NY
Albuquerque, NM	Albuquerque, NM
Atlanta, GA	Atlanta-Sandy Springs-Alpharetta, GA
Austin, TX	Austin-Round Rock-Georgetown, TX
Baltimore, MD	Baltimore-Columbia-Towson, MD
Baton Rouge, LA	Baton Rouge, LA
Birmingham, AL	Birmingham-Hoover, AL
Boise City, ID	Boise City, ID
Boston, MA	Boston-Cambridge-Newton, MA-NH
Bridgeport, CT	Bridgeport-Stamford-Norwalk, CT
Buffalo, NY	Buffalo-Cheektowaga, NY
Burlington, VT	Burlington-South Burlington, VT
Charleston, SC	Charleston-North Charleston, SC
Charleston, WV	Charleston, WV
Charlotte, NC	Charlotte-Concord-Gastonia, NC-SC
Chicago, IL	Chicago-Naperville-Elgin, IL-IN-WI
Cincinnati, OH	Cincinnati, OH-KY-IN
Cleveland, OH	Cleveland-Elyria, OH
Columbia, SC	Columbia, SC
Columbus, OH	Columbus, OH
Dallas, TX	Dallas-Fort Worth-Arlington, TX
Dayton, OH	Dayton-Kettering, OH
Denver, CO	Denver-Aurora-Lakewood, CO
Detroit, MI	Detroit-Warren-Dearborn, MI
Fresno, CA	Fresno, CA
Grand Rapids, MI	Grand Rapids-Kentwood, MI
Greenville, SC	Greenville-Anderson, SC

Harrisburg, PA

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Harrisburg-Carlisle, PA

Appendix: Data Methodology A Note on US Cities

Principal City

CBSA Name

Hartford, CT Hartford-East Hartford-Middletown, CT

Honolulu, HI Urban Honolulu HI

Houston, TX Houston-The Woodlands-Sugar Land, TX

Indianapolis, IN Indianapolis-Carmel-Anderson, IN

Jackson, MSJackson, MSJacksonville, FLJacksonville, FLKansas City, MOKansas City, MO-KS

Lafayette, LA Lafayette, LA

Las Vegas, NV Las Vegas-Henderson-Paradise, NV

Lexington, KY Lexington-Fayette, KY

Little Rock, AR
Los Angeles, CA
Louisville, KY
Little Rock-North Little Rock-Conway, AR
Los Angeles-Long Beach-Anaheim, CA
Louisville/Jefferson County, KY-IN

Madison, WI Madison, WI

Memphis, TN Memphis-Forrest City, TN-MS-AR

Miami, FL Miami-Fort Lauderdale-Pompano Beach, FL

Milwaukee, WI Milwaukee-Waukesha, WI

Minneapolis, MN Minneapolis-St. Paul-Bloomington, MN-WI
Nashville, TN Nashville-Davidson-Murfreesboro-Franklin, TN

New Haven, CT

New Orleans, LA

New Orleans-Metairie, LA

New York, NY

New York-Newark-Jersey City, NY-NJ-PA

Oklahoma City, OK Oklahoma City, OK

Omaha, NE Omaha-Council Bluffs, NE-IA
Orlando, FL Orlando-Kissimmee-Sanford, FL

Philadelphia, PA Philadelphia-Camden-Wilmington, PA-NJ-DE-MD

Phoenix, AZ Phoenix-Mesa-Chandler, AZ

Pittsburgh, PA Pittsburgh, PA

Portland, ME Portland-South Portland, ME

Portland, OR Portland-Vancouver-Hillsboro, OR-WA

Providence, RI Providence-Warwick, RI-MA

Raleigh, NC Raleigh-Cary, NC

Reno, NV Reno-Carson City-Fernley, NV

Appendix: Data Methodology A Note on US Cities

Principal City

CBSA Name

Richmond, VA Rochester, NY Rochester, NY

Sacramento, CA Sacramento-Roseville-Folsom, CA

Salt Lake City, UT Salt Lake City, UT

San Diego, CA
San Diego-Chula Vista-Carlsbad, CA
San Francisco, CA
San Jose, CA
San Jose-Sunnyvale-Santa Clara, CA
San Juan, PR
San Juan-Bayamon-Caguas, PR

Savannah, GA Savannah, GA

Seattle, WA Seattle-Tacoma-Bellevue, WA

St. Louis, MO
St. Louis, MO-IL
Syracuse, NY
Syracuse, NY
Tallahassee, FL
Tallahassee, FL

Tampa, FL Tampa-St. Petersburg-Clearwater, FL

Toledo, OH Toledo, OH

Trenton, NJ Trenton-Princeton, NJ

Tulsa, OK Tulsa, OK

Washington, DC Washington-Arlington-Alexandria, DC-VA-MD-WV

Wheeling, WV Wheeling, WV-OH

Anonymization of the Dataset

Prior to inclusion in the ELM Solutions reference database, we systematically scrubbed the data of any information that would identify a particular matter, company, law firm, invoice, or timekeeper (individual). To ensure relationships necessary for analysis, those variables were assigned randomly generated numbers. To maintain data integrity and allow for proper analysis, these numbers are linked across data tables to enforce their associations.

To further ensure anonymity and confidentiality:

- The information is published in such a manner as to make it reasonably impervious to reverse analysis should some attempt be made to determine what data might pertain to any company, law firm, timekeeper, invoice, or matter.
- The 2022 Real Rate Report will not reveal which ELM Solutions client or clients are included or excluded in its analyses.
- Clients are not and will not be informed as to whether their data are included within a particular facet of analysis.
- No textual description of any legal work performed by any individual exists in the ELM Solutions reference database.

A Note on Insurance Litigation

We aim to provide a point of comparison for companies purchasing law firm services. To improve comparability, we removed data related to insurance company defense litigation for all analyses unless noted otherwise. Insurance litigation tends to be less expensive than other types of litigation, as it is typically more repetitive and less complex.

"Real Rate" Definition

The information in this report consists of data taken from client invoices submitted by law firms for work performed from 2018 through 2022. All invoices were submitted through the ELM Solutions billing systems.

The analyses contained in this report are derived from aggregating hours, fees, and rates submitted as line items on those invoices. For a line item to qualify for inclusion in this report, it had to undergo multiple and rigorous testing processes to ensure its validity.

For example, for a rate to be loaded to the ELM Solutions reference database and used in this report, it must have been part of an invoice line entry in which all of the following items were included:

- · Name of the biller
- Role of the biller
- Date of activity
- · Hourly rate charged
- Time charged
- UTBMS code associated with the time charged
- · Total amount charged for the activity

In addition, each line item's hourly rate was validated against its "real rate" (calculated by dividing the total amount charged for the activity by the time charged). Any line items with an hourly rate that did not align closely with the real rate were not loaded to the reference database.

Real Rate = Line-Item Total/Line-Item Hours (Units) Example: \$4,000/10 Hours = Real Rate of \$400

Adjustments the client made to line-item amounts after submission are not factored into the dataset. These types of adjustments may impact the effective rate paid by the client to the law firm but do not reflect the real rate billed.

In short, the real rate is the rate appearing on an approved invoice at the invoice line-item level.

Aggregations of data taken from millions of these line-item-level invoice entries are the core of the information analyzed.

A Note on Negotiated Rates and Billing

Practices law firms can generally follow vary for submitting "negotiated" rates on invoices. Firms may submit the negotiated rate as the hourly rate identified on the invoice line item, insert a vendor line-item adjustment to ensure compliance, or provide a vendor invoice level adjustment to bring the total amount of the fees into compliance with agreed-on discounts. Although the former two are considered part of the real rate calculation, the latter can be problematic. It is not directly linked to a line item, and therefore, to determine the rate, it should not be assumed that the adjustment is related to a specific line item. Invoice-level adjustments may represent a credit or some other type of adjustment placed on the invoice. To ensure these types of adjustments would not adversely impact the analysis contained within the 2022 Real Rate Report, the team reviewed the population of invoices and line items to determine what the deviation of the real rate might be based on inclusion or exclusion. The analysis demonstrated that the variance was not significant (less than 1%).

As such, we decided not to include the vendor-level adjustments in the report.

Types of Matters Included in the Analysis

Matters within the ELM Solutions system are associated with areas of work described and defined by ELM Solutions clients. Those areas of work were analyzed and systematically categorized into legal practice areas. Normalization of practice areas was supported by mappings to system-level practice areas available in the ELM Solutions system and by naming convention.

All data included within this report have been mapped to a corresponding practice area. The majority of our analyses focus on the following 12 practice areas:

- · Bankruptcy and Collections
- Commercial
- Corporate
- Employment and Labor
- Environmental
- · Finance and Securities
- General Liability
- · Government Relations
- · Insurance Defense
- Intellectual Property
- · Marketing and Advertising
- Real Estate

Within each client's areas of work, sub-areas are often identified. The lists that follow identify client areas of work and, within those areas, the sub-areas underneath each practice area. Often, the same sub-area appears within different practice areas. For example, the sub-area "General/Other" when listed under "Commercial and Contracts" refers to general work provided regarding commercial and contracts matters. When listed under the "Employment and Labor" practice area, the same sub-area refers to work provided on employment and labor. Where applicable and practicable, each area and sub-area has been further subdivided into litigation and non-litigation work for granular analysis.

Bankruptcy and Collections

Chapter 11 General/Other

Collections Workouts and Restructuring

Commercial (Commercial Transactions and Agreements)

Contract Breach or Dispute General, Drafting, and Review General/Other

Corporate¹

Antitrust and Competition Corporate Development

General/Other Governance

Information and Technology

Mergers, Acquisitions, and Divestitures

Partnerships and Joint Ventures Regulatory and Compliance

Tax Treasury

White Collar/Fraud/Abuse

Employment and Labor

ADA General/Other **Immigration** Agreements

Compensation and Benefits Discrimination, Retaliation, and Harassment/EEO

Employee Dishonesty/Misconduct

ERISA

Union Relations and Negotiations/NLRB

Wages, Tips, and Overtime Wrongful Termination

Environmental

General/Other Superfund

Waste/Remediation Health and Safety

Finance and Securities

Commercial Loans and Financing Investments and Other Financial Instruments

Debt/Equity Offerings Loans and Financing

Fiduciary Services SEC Filings and Financial Reporting Securities and Banking Regulations General/Other

General Liability

Asbestos/Mesothelioma Personal Injury/Wrongful Death

Auto and Transportation Premises

Consumer Related Claims Product and Product Liability

Crime, Dishonesty and Fraud Property Damage

General/Other Toxic Tort

1 All references to "Corporate: General/Other" in the Real Rate Report are the aggregation of all Corporate sub-areas excluding the Mergers, Acquisitions, and Divestitures sub-area and the Regulatory and Compliance sub-area.

Government Relations

General/Other Lobbying and Relations

Insurance Defense

Auto and Transportation General/Other Personal Injury/Wrongful Death Product and Product Liability Professional Liability Property Damage Toxic Tort

Intellectual Property²

General/Other Licensing Patents Trademarks

Marketing and Advertising

General/Other

Real Estate

Construction/Development
Easement and Right of Way
General/Other
Land Use/Zoning/Restrictive Covenants
Landlord/Tenant Issues
Leasing
Property/Land Acquisition or Disposition
Titles

² All references to "Intellectual Property: General/Other" in the Real Rate Report are the aggregation of all Intellectual Property sub-areas excluding the Patents and Trademarks sub-areas.



ELM Solutions

About Wolters Kluwer ELM Solutions

Wolters Kluwer ELM Solutions is the market-leading global provider of enterprise legal spend and matter management, contract lifecycle management, and legal analytics solutions. We provide a comprehensive suite of tools that address the growing needs of corporate legal operations departments to increase operational efficiency and reduce costs. Corporate legal and insurance claims departments trust our innovative technology and end-to-end customer experience to drive world-class business outcomes. Wolters Kluwer ELM Solutions was named a leader in both the IDC MarketScape: Worldwide Enterprise Legal Spend Management 2020 Vendor Assessment and IDC MarketScape: Worldwide Enterprise Matter Management 2020 Vendor Assessment. The award-winning products include Passport®, one of the highest rated ELM solutions in the latest Hyperion MarketView™ Legal Market Intelligence Report; TyMetrix® 360°, the industry's leading SaaS-based e-billing and matter management solution; CLM Matrix, named a "strong performer" in the 2019 Q1 CLM Forrester Wave report; and the LegalVIEW® portfolio of legal analytics solutions based upon the industry's largest and most comprehensive legal spend database, with more than \$155 billion in invoices.

EXHIBIT H

IN THE UNITED STATES DISTRICT COURT FOR THE DISTRICT OF SOUTH CAROLINA

IN RE: AQUEOUS FILM-FORMING FOAMS PRODUCTS LIABILITY LITIGATION) Master Docket) No.: 2:18-mn-2873-RMG
CITY OF CAMDEN, et al., Plaintiffs,) Civil Action No.:) 2:23-ev-3230-) RMG
-VS-)))
E.I DUPONT DE NEMOURS AND COMPANY (n/k/a EIDP, Inc.), et al.,).)
Defendants.	

<u>DECLARATION OF STACI J. OLSEN IN SUPPORT OF</u> CLASS COUNSEL'S MOTION FOR ATTORNEYS' FEES AND COSTS

- I, STACI J. OLSEN, respectfully declare, under penalty of perjury, that the following is true and correct to the best of my knowledge, information and belief:
- 1. I am an attorney licensed to practice in the State of Texas and submit this declaration in support of Class Counsel's motion for attorneys' fees and costs.
- 2. I am Senior Counsel of Electronic Discovery with the law firm of Baron & Budd, P.C., and my principal office is located in Dallas, Texas.
- 3. I received my J.D. from Baylor University in 1996 and was admitted to the Texas State Bar in November, 1996.
- 4. I have 27 years of legal experience, including more than a decade of experience at Baron & Budd overseeing the compilation of evidence necessary to support complex and successful environmental litigation.
 - 5. I have personally performed substantial electronic discovery work on 119 cases

while at Baron & Budd. I have worked on environmental matters such as atrazine, perchloroethylene (PCE), trichloropropane (TCP), methyl tert-butyl ether (MTBE), Northern and Southern California and Maui wildfires, the 2010 Gulf Oil Spill, perfluorinated chemicals (GENX and PFAS), and polychlorinated biphenyl (PCB). The PCB case against Monsanto settled in 2020 via a nationwide class action.

- 6. I have extensive eDiscovery experience that includes the management of electronic information, document management, document review, and the training of staff and attorneys in the best use of electronic resources. I oversee every phase of document management, including the intake of documents, scanning, coding, searching, bates-stamping, substantive review, production of documents, the creation of privilege logs, and the identification/development of trial exhibits.
- 7. My work also involves the substantive review of client, defendant, and third-party subpoena documents for the creation of damages models, including all records of expenses and costs associated with contamination, assessments of impacts to natural resources, and any other evidence necessary for damages calculations. I also manage in-house electronic discovery and document review teams, and work with clients and litigation teams to develop keyword searches and issue tags, redact privileged information, and sleuth out interesting case facts for use in litigation.
- 8. In the spring of 2019, shortly after the creation of the AFFF MDL, I was appointed to the Document Review Management Team (DRMT), along with Stephanie Biehl of Sher Edling, LLP, and Tate J. Kunkle of Douglas & London, P.C. To this day, the three of us continue to manage document review for the Plaintiffs' Executive Committee (PEC).
- 9. Beginning in May of 2019, I, along with my colleagues on the DRMT, researched, interviewed, attended demonstrations, reviewed proposals, and negotiated with numerous e-

discovery platforms to ensure that the PEC would have the best e-discovery platform for what I knew would be a very document intensive litigation and span several years. Taking into account factors such as the ease of use for the reviewers, the large number of reviewers we anticipated, the functionality of the platform, and cost, among other considerations, the DRMT ultimately selected the e-discovery platform called Everlaw in July 2019, which was approved by the PEC.

- 10. After the e-discovery platform was selected, the DRMT set up document review coding protocols, trained document reviewers and reviewer teams, and instituted standard procedures for the upload and management of documents, including defendants' document productions, third-party documents, plaintiff bellwether documents, deposition transcripts and exhibits, and PEC work-product to share across the PEC.
- 11. The DRMT drafted a coding manual with background materials on AFFF, and PFAS more generally, for each reviewer to read prior to reviewing and coding documents in the Everlaw database.
- 12. The DRMT also held two (2) full-day, in-person document reviewer training sessions on September 19, 2019, in Dallas, and on February 20, 2020, in Atlanta, as well as a third, virtual (due to the pandemic), full-day document reviewer training session on April 30, 2020. Well over fifty (50) attorneys attended these training sessions, which included presentations covering each defendant, as well as a variety of important topics such as the government contractor immunity, organic chemistry, chemical engineering, and fate and transport.
- 13. In addition to the full-day training sessions, DRMT held weekly Zoom calls with all reviewers to answer questions, discuss the coding of documents including whether documents should be coded as "hot" (highly relevant and probative, and likely to be used in the litigation) or "cold" (less relevant and less probative, and thus less likely to be used in the litigation), present

new information on key topics, and to further educate and assist the reviewers. Defendant-specific teams, along with a U.S. government document team, were formed so they could each become experts on the documents they were reviewing. Once these teams became experts, they were able to share their expertise with all document reviewers and keep all reviewers informed as to the types of documents being seen during the training sessions and weekly meetings.

- 14. Over the last three-plus years, the DRMT has also hosted weekly and monthly small group calls for the Tier 2 document reviewers, defendant-specific teams, deponent-specific teams, and issue-specific review teams.
- 15. The DRMT not only maintained documents produced by defendants, but also maintained and assigned reviewers for documents produced by over 100 third-party subpoena recipients. Additionally, in accordance with Case Management Order No. 9, the DRMT served all third-party documents received via subpoena on the Defendants.
- 16. Furthermore, to ensure quality control of the review, documents were not only reviewed and coded by Tier 1 Reviewers, but samples of productions were also reviewed by Tier 2 reviewers. I also monitored the reviewers' time and productivity to ensure the integrity of the PEC's review.
- 17. The DRMT and over one-hundred-fifty (150) document reviewers were instrumental in identifying key documents relevant to government contractor defense, putting together a liability timeline, and ultimately defeating defendants' government contractor immunity motion.
- 18. In over 4 years of litigation, I, along with my colleagues Ms. Biehl and Mr. Kunkle, organized, managed, and oversaw the intake, review, and coding of over 4.65 million documents (totaling over 37 million pages) by over 150 document reviewers.

- 19. In addition to overseeing the 150+ reviewers, the DRMT additionally managed another approximately 200 attorneys and paralegals from various firms and State's Attorneys' Generals by providing them access to the Everlaw database, training them on the database, and providing them with certain batches of documents upon request, all while ensuring each had complied with the Protective Order (CMO 4) and agreed to the terms of the Common Benefit Order (CMO 3).
- 20. To date, there have been tens of thousands of hours of document review time spent reviewing and coding documents on the Everlaw platform. Document reviewers were represented by 21 PEC firms who worked tirelessly together on various projects (e.g., custodian review projects for depositions and liability themed reviews) to support Co-Lead Counsel, the PEC and its various committees (particularly the law and briefing and science committees, trial counsel, the bellwether teams, and all the experts), in constructing the liability story, making and opposing motions, and ultimately permitting the PEC to reach this unprecedented settlement.
- 21. Furthermore, the Information Technology Litigation Support (ITLS) team at Baron & Budd, under my supervision, oversaw working with Everlaw to make sure all uploads were carried out and placed on the platform. ITLS also worked extensively with DCC members and Everlaw to resolve various production issues such as overlays and duplicate bates numbers. Additionally, ITLS was responsible for the management and production of documents received from 3rd Parties. Baron & Budd's ITLS production workflow used industry leading state of the art data processing and the document review platform to accomplish these tasks. The workflow included receipt, processing, stamping, and creating standard load files. Using the Baron & Budd ITLS technology environment, we successfully produced almost 155,000 third-party subpoenaed documents to Defendants.

I declare under penalty of perjury that the foregoing is true and correct.

Executed this 13th day of October, 2023, in Dallas, Texas.

Staci J. Olsen, Esq.

EXHIBIT I

UNITED STATES DISTRICT COURT FOR THE DISTRICT OF SOUTH CAROLINA CHARLESTON DIVISION

MDL No. 2:18-mn-2873-RMG

IN RE: AQUEOUS FILM-FORMING FOAMS PRODUCTS LIABILITY LITIGATION

This Document relates to: ALL CASES

<u>DECLARATION OF WESLEY BOWDEN IN SUPPORT OF</u> CLASS COUNSEL'S MOTION FOR ATTORNEYS' FEES AND COSTS

I, WESLEY BOWDEN, respectfully declare, under penalty of perjury, that the following are true and correct, to the best of my knowledge, information, recollection and belief:

- 1. I am licensed to practice law in the State of Florida and the Northern, Middle, and Southern Districts of Florida.
- 2. I am a partner at the law firm of Levin Papantonio Rafferty Proctor Buchanan O'Brien Barr & Mougey, P.A., and my principal office is located in Pensacola, Florida.
- 3. I was appointed to the Plaintiff's Executive Committee ("PEC") on March 20, 2019, and have served on the Science Committee along with Christina Cossich, Scott Summy, Gary Douglas, and Robert Bilott since its formation. I have been directly involved in identifying, selecting, and developing experts for this litigation and can personally attest to the efforts undertaken by my colleagues and I described herein. In part due to my experience as co-lead trial counsel in previous PFAS litigation (*In re: E.I. du Pont de Nemours & Co. C-8 Personal Injury Litig.*, MDL No. 2433) I was asked to serve as Co-Lead Trial Counsel to Gary Douglas for the City of Stuart, Florida v. 3M Co., et al. bellwether trial.
- 4. This declaration is respectfully submitted in support of the PEC Motion for Attorneys' Fees and Costs, for the collective benefit of all attorneys and firms who have submitted common benefit time and / or expenses in accordance with Case Management Order No. 3.

Introduction

- 5. Recognizing the complexity, scope, and continuously growing body of PFAS knowledge, the PEC immediately organized the Science Committee following the Court's issuance of CMO 2.
- 6. Benefiting from the collective PFAS litigation experience of its members, the Science Committee, starting in 2019, along with key members of other important PEC appointed Committees (collectively referred to internally as the "Strike Force") worked together to begin the monumental task of developing the science necessary to prosecute the litigation on behalf of the PEC. We began collecting and reviewing the then-existing body of PFAS literature to identify and coordinate the retention of leading experts in organic chemistry, regulatory compliance, toxicology, epidemiology, risk assessment, polymer science, process engineering, environmental science, fate and transport of environmental contaminants, industrial hygiene, and oncology, among other fields.
- 7. These initial efforts focused on developing and presenting experts for the Court's Science Day with topics including EPA and state regulatory action, identification of PFAS in soils and groundwater, testing protocols for toxicity, human health effects, remediation technologies, and alternatives to PFOS and PFOA precursor-derived AFFF formulations.
- 8. Over the next four years the PEC would retain and develop over thirty (30) experts ¹ as well as continue to monitor and review thousands of newly published peer-reviewed PFAS articles. These consulting and testifying experts were essential to the successful development of the liability story as uncovered through more than eighty (80) corporate and government witness depositions and millions of documents.
- 9. After years of effort, the Science Committee and Strike Force members on behalf of the PEC would ultimately designate and disclose fourteen (14) experts for the First Water Provider Bellwether Trial. The expert reports encompassed the liability story for the PFAS industry as a whole and presented the blueprint for scientific analysis and PFOA source tracking applicable to every defendant in this MDL.

Science Day

10. Even prior to the issuance of CMO 2, our core group of key Science Committee and Strike Force members anticipated the need for a Science Day where all parties would present on the complex regulatory and technical issues the litigation would cover. We

2

¹ As this litigation is on-going, the PEC is withholding the names of experts not yet tendered pursuant to Fed. R. Civ. P. 26 or who are serving as consulting experts only.

- then retained and began consulting with experts who had previously testified in MDL 2433 — In re: E.I. du Pont de Nemours and Company C-8 Personal Injury Litigation.
- 11. During the spring and summer of 2019, we continued working with multiple experts to examine the underpinnings of the then-existing PFAS regulations. This effort included a detailed assessment of the mechanisms of action of PFAS in laboratory animals, extrapolation of human equivalent doses, evaluation of exposure models, and the calculation of exposure guidelines. The Science Committee concluded that, despite the seemingly variable regulatory standards, regulatory guidelines were trending toward lower permissible levels.
- 12. At the time, the EPA had issued a Health Advisory Level of 70 ppt for PFOA and PFOS combined. However, due to our efforts in preparing for Science Day, the PEC was able to anticipate significantly lower enforceable levels and develop liability themes and testimony accordingly, well in advance of the EPA issuing the proposed MCL of 4 ppt for PFOA and PFOS in May of 2023.
- 13. At the same time, we began developing fate and transport models of PFOS and PFOA from AFFF agents to impacted soils and groundwater. The models would help guide discovery efforts, particularly in identifying key documents among the over 37 million pages produced in this litigation.
- 14. The Committee members also retained world-renowned experts who are widely considered pioneers in detecting and addressing PFAS-related human health impacts. Included in this group of experts are those who have dedicated their professional lives to treating Americans who have been exposed to PFAS and are suffering from PFAS-related cancers, experts who have studied the immunological impacts of PFAS in children, and experts who have faced congressional scrutiny to ensure the broader scientific community has access to the best available data concerning environmental toxins.

General Liability Experts

- 15. The Science and Strike Force Committees developed and disclosed fourteen (14) experts for the First Water Provider Bellwether Trial and twenty-two (22) expert reports.
- 16. The reports covered topics including organic chemistry, toxicology, professional engineering, chemical engineering, industrial hygiene, public safety and health, forensic accounting, fate and transport, toxicology, epidemiology, risk assessment, hydrology, regulatory compliance, analytical chemistry, and patent law and application.
- 17. Because of their prominence in their fields, the experts were able to address in their reports previously untested liability theories and advances in science. For example, the

Science Committee obtained through discovery samples of 3M's PFAS products FC-95 and FC-143, the salts of PFOS and PFOA respectively. These samples were submitted for detailed chemical analysis which identified previously unknown impurities. Further, the isomer profiling – a type of molecular fingerprinting – of the impurities was utilized as a tool for source tracking. This enabled the experts to directly link PFOS and PFOA found in soil and ground water to their manufacturing source. This novel application of isomer profiling of fluorosurfactants impurities had not previously been used to identify AFFF agents in a litigation setting, not only advancing the litigation as a whole, but furthering the broader scientific community's understanding of AFFF agents and the scope of their environmental impact.

18. The PEC's disclosed expert witnesses include:

a. Linda Birnbaum, Ph.D., D.A.B.T., A.T.S

i. Dr. Birnbaum is the former director of the National Institute of Environmental Health Sciences of the National Institutes of Health (NIEHS) and former director of the National Toxicology Program (NTP), serving in that position under two Presidential administrations while testifying before the United States Congress on multiple occasions to address matters of environment hazards and risks to the public health including PFAS. She is a board-certified toxicologist who has devoted more than 40 years of her professional career to public service as a federal scientist at both the United States EPA and NIEHS and has published more than 1,000 peer-reviewed scientific articles. Dr. Birnbaum offered opinions on the adequacy of the underlying state and federal methodologies for establishing maximum contaminant levels for PFAS, including PFOS and PFOA. In this litigation, she opined that PFOA and PFOS pose substantial risk to human health and that all reasonable efforts should be made to eliminate human exposure. Importantly, Dr. Birnbaum's analysis was revealed to be not only correct, but ahead of her regulatory colleagues as reflected in the EPA's adoption of this same position in June 2022 and March 2023.

b. Jonathan Martin, Ph.D.

i. Dr. Martin has devoted his 22 year career as an independent academic scientist to the study of PFAS. He is one the most cited PFAS authorities in the world having published more than 180 peer-reviewed papers that have been cited more than 20,000 times by other scientists. Dr. Martin spearheaded robust and highly sophisticated water sampling and analysis for the ten bellwether sites. This analysis included testing for more than 70 analytes – far more than otherwise commercially available to the public at large. Through this analysis, Dr. Martin applied an isomer profiling

methodology enabling plaintiffs to analytically source track the PFOA in the environment to manufacturing sources.

c. Michael Siegel, M.D., M.P.H.

i. Dr. Siegel is an expert in Public Health, and a graduate of Yale University School of medicine and UC Berkeley School of Public Health where he obtained a master's degree in public health. Dr. Siegel has testified on three prior occasions on the subject of PFAS (In re: E.I DuPont de Nemours & Co. C8 Personal Injury Liab. Litig., MDL No. 2433). Utilizing standard methodologies for assessing and disclosing risks to public health, Dr. Siegel opined that the defendants herein violated public health standards in failing to disclose what they knew about important health risks of PFAS chemicals. His opinions have broad application to all defendants in this MDL.

d. David MacIntosh, Sc.D., C.I.H., D.A.B.T.

i. Dr. MacIntosh is a Board Certified Toxicologist, Doctor of Science, and Certified Industrial Hygienist. He holds a doctoral degree from the Harvard University School of Public Health in Environmental Health, a master's degree in Environmental Health from Indiana University and a bachelor's of science from Indiana in Decision Science. He has nearly three decades of experience in public health, specializing in management of human health risks posed by hazardous substances. His opinions include the industry-known (and knowable) fate and transport traits of PFAS. He has further opinioned that the body of PFAS toxicological and epidemiological data supports that PFAS poses a significant risk to human health and warrants a public health goal of zero human exposure. It is of particular significance that Dr. MacIntosh developed and disclosed these opinions well in advance of the EPA's subsequent adoption of this same position in June 2022.

e. Stephen Petty, P.E., C.I.H., C.S.P

i. Mr. Petty is a Professional Engineer, Certified Industrial Hygienist, and Certified Safety Professional. He has 37 years of environmental, health and safety, forensic engineering, environmental engineering, and energy experience. Prior to forming the consulting firm Engineering & Environmental Service Group, he was the Manager of Residential and Commercial Research at Columbia Energy, where he was awarded nine U.S. Patents, and a Senior Research Engineer at Battelle Laboratories. His opinions, applicable to all defendants, include industry standards of care, sufficiency of warnings, industry knowledge of fluorochemical degradation, and standards of care for industry trade groups.

f. Christopher P. Higgins, Ph.D.

i. Prof. Higgins holds a Master of Science as well as a Doctorate in Civil and Environmental Engineering from Harvard and Stanford Universities, respectively. He is one of the most prolific authors of peer-reviewed PFAS publications whose works have been cited by regulatory bodies and industry alike. Prof. Higgins opinions utilize standard scientific methodologies to determine the manufacturing origin of PFOS and PFOA in groundwater and soils. Prof. Higgins further utilizes isomer profiling to differentiate PFOA from manufacturing sources. This methodology enables all impacted plaintiffs in this litigation to accurately identify responsible parties.

g. Kevin Berryhill, P.E.

i. Mr. Berryhill is a Professional Engineer with extensive experience in planning, designing, and overseeing construction of water treatment plants designed to remove a wide range of contaminants including PFAS. Mr. Berryhill's opinions center on the effectiveness of various remediation strategies including their related costs. He has further opinioned on the cost related to treatment of individual PFAS compounds, including shortchain PFAS as well as PFOA precursors. His methodologies and opinions are applicable to all defendants in this MDL.

h. Robert W. Johnson

i. Mr. Johnson holds a Master of Business Administration degree from Stanford University. His opinions entail a financial assessment of the defendants' solvency and ability to pay. He also opines on the present value cost of implementing PFAS remediation for impacted plaintiffs. His cost models have direct application to all plaintiffs in the MDL tasked with assessing the immediate impact PFAS has on their constituents and rate payers.

i. Anthony Brown, M.S.

i. Mr. Brown holds degrees in Civil Engineering and a Masters of Science in Engineering Hydrology. He has more than 30 years of experience as an environmental and water resources consultant. He offers methodologies for mapping complex hydrogeology and fate and transport of PFAS as well as PFAS co-mingled contaminants. These methodologies can be applied as part of the process identifying any defendant's PFAS products.

j. Ronald Kendall, Ph.D.

 Prof. Kendall is the founding Director and Director Emeritus of The Institute of Environmental and Human Health as well as the Department Chair of the Department of Environmental Toxicology at Texas Tech University. He opines that, while AFFF agents have been useful firefighting technologies, the use of C8 PFAS compounds in AFFF was not essential and needlessly led to widespread environmental contamination, and historical uses present a substantial risk to human health.

- k. Patrick Lowder, Ph.D., J.D.
 - i. Dr. Lowder holds a Doctorate in Organic Chemistry and focuses his legal practice on patent applications. His investigation of the defendants' patents in this litigation uncovered that industry, not the Department of Defense, controlled the patent rights to the fluorosurfactants compositions of early commercial AFFF agents. He further opines that multiple defendant manufacturers made unauthorized changes to the carbon-chain length distributions of the fluorosurfactants in AFFF compositions. This deceit led to the defendants obtaining false designations of the Navy's approval and qualification of the AFFF agents.

Personal Injury Experts

- 19. The PEC has been in contact with seventy (70) experts and has retained more than fifteen experts on matters involving the role of PFAS in human disease. These fields of expertise include:
 - a. Urology
 - b. Nephrology
 - c. Oncology
 - d. Environmental Sciences
 - e. Toxicology
 - f. Epidemiology
 - g. Environmental and Occupational Health

Fraudulent Transfer Experts

- 20. Plaintiffs allege the DuPont entities had engaged in the fraudulent transfer of assets to protect E. I. du Pont de Nemours and Co. ("Old DuPont") from liability in this litigation.
- 21. The PEC therefore retained three experts to examine the inner workings of what appeared to be a complex, decades-spanning effort to fraudulently protect Old DuPont. As a result, the PEC is now able to demonstrate that the spin-off of Chemours from Old DuPont was done to accomplish two goals: 1) to offload Old DuPont's legacy environmental and litigation liabilities, including with respect to PFOA, and 2) extract a \$4 billion dividend payment from Chemours.

Financial & Bankruptcy Experts

- 22. The PEC has retained Houlihan Lokey as an investment banker consultant in connection with the Kidde bankruptcy, including among other things, assessing financial issues and options, such as a sale of the debtor or its parts, identifying buyers, analyzing strategic alternatives.
- 23. Province has been retained as a financial advisor, including among other things, analyzing the acts, conduct, assets, liabilities and financial condition of the Debtor and its affiliates, including certain transactions preceding the bankruptcy filing and the formation of the Debtor; analyzing claims against the Debtor and non-Debtor affiliates; assisting and advising the Committee and counsel regarding the identification and prosecution of estate claims, including in connection with any issues regarding the filing of the Case and the propriety of the filing; assisting and advising the Committee in its review and analysis of, and negotiations with the Debtor and non-Debtor affiliates related to, intercompany transactions and claims.

Settlement Experts

- 24. The PEC also retained multiple experts to develop a model based on contamination levels and water flow rates. Given the proprietary nature of flow rates, population data was used to model flow rates for individual utilities and wells. This conceptual model was critical to developing the Allocation Procedures ultimately used for settlement purposes.
- 25. The PEC also retained class fairness experts who provided guidance and opinion on the class settlement and further are prepared to testify at the Fairness Hearing.
- 26. The PEC further retained renowned fee experts to design a fee structure that fairly treats the multitude of the common benefit lawyers subject to or who will likely seek to participate in the fee petition.

Conclusion

27. As stated above, the PEC has currently retained over thirty (30) experts from a broad range of backgrounds. Each has significantly contributed to and meaningfully advanced the litigation as a whole.

I declare under penalty of perjury that the foregoing is true and correct.

Executed this day of October, 2023

Wesley A. Bowden

Levin, Papantonio, Rafferty, Proctor, Buchanan, O'Brien, Barr & Mougey, P.A. 316 S. Baylen Street, Suite 600

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EXHIBIT J

IN THE UNITED STATES DISTRICT COURT FOR THE DISTRICT OF SOUTH CAROLINA

PRODUCTS LIABILITY LITIGATION) Master Docket) No.: 2:18-mn- 2873-RMG
CITY OF CAMDEN, et al., Plaintiffs,) Civil Action No.: 2:23-cv-3230- RMG
-vs-)))
E.I DUPONT DE NEMOURS AND COMPANY (n/k/a EIDP, Inc.), et al.,)))
Defendants	

DECLARATION OF REBECCA G. NEWMAN IN SUPPORT OF CLASS COUNSEL'S MOTION FOR ATTORNEYS' FEES AND COSTS

I, the undersigned, Rebecca G. Newman, respectfully declare, under penalty of perjury, that the following is true and correct, to the best of my knowledge, information, recollection and belief:

- 1. I am an attorney licensed to practice in the States of New York and New Jersey, and in the United States Court of Appeals for the Sixth Circuit, the United States District Courts for the Eastern and Southern District of New York, the United States District Court for the District of New Jersey, the United States District Court for the Federal Court of Claims, the United States District Court for the District of Colorado, and the United States District Court for the Eastern District of Wisconsin, and submit this declaration in support of Class Counsel's Motion for Attorneys' Fees and Costs, being filed concurrently herewith.
- 2. I am a Senior Associate with the law firm of Douglas & London, P.C. ("Douglas & London") principally located in New York, New York.

- 3. I received my J.D. from Brooklyn Law School in 2008 and was admitted to the State Bar of New Jersey in 2008 and the State Bar of New York in 2009.
- 4. I have 15 years of legal experience, including over a decade worth of experience litigating cases involving per- and polyflouroalkyl substances ("PFAS"), including as a member of three trial teams in the *In re E. I. DuPont de Nemours and Co. C8 Personal Injury Litig.*, (S.D.O.H), which resulted in three successful plaintiffs' verdicts. I was also a member of the trial team that worked on the first bellwether in this MDL, *The City of Stuart v. 3M et al.*
- 5. In the Spring 2019, I was appointed by Co-Lead Counsel for the Plaintiffs' Executive Committee ("PEC"), along with Carla Burke Pickrel of Baron & Budd, P.C., Frederick S. Longer of Levin, Sedran & Berman, and Kevin J. Madonna of Kennedy & Madonna, LLP, as the Co-Chairs of the AFFF MDL Law and Briefing Committee, and in this role have been directly involved in the overall legal research and writing aspects of this MDL and can personally attest to same.

Law and Briefing Committee Research & Memoranda

- 6. The motions and responsive briefing filed on the Court docket, discussed below, which the Law and Briefing Committee consistently participated in, has repeatedly provided zealous written advocacy on the PEC's behalf.
- 7. However, in addition to the briefing filed before the Court, I can personally attest that the Law and Briefing Committee routinely conducted legal research and drafted memoranda on the PEC's behalf at Co-Lead Counsel's request. Many hours of legal research and drafting of memoranda covered a wide range of topics, including but not limited to: (1) successor liability; (2) fraudulent conveyance law; (3) component part liability; (4) distributor liability; (5) nationwide medical monitoring law; (6) government contractor immunity defense; (7) state-by-state causation

standards, including an analysis of the permissibility of using a differential diagnosis approach to causation; (8) market share liability; (9) statutes of repose; (10) discretionary function; (11) the "Timing and Review" provision of § 113 of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 ("CERLA"); (12) permissibility of contacting former employees; and (13) the scope of jurisdictional discovery.

- 8. Additional Law and Briefing Committee research and memoranda were likewise undertaken that are not being specifically identified here because doing so could potentially reveal work-product and/or litigation strategy.
- 9. These research efforts provided the PEC and Co-Lead Counsel with ample legal authority to assist them in being effective oral advocates both when addressing the Court and when liaising with defense counsel in routine meet and confers.

Motions Seeking Court Relief

10. Moreover, I, along with my Law and Briefing Co-Chairs, drafted, edited, assisted, and/or oversaw the filing of every brief (affirmative and responsive) filed before the Court in this MDL often in concert with both the Strike Force and/or the *Stuart* Trial Team. These efforts included the following non-exhaustive lists of submissions:

Plaintiffs' Affirmative Motions

No.	ECF No.	Date	Motion Description				
1	564	4/27/2020	Motion for a Protective Order Regarding Defendan Third-Party Subpoena to West Virginia University				
2	581	5/6/2020	Motion to Compel Discovery from E. I. DuPont de Nemours and Company, The Chemours Company, The Chemours Company, FC, LLC, Corteva, Inc. and DuPont de Nemours, Inc.				
3	870	9/28/2020	Motion for a Protective Order Regarding Improper Requests for Admission Served Upon the United States				

No.	ECF No.	Date	Motion Description		
4	1150	2/3/2021	Motion to Compel Discovery from Defendant Dynax Corporation		
5	1879	9/2/2021	PEC Letter Regarding Government Contractor Briefing		
6	2117	1/21/2022	PEC's Motion to Compel National Foam, Inc. to Designate a Rule 30(b)(6) Witness(es) To Be Deposed		
7	2174	2/15/2022	Motion to Compel the Production of the Custodial File of 3M Witness Lewis Lehr		
8	2318	4/26/2022	Motion to Compel Discovery from E. I. DuPont de Nemours and Company, The Chemours Company, The Chemours Company, FC, LLC, Corteva, Inc. and DuPont de Nemours, Inc.		
9	2604	9/16/2022	Motion to Compel Discovery from the Turn Out Gear Defendants		
10	Stuart ECF 226	3/24/2023	Motion in <i>Limine</i> #1 to Exclude the Government Contractor Defense		
11	2918	3/24/2023	Motion in <i>Limine</i> #2 to Preclude Evidence of Other Possible Sources of Contamination		
12	Stuart ECF 229	3/24/2023	Motion in Limine #3 to Exclude Evidence of Plaintiff's Experts Unrelated Opinions, Writings and/or Views on Political and/or Controversial Irrelevant Topics as Well as to Exclude Irrelevant and Inflammatory Political Attacks on Plaintiff's Expert Dr. Linda Birnbaum		
13	Stuart ECF 230	3/24/2023	Motion in <i>Limine</i> #4 to Exclude All Evidence and Argument Relating to General Causation		
14	Stuart ECF 231	3/24/2023	Motion in <i>Limine</i> #5 to Exclude All Evidence and Arguments Challenging and/or Criticizing EPA's Health Advisory Levels for PFOA and PFOS		
15	Stuart ECF 233	3/24/2023	Motion In <i>Limine</i> #6 to Exclude All Evidence and Arguments Regarding the City of Stuart's Receipt of Funds from the State of Florida and/or Third Parties		
16	Stuart ECF 234	3/24/2023	Motion in <i>Limine</i> #7 – Plaintiff's Omnibus Motion in <i>Limine</i>		
17	3392	7/10/2023	Plaintiffs' Motion for Preliminary Approval of Class Settlement, for Certification of Settlement Class and For Permission to Disseminate Class Notice.		

Responsive Briefing

No	ECF No.	Date	Motion Description		
1	1284	3/19/2021	Dynax Motion to Dismiss Pursuant to Fed. R. Civ. P. 12 (b)(2) (Ayer)		
2	1285	3/19/2021	Dynax Motion to Dismiss Pursuant to Fed. R. Civ. P. 12 (b)(2) (Bakman Water Company)		
3	1286	3/19/2021	Dynax Motion to Dismiss Pursuant to Fed. R. Civ. P. 12 (b)(2) (City of Dayton)		
4	1287	3/19/2021	Dynax Motion to Dismiss Pursuant to Fed. R. Civ. P. 12 (b)(2) (Emerald Coast Utilities Authority)		
5	1288	3/19/2021	Dynax Motion to Dismiss Pursuant to Fed. R. Civ. P. 12 (b)(2) (City of Sioux Falls)		
6	1289	3/19/2021	Dynax Motion to Dismiss Pursuant to Fed. R. Civ. P. 12 (b)(2) (City of Stuart, Florida)		
7	1290	3/19/2021	Motion to Dismiss for Lack of Personal Jurisdiction by Corteva, Inc. and Dupont de Nemours, Inc.		
8	1291	3/19/2021	Chemicals, Incorporated's Motion to Dismiss for Lack of Personal Jurisdiction		
9	1299	3/19/2021	Archroma U.S., Inc.'s Motion to Dismiss for Lack of Personal Jurisdiction (<i>Emerald Coast Utilities Authority</i>)		
10	1300	3/19/2021	Clariant Corporation's Motion to Dismiss for Lack of Personal Jurisdiction		
11	1301	3/19/2021	Archroma U.S., Inc.'s Motion to Dismiss for Lack of Personal Jurisdiction (Sioux Falls)		
12	1965	11/5/2021	Motion for Summary Judgment on the First Element of the Government Contractor Immunity Defense		
13	2156	2/4/2022	Defendant National Foam, Inc.'s Cross-Motion for a Protective Order		
14	2346	6/17/2022	Defendants' Motion for Partial Summary Judgment on the Second and Third Elements of the Government Contractor Defense		
15	2689	12/2/2022	Dynax Corporation's Motion for Summary Judgment		
16	2690	12/2/2022	National Foam's Motion for Summary Judgment		
17	2692	12/2/2022	Clariant Corporation's Motion for Summary Judgment		
18	2693	12/2/2022	DuPont's Motion for Summary Judgment		
19	2694	12/2/2022	Kidde-Fenwal, Inc.'s Motion for Summary Judgment		

No	ECF No.	Date	Motion Description
20	2695	12/2/2022	Defendants' Omnibus Motion for Summary Judgment
21	2696	12/2022	Defendants' Omnibus Motion to Exclude Plaintiff's Experts' Testimony
22	2698	12/2/2022	Tyco Fire Products LP and Chemguard's Motion for Summary Judgment
23	Stuart ECF 232	3/24/2023	3M Company's Motions in <i>Limine</i>
24	2933	3/24/2023	Defendants' Motion in <i>Limine</i> to Exclude Evidence Relating to the Films <i>Dark Waters</i> and <i>The Devil We Know</i>
25	2929	3/24/2023	DuPont/Chemours Omnibus Motions in Limine
26	Stuart ECF 228	3/24/2023	Defendants' Omnibus Motions in Limine
27	2928	3/24/2023	The Telomer Defendants' Motions in Limine

- 11. I can personally attest that every document identified above required interfacing, and working cooperatively with, the various AFFF MDL Committees, including the Science Committee and Strike Force routinely, to ensure that written arguments were presented with due regard for scientific and factual accuracy and, of course, consistent with prevailing legal precedent and with the highest standards of vigorous advocacy.
- 12. Moreover, the Law and Briefing Committee was likewise consistently assisted by administrative support staff who spent hours ensuring appropriate redactions and sealings were applied to any filings containing materials protected under Case Management Order ("CMO") No. 4 ("Protective Order") [ECF No. 99], as amended by CMOs 4A-4C [ECF Nos. 1523, 2670, and 3611]. These efforts, although largely administrative, were painstaking and time-intensive, especially with respect to the government contractor briefing, which, in total, included the annexation of over two-hundred and fifty exhibits, each of which had to be reviewed for

confidentiality, and, where appropriate, redactions applied.

13. While all the above documents required significant effort on the part of the Law and Briefing Committee, efforts undertaken in both the context of the government contractor defense and the *Stuart* trial are deserving of special mention.

Government Contractor Immunity Defense

- 14. From the outset of the MDL, the Law and Briefing Committee played a critical and foundational role in assisting both the Strike Force and the Government Contractor Committees with their efforts to overcome the government contractor defense.
- 15. The Law and Briefing Committee began to research the government contractor defense in the Spring of 2019, and under your Declarant's coordination, the Law and Briefing Committee, along with the Strike Force and the Discovery Committee, scheduled multiple document-review training sessions intended to educate document reviewers across the country on the importance of the government contractor defense, and to assist them in their efforts to identify documents that could become critical to overcoming the defense. Early on, the Law and Briefing Committee was heavily engaged in ensuring an understanding of the defense across all common benefit attorneys.
- 16. Your Declarant further attests that the Law and Briefing Committee played a significant role in the drafting of each of Plaintiffs' oppositions with respect to the government contractor defense. Specifically, your undersigned oversaw the coordination of both rounds of the government contractor briefing, including working in tandem with the Government Contractor Committee on Plaintiffs' various expert declarations in support of Plaintiff's Opposition to the Defendants' Motion for Partial Summary Judgment on the First Element of the Government Contractor Immunity Defense [ECF No. 2063].

17. The sum total of the opposition briefing with respect to the Defendants' motion for summary judgment on the government contractor defense included the initial round of briefing relating only to the first element of *Boyle*, which included a 50-page brief annexed with 127 exhibits, including three expert declarations. *Id.* The second round of briefing pertaining to the second and third elements of *Boyle* included a 92-page brief annexed with 128 exhibits [ECF No. 2409]. At the August 19, 2022, hearing on the government contractor defense, the Court noted with respect to the government contractor briefing that it was "the best briefing that I've seen in my dozen years on the bench." [Tr. of Oral Argument, Aug. 19, 2022, 57:4-5.]

Stuart Trial

- 18. In connection with the *Stuart* Trial, I can personally attest that the Law and Briefing Committee assisted the *Stuart* trial team and coordinated the drafting and filing of Plaintiff's opposition to Defendants' omnibus motion for summary judgment relating to Plaintiff's damages theories, its nuisance cause of action, and its evidence concerning specific causation. In addition, the Law and Briefing Committee assisted with and coordinated the filing of oppositions to six (6) defendant-specific summary judgment motions that raised various arguments.
- 19. The Law and Briefing Committee likewise assisted in and coordinated the filing of an opposition to Defendants' omnibus *Daubert* motion, which attacked eleven (11) of Plaintiff's fourteen (14) experts.
- 20. Following dispositive motion briefing, the Law and Briefing Committee assisted the *Stuart* trial team with evidentiary motions, including filing seven (7) affirmative motions in *limine* and opposing a nine-part omnibus motion *in limine*, a five-part 3M-specific motion *in limine*, a four-part DuPont-specific motion *in limine*, and an omnibus telomer-defendant motion *in limine*.

- 21. The Law and Briefing Committee likewise worked with the trial team to prepare and submit the Plaintiff's Pre-Trial Brief, which provided the Court with a 30,000-foot view of Plaintiff's claims, as well as an outline of the totality of evidence that Plaintiff intended to use to prove its claims.
- 22. Finally, several members of the Law and Briefing Committee were likewise part of the *Stuart* trial team and on the ground in Charleston, South Carolina, prepared to be on call throughout the duration of the *Stuart* trial, including Law and Briefing Co-Chair Mr. Longer and your undersigned.

Other Matters

- 23. As noted above, the Law and Briefing Committee was tasked with research on various legal issues and concepts that never became the subject of formal motions or oppositions. Its members provided the PEC with legal advice on a variety of topics, including, *inter alia*, the state of the law and analyses on the likelihood of success on various subject matters. These legal analyses pervasively impacted the strategy and decisions that were made in this MDL.
- 24. Furthermore, the Law and Briefing Committee members routinely assisted with the framing and drafting of disputed issues in the monthly Joint Status Reports.
- 25. Finally, the Law and Briefing Committee members were also often recruited to assist in the drafting of governing Case Management Orders.

I declare under penalty of perjury that the foregoing is true and correct.

Executed this 15th day of October, 2023, in New York, New York.

Rebecca G. Newman

Douglas & London, P.C.

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EXHIBIT K

Date Filed 10/15/23 Entry Number 3795-14 2:18-mn-02873-RMG Page 2 of 2

HUNTINGTON NATIONAL BANK 41 SOUTH HIGH STREET COLUMBUS, OH 43216

Huntington Private Bank

ACCOUNT NUMBER:

STATEMENT PERIOD: SEPTEMBER 01, 2023 THROUGH SEPTEMBER 30, 2023

In all the Hereal Aller Level

HUNTINGTON NATIONAL BANK NATIONAL SETTLEMENT FUND TEAM ATTENTION: MELISSA VILLAIN, SVP ONE ROCKEFELLER PLAZA TENTH FLOOR NEW YORK, NY 10020

ACCOUNT NAME: **PWS-1 PFAS WATER PROVIDER**

SETTLEMENT TRUST

ACCOUNT NUMBER:

ADMINISTRATIVE

OFFICER: SUSAN BRIZENDINE

614-331-9804 SUSAN.BRIZENDINE @HUNTINGTON.COM

INVESTMENT

CORP TR DOC GOV INV OFFICER:

INVESTMENT

HUNTINGTON HAS NO INV AUTHORITY OBJECTIVE:

ACCOUNT SUMMARY

	THIS PERIOD		REALIZED CAP	APITAL GAINS / LOSSES	
BEGINNING MARKET VALUE	0.00	0.00		THIS PERIOD	YEAR TO DATE
OTHER CASH RECEIPTS	1,185,004,270.781,	185.004.270.78		THIS PERIOD	TODATE
CHANGE IN VALUE	4,482,735.47	4,482,735.47	TOTAL GAINS / LOSSES	0.00	0.00
ENDING MARKET VALUE	1,189,487,006.251,	189,487,006.25			



2:18-mn-02873-RMG Date Filed 10/15/23 Entry Number 3795-15 Page 1 of 21

EXHIBIT L

TAFT, STETTINIUS & HOLLISTER LLP

950 99

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March 6, 2001

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CERTIFIED MAIL NO: 70000600002406963517 RETURN RECEIPT REQUESTED

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Thomas Voltaggio Acting Regional Administrator United States Environmental Protection Agency Region III 1650 Arch Street Philadelphia, PA 19103-2029

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Darrell V. McGraw, Esq. West Virginia Attorney General's Office State Capital Building Room 26E 1900 Kanawha Blvd., East Charleston, WV 25305

Re: Request For Immediate Governmental Action/Regulation Relating To DuPont's C-8 Releases In Wood County, West Virginia And Notice Of Intent To Sue Under The Federal Clean Water Act, Toxic Substances Control Act, And Resource Conservation And Recovery Act - NOTE: For Inclusion In USEPA Docket No. OPPTS-50639A

Ladies and Gentlemen:

Our law firm represents Wilbur Earl Tennant and Sandra K. Tennant (Route 3, Box 17, Washington, WV 26181, (304) 863-8787), James David Tennant and Della Marie Tennant (Route 3, Box 372, Parkersburg, WV 26101, (304) 863-5428), and Erwin Jackson Tennant (Route 3, Box 17A, Washington, WV 26181, (304) 863-6977) (collectively, the "Tennants") in connection with a lawsuit that is currently pending against E.I. duPont de Nemours & Co., Inc. ("DuPont") in Federal Court in Parkersburg, West Virginia, styled *Tennant v. E.I. duPont de Nemours & Co., Inc.*, Civil Action No. 6:99-0488 (S.D. W.Va.). The Tennants have sued DuPont in connection with the release of various pollutants and contaminants from DuPont's Dry Run Landfill in Wood County, West Virginia. (See Exhibit 133.) The Tennants believe that

such releases have resulted in and continue to result in personal injury and property damage to the Tennants, including the death of several hundred head of the Tennants' cattle and serious health problems for the Tennants.

During the course of the litigation, we have confirmed that the chemicals and pollutants released into the environment by DuPont at its Dry Run Landfill and other nearby DuPont-owned facilities may pose an imminent and substantial threat to health or the environment. More specifically, information currently available to the Tennants confirms that DuPont has been releasing and continues to release into the air, land, and water, including human drinking water supplies, an essentially unregulated, confirmed animal carcinogen known as ammonium perfluorooctanoate (a/k/a C-8/FC-143/APFO/PFOA) (CAS No. 3825-26-1) (hereinafter "C-8"). Hundreds of head of cattle, along with numerous deer, fish, frogs, and other animals, have died in the area affected by the C-8 releases, and area residents exposed to the C-8 releases have been suffering ill health effects that are believed to be associated with C-8 exposure. For example, one of our clients, Wilbur Earl Tennant, has been in and out of the hospital repeatedly over the last few years suffering from respiratory problems, chemical burns, and other health problems after exposure to materials from the Dry Run Landfill.

For the reasons discussed in more detail below, the Tennants hereby request that each of your agencies intervene in the Tennants' pending lawsuit and order the immediate investigation, assessment, containment, removal, and remediation of DuPont's C-8 releases into the environment from the Dry Run Landfill, including an order that DuPont immediately cease and desist all C-8 releases and that appropriate medical care/testing/evaluation be provided to the Tennants. The Tennants also request that DuPont's permit to operate the Dry Run Landfill be immediately revoked and that all operations at that landfill be suspended until adequate scientific demonstrations are made to prove that the C-8 releases have been abated and will not recur.

In addition, the Tennants specifically request that USEPA exercise its authority under TSCA to order DuPont to immediately cease all manufacturing activities involving C-8 until DuPont can prove through appropriate scientific testing and research that its usage of C-8 does not pose an unreasonable risk of injury to health or the environment. In the meantime, the Tennants request that your agencies take those steps necessary to begin regulating C-8 releases into the environment. In that regard, the Tennants request that, at a minimum, USEPA include C-8 among the chemicals that it proposed in October of 2000 to regulate under TSCA on the grounds that the chemicals "may be hazardous to human health and the environment." (See Exhibit 123.) The Tennants believe that the information recently obtained from DuPont regarding C-8's potential threat to human health, (see e.g., Exhibits 71, 125, and 126), warrants regulation of C-8 at least as aggressively as the related perflourinated chemicals manufactured by 3M.

Currently available information also indicates unusual levels of iodide/iodine, along with Triton in Dry Run Creek. (See Exhibit 91.)

This letter also constitutes notice on behalf of the Tennants and a class of other individuals similarly situated of their intent to bring citizen suit claims against DuPont in connection with DuPont's C-8 releases into air, land, and water from DuPont's Washington Works facility in Wood County, West Virginia under the Federal Clean Water Act ("CWA"), Toxic Substances Control Act ("TSCA"), and Resource Conservation and Recovery Act ("RCRA").² The factual and legal basis of such citizen suit claims is explained in detail below.

Additional documentation in support of the basic facts summarized below is available at our offices in Cincinnati, including a chronologically-organized database of the over 110,000 pages of documents produced to date by DuPont on this topic.

I. DuPont Has Used C-8 Primarily At Its Washington Works Plant In Wood County, West Virginia.

C-8 is a perfluorinated detergent/surfactant manufactured in the United States by 3M Company that DuPont uses in connection with its manufacture of Teflon®-related products. (See Exhibits 1 and 118.)³ DuPont has used C-8 as a reaction aid in its production of polytetrafluoroethylene (PTFE) and tetrafluoroethylene (TFE) co-polymers at its Washington Works facility outside Parkersburg, West Virginia since the early 1950s. (See Exhibit 118.) Wastes from the Washington Works' C-8 processes are either vented to the air following incineration, dumped into the Ohio River, sent to DuPont's Chambers Works facility in Deepwater, New Jersey for treatment and discharge, or disposed of at landfills. (See id.) The polymer product manufactured at the Washington Works is either sold directly to DuPont's customers (in the United States and abroad) or transferred to DuPont's Spruance Plant in Richmond, Virginia for use in the production of Teflon® and PTFE-coated fibers or transferred to DuPont's Parlin Plant in Parlin, New Jersey for use in the production of Teflon® finishes, some of which is then used in consumer cookware. (See id.) C-8 may remain in some of the products sold from DuPont's Washington Works, Spruance Plant, and Parlin Plant. (See id.) Some of DuPont's Teflon® materials have been used in medical implants that are inserted directly into the human body. (See Exhibit 132.)

Please note that, although the Tennants already have filed claims against DuPont under the CWA and RCRA, these pending claims relate only to releases from DuPont's Dry Run Landfill. This letter provides notice of the Tennants' intention to also bring separate claims against DuPont under the CWA, TSCA, and RCRA with respect to releases from DuPont's nearby Washington Works plant in Wood County, West Virginia, on behalf of themselves and a class of others similarly situated.

³ ®DuPont's registered trademark.

II. DuPont Has Known That Excessive Exposure To C-8 Causes Adverse Effects.

DuPont has worked closely with 3M since at least the 1970s to investigate the toxic and carcinogenic effects of C-8 on animal and human health. (See id. and Exhibits 2, 24, and 49.) Through such company-sponsored studies, DuPont acquired knowledge by at least the early 1980s that C-8 was toxic and carcinogenic to animals, whether through inhalation, direct skin contact, or ingestion. (See Exhibits 12, 49, and 71.) Around the same time, DuPont also became aware that C-8 is biopersistent/bioaccumulative in animals and humans. (See Exhibits 30, 49 and 71.)⁴

In response to the mounting toxicity data on C-8, and because C-8 was essentially an unregulated chemical that, according to USEPA, had simply "sail[ed] under the agency regulatory radar screen" for decades, (see Exhibit 114), DuPont established in the 1980s its own internal standards for what it considered to be acceptable C-8 exposure levels for humans. For exposure to C-8 via air emissions/inhalation routes, DuPont determined that an "acceptable exposure limit" (AEL) for humans is 0.01 mg/m³ (skin), with an acceptable "community exposure guideline" (CEG) for airborne emissions of 0.0003 mg/m³. (See Exhibits 2-4, and 9.) For human exposure to C-8 through contaminated water, DuPont established a CEG of 1 ppb. (See id.) DuPont also began routine monitoring of the levels of C-8 in the blood of its own employees, including employees at Washington Works, as early as 1981, (see Exhibit 118), and began looking for alternatives to C-8. By 1993, DuPont believed it may have found a viable, less toxic alternative to C-8, (see Exhibit 42), but decided to keep using C-8 anyway.

Later in 1993, a study conducted by the University of Minnesota linked C-8 exposure with increased prostate cancer among human males. (See Exhibits 47 and 51.) By 1996, DuPont also had been informed that new tests were linking C-8 to DNA damage. (See Exhibit 60.) In response, DuPont, 3M, and others commissioned studies to further assess the potential effects of C-8 on humans through tests on monkeys. (See Exhibits 77, 84, 93, and 105.) By November of 1998, DuPont knew that one of the monkeys in the study receiving a 30 mg/kg dose of C-8 was suffering severe health effects. (See Exhibit 90.) By February of 1999, DuPont knew that one of the monkeys involved in the C-8 testing receiving the lowest dose of C-8 (3 mg/kg) had suffered such severe health effects that it had to be sacrificed. (See Exhibit 94.) By May of 1999, DuPont knew that a second monkey in the study had also suffered such severe health effects that it had to be sacrificed. (See Exhibits 103, 105, 107, 108 and 125.) The preliminary monkey study results also confirmed adverse liver effects among all of the monkeys in the study, regardless of exposure levels. (See id. and Exhibits 125 and 126.) Thus, because even exposure to the lowest

DuPont also became aware of evidence as early as 1981 that at least two children born to its Washington Works employees who worked with C-8 while pregnant appeared to have been born with birth defects similar to those observed among rats exposed to high levels of C-8. (See Exhibit 13.)

dose of C-8 during the studies (3 mg/kg) produced adverse observable effects, a "no observable effects level" (NOEL) could not be found for C-8 in primates. (See Exhibits 105, 126.)

3M eventually notified USEPA of the preliminary results of the monkey study in a filing under TSCA, Section 8(e) during November of 1999. (See Exhibit 111.) Within only a few months, USEPA notified 3M that it intended to pursue more rigorous regulation of the perfluorinated chemicals manufactured by 3M. (See Exhibits 113 and 120.) Soon thereafter, 3M publicly announced that it would "voluntarily" withdraw from the market all of its perfluorinated chemical products, including the C-8 that it sells to DuPont for use in DuPont's Teflon® products, and the chemicals 3M uses to make its Scotchguard® products. (See Exhibits 113 and 114.)⁵

After learning that DuPont was one of the principal users of 3M's C-8 product, USEPA's TSCA Division requested in April of 2000 that DuPont supply information regarding DuPont's usage and release of C-8 within the United States. (See Exhibit 112.) DuPont produced some C-8 research data to USEPA on May 25, 2000, (see Exhibit 115), followed by preliminary usage and release information in a letter dated June 23, 2000. (See Exhibit 118.) In its C-8 disclosure letter to USEPA, DuPont confirmed that it has used C-8 primarily at its Washington Works site and that it had released C-8 into the air, water, and land at the Washington Works, into water at its Parlin Plant, Spruance Plant, and Chambers Works, into soils at the Chambers Works, and into soil and water at the "Local," Letart, and Dry Run Landfills owned and operated by DuPont near the Washington Works in West Virginia. (See id.) DuPont did not, however, reference any of the results of the C-8 monkey studies. (See id.) On October 18, 2000, USEPA proposed to begin regulating most of 3M's perfluorinated chemicals under TSCA on the grounds that the chemicals "may be hazardous to human health and the environment." (See Exhibit 123 (65 Fed. Reg. 62319-33 (Oct. 18, 2000)).) USEPA deferred, however, regulation of C-8, pending further review of the information being obtained from 3M and DuPont. After receiving a draft of this letter in November of 2000, DuPont sent revised C-8 usage and release information to USEPA in a letter dated January 25, 2001. (See Exhibit 136.) As of today's date, however, the Tennants are not aware of the results of the C-8 monkey studies having been "finalized" or published.

III. DuPont Promised Not To Dispose Of Toxins Like C-8 In Its Dry Run Landfill.

In the early 1980s, DuPont approached the Tennants seeking to buy several hundred acres of the Tennants' property for the purposes of constructing a landfill near the base of Dry Run Creek in Wood County, West Virginia. (See Exhibit 14.) In response to initial resistance from the Tennants to the idea of selling any portion of their land for a landfill, DuPont promised the Tennants that no hazardous materials would ever be disposed of in the landfill. (See Exhibit 14.) After receiving DuPont's verbal and written assurances that no harmful chemicals would ever be disposed of in the proposed landfill and that the Tennants would be permitted to graze their

⁵ ®3M's registered trademark.

cattle along the adjacent Dry Run Creek,⁶ the Tennants eventually agreed to sell a portion of their property to DuPont for construction of the "non-hazardous" landfill. DuPont received a permit to operate the Dry Run Landfill as an unlined, non-hazardous, solid waste landfill in 1982, and began actual landfilling operations at the Landfill in 1984. (See Exhibit 5.)

IV. DuPont Has Dumped Thousands Of Tons Of C-8 Wastes Into The Dry Run Landfill.

Soon after DuPont began operating the Dry Run Landfill in 1984, DuPont received the results of internal sampling confirming that C-8 was leaching into groundwater beneath three old, unlined anaerobic digestion ponds at the Washington Works that DuPont previously had used for the disposal of thousands of tons of C-8-soaked sludges. (See Exhibits 9, 17, 20, and 31.) DuPont's internal sampling indicated that, not only was C-8 getting into the groundwater that DuPont used for the Washington Works' drinking water, but C-8 also was migrating through the groundwater under the Washington Works and into the Lubeck Public Service District's ("Lubeck PSD's") immediately-adjacent public drinking water wells. (See Exhibits 17, 18, 20, and 31.) Internal DuPont sampling confirmed C-8 in the Lubeck PSD community drinking water supply as high as 1.5 ppb in 1984, (see Exhibits 17, 18, and 20), increasing to as high as 1.9 ppb in 1987, (see Exhibits 19 and 20), and further increasing to as high as 2.2 ppb in 1988 (see Exhibits 27 and 28. See also Exhibit 33.) All of these levels exceed DuPont's own 1 ppb CEG for community drinking water. (See Exhibits 2-4, and 9.)

Upon receipt of those results, DuPont decided to try to remove the source of the C-8 in the public and company drinking water supplies by digging up and removing the sludges from Washington Works' three anaerobic digestion ponds and dumping the tons of C-8-contaminated sludge⁷ into the Dry Run Landfill. (See Exhibits 20, 21, 22, 23, and 26.) After DuPont submitted data to the West Virginia Division for Environmental Protection ("WVDEP") asserting that the sludges were "non-hazardous" under RCRA, WVDEP granted DuPont permission to dispose of approximately 7,100 tons of the sludge in the unlined Dry Run Landfill. (See Exhibits 21, 23, and 25.) DuPont completed the sludge disposal in 1988. (See Exhibit 6.)

Rather than abate the presence of DuPont's C-8 in the public drinking water supply, DuPont simply purchased the Lubeck PSD well property and the wells were moved approximately two miles further down-gradient from the Washington Works. (See Exhibits 9, 30, 31, and 97.) DuPont then notified its employees to immediately cease all sampling of the

DuPont even agreed to lease back to the Tennants for cattle pasture significant portions of the landfill property along the Dry Run Creek. Those leases remained in effect until the Tennants began complaining about the Dry Run Landfill to USEPA. (See Exhibit 5.)

DuPont confirmed C-8 levels as high as 610 ppm in the sludge taken from the three ponds. (See Exhibit 9.)

former Lubeck PSD wells and to destroy all previously-drawn, unanalyzed Lubeck PSD well samples. (See Exhibit 29.)

Also in 1989, WVDEP informed DuPont that new landfill regulations had gone into effect in the State of West Virginia requiring existing, unlined landfills to be upgraded with more rigorous waste containment mechanisms, including liners and more extensive groundwater monitoring well systems. (See Exhibit 32.) In response, DuPont installed a series of new groundwater monitoring wells at its Dry Run Landfill and at its nearby, unlined Letart Landfill in Mason County, West Virginia where DuPont had been disposing of most of its Teflon® and other C-8 wastes from the Washington Works as non-hazardous solid waste since the 1960s. (See Exhibit 121.) After DuPont's initial groundwater sampling at the Letart Landfill confirmed the presence of C-8 at 0.7 ppm, (see Exhibit 9), DuPont began investigating whether any C-8 also was leaching out of the waste at the Dry Run Landfill. (See Exhibit 6.) By April of 1990, DuPont had confirmed that C-8 was, in fact, leaching from the Dry Run Landfill and discharging directly into the Dry Run Creek at levels as high as 1.6 ppm - more than 100 times DuPont's own internal standard for drinking water of 1 ppb. (See Exhibits 9, 35, 37, 41, and 136.) Soon thereafter, DuPont abandoned its efforts to seek a new permit for the Letart Landfill, and notified WVDEP that it had decided, instead, to simply close that landfill "for economic reasons." (See Exhibits 74 and 121.)8 DuPont proceeded, however, with its efforts to get a revised permit for the Dry Run Landfill that would allow DuPont to continue to operate the landfill without having to install a liner. (See Exhibit 50.)

After confirming elevated C-8 levels in the water at Dry Run, DuPont began investigating how to get rid of the approximately 7,100 tons of C-8-contaminated sludge that it dumped into the landfill in 1988, which DuPont assumed was a source of the C-8 being detected in Dry Run Creek. (See Exhibits 7, 8 and 38.) Although DuPont initially notified WVDEP that it would remove the C-8-contaminated sludges from the Dry Run Landfill and dispose of the material at its Letart Landfill, (see Exhibits 36 and 39), DuPont simply moved the sludges to another location within the Dry Run Landfill in 1991. (See Exhibits 5 and 6.)

By the summer of 1993, WVDEP inspectors noticed increasingly excessive amounts of sediment and discoloration building up in the leachate collection ponds at the Dry Run Landfill. (See Exhibit 44.) In response, DuPont, despite knowledge that the leachate contained high levels of C-8 and despite knowledge that the Tennants' cattle were drinking the water in Dry Run Creek, ordered the drains on its leachate collection ponds opened for more than two weeks (after monthly sampling had been completed (see Exhibit 45)), so that the leachate could flow out of

After DuPont finally shut down its unlined, "non-hazardous" Letart Landfill in 1996, it began paying to dispose of its C-8-contaminated wastes at a RCRA <u>hazardous</u> waste facility in Alabama. (See Exhibit 121.)

the ponds and directly into the Dry Run Creek. (See Exhibits 46 and 86.)9 Although WVDEP requested that DuPont submit acute toxicity sampling results for the leachate being discharged out of the sedimentation ponds, (see Exhibit 44), DuPont successfully avoided taking any such samples until four months after the original leachate had drained into the creek. (See Exhibit 48.) The acute toxicity results that DuPont did eventually submit to WVDEP confirmed a 15% mortality, even among neonates exposed to the water four months later. (See id.) In the meantime, dozens of the Tennants' cattle were dying along the Dry Run Creek bed and the Tennants and their family and friends were exposed to C-8.

By the fall of 1994, DuPont had adopted a corporate plan to start routinely dumping C-8 wastes into the Dry Run Landfill, in anticipation of the upcoming closure of its Letart Landfill. (See Exhibit 130.) Thus, in furtherance of this corporate plan, but without any authorization or approval of any kind from WVDEP, DuPont began dumping its C-8-contaminated biocake wastes into the Dry Run Landfill that Fall. (See Exhibits 5 and 86.) According to DuPont's own analyses, the biocake contained 930 ppb of C-8. (See Exhibits 6, 58, 85, and 87.) By the spring of 1995, discolored, foul-smelling water was observed being discharged out of the Dry Run Landfill sedimentation ponds into Dry Run Creek, with almost knee-high suds and foam present along the Dry Run Creek bed, which DuPont assumed contained C-8. (See Exhibits 5, 53, 54, 56, 88 and 91.) At the same time, even more of the Tennants' cattle were dying.

In response to repeated pleas from the Tennants that WVDEP force DuPont to take action to address the black odorous water and foam being discharged into the Dry Run Creek where their cattle were drinking and dying, WVDEP notified DuPont that it would need to start taking steps to address its improper discharges into Dry Run Creek and to upgrade the Dry Run Landfill. (See Exhibits 5 and 57.) After it became evident that little progress was being made by DuPont in response to WVDEP's requests, the Tennants notified USEPA of the problem and provided copies of videotapes showing the discolored foaming water and dead animals along the Dry Run Creek bed. (See Exhibit 61.) Around the same time, the West Virginia Department of Natural Resources contacted DuPont in response to recent reports of numerous deer killed or dying in the area of the Dry Run Creek. (See Exhibit 59.) Despite such complaints, DuPont did nothing to disclose to the Tennants that C-8 was in the Dry Run Creek, nor did DuPont suggest in any way to the Tennants that their cattle should not be drinking the water in the Creek. (See Exhibit 74.) Instead, DuPont kept silent on the C-8 issue and took the position with the public and the regulatory agencies that all of the problems with the creek were simply the result of some high

DuPont also ordered the landfill drain opened in 1989 and again in 1995 so that the contents of the sedimentation pond could flow directly into Dry Run Creek, without any apparent notice to or permission from WVDEP. (See Exhibits 34 and 55.)

Discolored, foaming water continued in Dry Run Creek throughout the remainder of 1995, 1996, 1997, 1998, and into 1999.) (See Exhibits 62, 63, 89, and 92.)

iron sulfide levels that had been fully addressed and completely resolved. (See Exhibits 5, 74, and 78.)¹¹

In October of 1996, USEPA contacted DuPont and informed the company that it would be initiating an inspection of the Dry Run Landfill in response to the recent reports of hundreds of dead cattle and deer in the area of the Dry Run Creek. (See Exhibits 5, 64, and 68.) On the exact same day that DuPont learned of USEPA's pending inspection, Eli McCoy (with WVDEP's Water Division) forwarded to DuPont a draft complaint to aid DuPont in diffusing any potential enforcement action by USEPA relating to the discharge problems at the Dry Run Landfill. (See Exhibits 5 and 65.) Within a matter of weeks, DuPont completed its negotiations with the State and entered a consent decree to bar further governmental enforcement action in exchange for DuPont's payment to WVDEP of a \$200,000 penalty. (See Exhibits 5, 67, and 69.) Soon thereafter Mr. McCoy left WVDEP and began working for the same DuPont consultant that would assist DuPont in complying with the consent decree - Potesta & Associates. (See Exhibits 73.)

As part of the December 1996 settlement with WVDEP, DuPont finally agreed to begin implementing upgrades to the Dry Run Landfill, such as installation of the type of liner that was required under the State's landfill regulations since 1988, and construction of a leachate collection system. (See Exhibits 66 and 69.) DuPont also finally agreed to cease the disposal of its biocake wastes at the Dry Run Landfill. (See id.) Thus, by the time USEPA actually commenced its ecological risk assessment activities in the Dry Run Landfill area in 1997, DuPont allegedly had stopped disposing of its C-8-contaminated biocake sludge at the Dry Run Landfill and had allegedly begun collecting C-8-contaminated leachate from the Landfill for transport to the Washington Works for treatment and discharge directly into the Ohio River. (See Exhibits 5, 70, and 72.)

By the end of 1997, USEPA released to DuPont a draft of its Ecological Risk Assessment Report for the Dry Run Landfill. (See Exhibit 75.) USEPA's report indicated that, although adverse impacts were clearly evident among numerous animals, plants, and other wildlife in the area of the Dry Run Creek, USEPA had not been able to identify any particular known, regulated chemical as the clear cause of the observed problems. (See id. at 52) USEPA, therefore, recommended further assessment and identification of numerous "tentatively identified compounds" that had been detected in various environmental media in the area of Dry Run Creek that might be contributing to the problems. (See id.) In response to the suggestion of further governmental investigation, DuPont immediately requested and USEPA agreed to discuss a "collaborative" effort to further investigate conditions in the area of Dry Run Creek. (See

DuPont's practices with respect to making public the company's knowledge of the toxicity of its products was addressed in detail in <u>In re E.I. duPont de Nemours & Co.</u>, 918 F. Supp. 1524 (M.D. Ga. 1995) (court imposed over \$100 million in sanctions against DuPont).

Exhibits 79 and 83.) Part of that collaborative effort included DuPont's agreement that it would disclose more fully the precise identities of each of the various types of chemicals it had dumped into the Dry Run Landfill that DuPont had not previously identified for USEPA. (See Exhibit 83.) Although DuPont had been monitoring C-8 levels in Dry Run Creek for years and had confirmed C-8 in the water each time, DuPont eventually identified C-8 as being only "possibly" present in the Dry Run Landfill in a list of dozens of chemicals that it sent to USEPA in late 1998 almost a year after the USEPA had completed its draft Risk Assessment Report. (See Exhibit 83.)

Because of USEPA's persistent concerns that something in the Dry Run Creek was killing hundreds of head of the Tennants' cattle, (see Exhibit 78), 13 DuPont also agreed to jointly fund an investigation into the health of the Tennants' cattle. Specifically, DuPont agreed in the Spring of 1999 to create a "Cattle Team" to "independently" investigate such issues. By that time, however, less than a few dozen of the Tennants' cattle were even still alive. The Cattle Team was comprised of three veterinarians selected by DuPont, including Greg Sykes, a DuPont employee who had been involved in DuPont's internal investigations into the effects of C-8 on animals for many years, (see Exhibit 24), and three veterinarians selected by USEPA. (See Exhibit 95.) Despite DuPont's knowledge that C-8 was a toxic animal carcinogen (as reenforced to DuPont by the recent C-8 monkey study results (see, e.g., Exhibits 87 and 166)), that the Tennants' cows were drinking out of Dry Run Creek, the information currently available to the Tennants does not indicate that anyone from DuPont ever disclosed such facts to the other members of the Cattle Team during the course of the Cattle Team's investigation. (See Exhibit 93.) Consequently, there is no evidence that the Cattle Team even considered the potential impact of C-8 on the Tennants' cattle, despite the release of the C-8 monkey study results to DuPont well before the final Cattle Team Report was released in December of 1999. (See Exhibit 109.) Again, DuPont kept completely silent on the C-8 issue and sat back and let the Cattle Team "independently" investigate the health of the Tennants' cattle, even though the USEPA-appointed Cattle Team members would never have any reason even to think to look at C-8.

Over the last several years, while DuPont was working with USEPA on their "collaborative" effort to address environmental problems in the area of Dry Run Creek, several of the Tennants have been in and out of the hospital suffering from respiratory problems, chemical

At around the same time, DuPont, again, ordered the Dry Run Landfill sedimentation pond drain opened, so that the foul-smelling contents could discharge directly into the Dry Run Creek where the few remaining head of the Tennants' "[c]attle were wallowing in the stream just beyond the fence." (See Exhibits 81 and 82.)

At least two other local residents, including at least one current DuPont employee, also have complained that their cattle appear to have been harmed by something in Dry Run Creek. (See Exhibits 54 and 117.)

burns, and other health problems after having been exposed to fugitive air emissions and liquid discharge from DuPont's Dry Run Landfill. Moreover, despite installation several years ago of a leachate collection system that was supposed to prevent contaminants from the Dry Run Landfill from getting into the Dry Run Creek, DuPont's own monitoring reports confirm that C-8 is still getting into the Dry Run Creek with results as high as 87 ppb in the creek, as recently as the Summer of 1999, and as high as 27.6 ppb during the Fall of 2000 – readings more than twenty times DuPont's CEG for C-8 in water. (See Exhibit 134.) Thus, DuPont's own monitoring reports confirm that, despite installation of a purported leachate collection system, there is a continuing, ongoing discharge of high levels of C-8 from the Dry Run Landfill into Dry Run Creek.

V. <u>DuPont Has Known That Its C-8 Wastes Have Leached Into Drinking Water.</u>

In addition to DuPont's failure to disclose to the Tennants or the USEPA-appointed Cattle Team members the full extent of its knowledge regarding the nature, extent, and likely effects upon wildlife of the C-8 it has been releasing and continues to release into Dry Run Creek, the information currently available to the Tennants indicates that DuPont also has not fully disclosed to USEPA, WVDEP, local governmental entities, its neighbors, or the public its knowledge of the full extent of the impact of its C-8 wastes on local drinking water.

As part of its efforts to complete its RCRA Facility Investigation Report ("RFI Report") for the Washington Works, DuPont was required to investigate whether any of its former solid waste management units, including the three anaerobic digestion ponds that were closed in 1988, are contributing to any release of wastes onto neighboring properties and whether any wastes are exposing any persons to unreasonable health risks. (See Exhibits 98 and 99.) In connection with its RFI efforts, DuPont took more samples of the groundwater under the Washington Works site that it uses for drinking water at the Plant. (See Exhibits 10, 11, 76, and 99.) DuPont also arranged for the sampling of groundwater under the neighboring GE Plastics Plant that GE uses for its own plant drinking water. (See Exhibits 10 and 11.) Sampling confirmed C-8 in the Washington Works' drinking water as high as 3.3 ppb14 and as high as 0.71 ppb in the neighboring GE Plastics drinking water supply. (See Exhibits 10, 11, 43, 76, 96, 99, 102, 104,

It is noted that, although DuPont had been sampling three drinking water wells at the Washington Works (wells 331, 332, and 336), when it came time to actually report the results to USEPA in its RFI Report, Dupont was careful to sample only the drinking water well that had previously yielded C-8 results less than 1 ppb (well 336), and conveniently did not even sample the wells that traditionally had yielded the higher C-8 results, nor did DuPont report these higher results in its RFI Report. (See Exhibits 76, 96, 99). Yet, when even the well with the C-8 readings traditionally below 1 ppb yielded a result of 1.9 ppb, DuPont fabricated a new 3.0 ppb "screening level" for C-8 to avoid having to reference any drinking water results exceeding DuPont's own 1 ppb CEG in its own plant drinking water. (See Exhibit 99).

106, 110 and 129.) DuPont even found C-8 as high as 0.8 ppb in the <u>new</u> Lubeck PSD drinking water wells, which are now located approximately two miles farther away from the Washington Works site. (See Exhibits 10-11, 40, and 41.)¹⁵ Recent sampling of the private drinking water wells on the Tennants' property down-gradient from the Dry Run Landfill also has now confirmed C-8 in those drinking water wells. (See Exhibit 131.) DuPont has even investigated what C-8 levels might be present at various cities along the Ohio River, based upon DuPont's ongoing releases of C-8 into the River from the Washington Works facility. (See Exhibits 40, 100, and 118.)¹⁶ Approximately 24,000 pounds of C-8 also is discharged directly into the air every year from the Washington Works Site, although it is not clear that C-8 is actually permitted for such air discharge by DuPont. (See Exhibits 101 and 118.)

Thus, it is evident that the residents living in at least the area near DuPont's Washington Works facility, Letart Landfill, and Dry Run Landfill (the "DuPont Sites") may have been and may continue to be exposed to DuPont's C-8 through DuPont's on-going and continuous releases of C-8 into the air, land, and water at and/or around those Sites, (see Exhibit 80), including direct ingestion of C-8 in the C-8-contaminated drinking water extracted from wells at the Washington Works Plant, the neighboring GE Plastics Plant, the Lubeck PSD well fields, and private residential and agricultural properties near DuPont's Sites.¹⁷ Local wildlife and the environment may be similarly exposed. Despite DuPont's knowledge for years of the nature, extent, and effect of these C-8 releases on human health and the environment, including the

Sampling results from 1991 confirmed C-8 at <u>2.4 ppb</u> in the new Lubeck wells with C-8 levels as high as <u>3.9 ppb</u> in the tap water of several local, Lubeck-area homes. (<u>See</u> Exhibit 128.) Sampling in August of 2000 confirmed C-8 still present in the new Lubeck PSD wells at levels as high as 0.59 ppb. (<u>See</u> Exhibit 119.)

DuPont has been evaluating the levels of C-8 in the Ohio River, which is a source of drinking water for numerous communities, since at least 1982. (See Exhibit 15.)

In August of 2000, after the Tennants had made it known to DuPont that they had become aware of the C-8 in the Lubeck PSD wells, DuPont drafted a letter for the Lubeck PSD to send to its water customers to "disclose" the existence of the C-8. (See Exhibit 124.) In that letter, however, DuPont was very careful to refer only to the current C-8 levels in the current Lubeck PSD wells, and avoided any mention whatsoever of the earlier C-8 readings that were substantially above DuPont's 1 ppb CEG. (See id.) DuPont again was careful to avoid any public disclosure of its knowledge of earlier C-8 drinking water results that were well-above DuPont's 1 ppb CEG in recent statements provided to local Parkersburg newspapers, even though DuPont had received in November a draft of this letter referencing the higher C-8 levels. (See Exhibit 135.)

bioaccumulative/biopersistent nature of the material, ¹⁸ it appears that DuPont has allowed and continues to allow these releases to occur unabated for fear of not being able to continue to make its Teflon® products, if it cannot use C-8. This situation is particularly disturbing, given that DuPont apparently has known of ways to remediate C-8-laden soils since the early 1990s but because of the expense, chose to do nothing "pending further actions that may be dictated by the EPA for remediation of the Washington Works site." (See Exhibit 122.) Even more disturbing is the fact that DuPont has known for years that C-8 levels in the Washington Works and old Lubeck PSD drinking water wells far exceeded its own 1 ppb CEG but has done absolutely nothing in response. DuPont has chosen, instead, to focus either on current, somewhat lower C-8 levels, or to simply fabricate a totally new drinking water "screening level" of 3 ppb for the Washington Works Plant when faced with having to disclose to USEPA in its RFI report for the Washington Works the existence of C-8 in the Plant's drinking water at levels well above 1 ppb. (See Exhibits 99 and 124.)

VI. DuPont Should Be Ordered To Remediate Its C-8 Releases And To Immediately Shut Down Its Manufacturing Processes Involving C-8 Until Adequate Demonstrations Are Made That There Is No Unreasonable Risk To Health Or The Environment.

Over the years, DuPont has successfully avoided fully disclosing the nature and extent of the C-8 problem at its Dry Run Landfill by characterizing C-8 as an unregulated "non-hazardous" waste and/or substance under applicable law. Consequently, when the Federal and State agencies have asked questions about the nature and quantity of toxic wastes handled by DuPont at the Dry Run Landfill, DuPont has omitted any comprehensive discussion of C-8 on the grounds that it is not a "hazardous waste," "hazardous substance," or otherwise listed or regulated waste under current laws. DuPont shrewdly avoided any permit limits on its C-8 emissions and/or dumping at its Washington Works facility and Dry Run Landfill through similar corporate strategies. Thus, although DuPont has known for years that C-8 is an animal carcinogen and bioaccumulative/biopersistent substance, it has continued to knowingly dump thousands of tons of the waste into the environment at unlined, uncontrolled landfills and has allowed the waste to be disposed directly into the air, Ohio River, and local drinking water supplies, arguing that there has not been any improper disposal and/or release of any regulated material.

In addition, DuPont has been careful to refer to the chemical in conflicting, inconsistent ways in its filings with regulatory agencies - sometimes calling it "C-8," sometimes calling it "FC-143," sometimes calling it "PFOA," sometimes calling it "APFO," and sometimes calling it by its full chemical name - "ammonium perfluorooctanoate" - thereby making it difficult for the agencies to understand how all the information interrelates. As confirmed by USEPA's recent

DuPont's own employees even raised concerns about Teflon® customer exposure to C-8 as early as 1983. (See Exhibits 16 and 52.)

proposal to begin regulating 3M's previously-unregulated perfluorinated chemicals, DuPont's past corporate strategy for diverting regulatory attention away from C-8 should stop now.

Based upon the foregoing facts, the Tennants hereby respectfully request that your agencies intervene in the Tennants' pending Federal Court litigation and order the immediate investigation, assessment, containment, removal, and remediation of DuPont's on-going C-8 releases into the environment by virtue of the authority granted to your agencies under at least the following laws and their implementing regulations:

- The Toxic Substances Control Act, as amended, 15 U.S.C. §§ 2601-2692;
- The Federal Clean Water Act, as amended, 33 U.S.C. §§ 1251-1387;
- The Safe Drinking Water Act, as amended, 42 U.S.C. §§ 300f-300j-26;
- The Federal Clean Air Act, as amended, 42 U.S.C. §§ 7401-7671q;
- The Resource Conservation and Recovery Act, as amended, 42 U.S.C. §§ 6901-6992k;
- The Comprehensive Environmental Response, Compensation and Liability Act, as amended, 42 U.S.C. §§ 9601-9675;
- The West Virginia Air Pollution Control Act, W.Va. Code §§ 22-5-1 through 22-5-18;.
- The West Virginia Water Pollution Control Act, W.Va. Code §§ 22-11-1 through 22-11-28;
- The West Virginia Groundwater Protection Act, W.Va. Code §§ 22-12-1 through 22-12-14;
- The West Virginia Natural Streams Preservation Act, W.Va. Code §§ 22-13-1 through 22-13-15;
- The West Virginia Solid Waste Management Act, W.Va. Code §§ 22-15-1 through 22-15-21;
- The West Virginia Hazardous Waste Management Act, W.Va. Code §§ 22-18-1 through 22-18-25; and

• The West Virginia Hazardous Waste Emergency Response Fund Laws, W.Va. Code §§ 22-19-1 through 22-19-6.

The Tennants also request that your agencies exercise their respective authority under the referenced laws to order DuPont to **immediately** cease and desist its C-8 releases into the environment, as addressed in this letter and to provide for immediate, appropriate medical care/testing/evaluation of the Tennants. The Tennants further request that DuPont's permit to operate the Dry Run Landfill be **immediately** revoked until adequate scientific demonstrations are made to prove that the C-8 releases have been abated, will not recur, and pose no unreasonable risk to human or animal health or the environment.

With respect to minimizing harm to the public health and the environment from future C-8 releases, the Tennants hereby specifically request that USEPA exercise its authority under the Toxic Substances Control Act to order DuPont to immediately cease all manufacturing activities using C-8, including DuPont's Teflon® manufacturing operations, until DuPont either confirms that it has stopped its usage of C-8 entirely or has made adequate scientific demonstrations to prove that its continued usage of C-8 (whether from 3M or any other source) does not pose an unreasonable risk of injury to health or the environment. In the meantime, the Tennants request that your agencies take these steps necessary to regulate C-8 emissions/releases to the environment. As mentioned above, the Tennants believe that such steps should include, at a minimum, including C-8 among the list of perfluorinated chemicals that USEPA proposed in October of this year to begin regulating under TSCA on the basis that the chemicals "may be hazardous to human health and the environment." (See Exhibit 123.)

VII. The Tennants Intend To Bring Citizen Suit Claims Against DuPont Under The CWA, TSCA, And RCRA If Appropriate Action Is Not Taken Immediately To Abate And Remediate DuPont's C-8 Releases From Its Washington Works Facility.

As explained above, DuPont has been and continues to discharge C-8 from its Washington Works Facility in Wood County, West Virginia into the air, groundwater, and Ohio River. Moreover, the C-8 discharged by DuPont has been contaminating and continues to contaminate the land, air, and human and animal drinking water supplies.

A. <u>DuPont Is Violating The CWA.</u>

Section 505(a)(1) of the Clean Water Act ("CWA") permits citizens to commence a civil action against "any person ... who is alleged to be in violation of (A) an effluent standard or limitation under this chapter." 33 U.S.C. §1365(a)(1). "Effluent standard or limitation" is defined under the CWA to include, among other things, "a permit or condition thereof issued under Section 1342 of this title," such as state-issued but federally-enforceable NPDES discharge permits. <u>Id</u>. at §1365(F). Based upon information currently-available to the Tennants, DuPont's NPDES permit for its Washington Works facility specifies that DuPont shall not discharge any

effluent in violation of applicable Water Quality Standards. (See, e.g., WV/NPDES Permit No. WV0001279, Conditions A.1 - A.10, C.12, and H.2). The West Virginia Water Quality Standards prohibit DuPont from discharging into surface or groundwaters any "materials in concentrations which are harmful, hazardous, or toxic to man, animal, or aquatic life." W. Va. Code St. R. tit. 46, §46-1-3.2 (2000). Based upon currently-available information, as described above, DuPont has been discharging and continues to discharge C-8 into surface and groundwaters in concentrations exceeding DuPont's own CEG for human drinking water and at concentrations that are otherwise harmful, hazardous, or toxic to man, animal, or aquatic life, constituting a continuing violation of the West Virginia Water Quality Standards, and thereby constituting a continuing violation of DuPont's NPDES permit terms and the CWA. See, e.g., 33 U.S.C. §§1311(a), 1342. Notice is, therefore, hereby provided that the Tennants, on behalf of themselves and a class of others similarly situated, intend to file suit against DuPont, pursuant to Section 505(a)(1) of the CWA, within sixty (60) days of this notice to obtain appropriate relief for the violations of the CWA referenced herein.

B. <u>DuPont Is Violating TSCA.</u>

Section 20(a)(1) of the Toxic Substances Control Act ("TSCA") permits citizens to commence a civil action against "any person . . . who is alleged to be in violation of [TSCA] or any rule promulgated under Sections 2603, 2604, or 2605 of [TSCA], or Subchapters II or IV of [TSCA]." 15 U.S.C. § 2619(a)(1). TSCA requires any "person who manufactures, processes, or distributes in commerce a chemical substance or mixture and who obtains information which reasonably supports the conclusion that such substance or mixture presents a substantial risk of injury to health or the environment" to "immediately" inform USEPA of "such information, unless such person has actual knowledge that" USEPA has been adequately informed of such information. Id. at § 2607(e). TSCA also requires each person who manufactures or processes a chemical substance to comply with the regulations adopted by USEPA under TSCA governing the reporting to USEPA of certain research and adverse health effects information relating to such chemical substances. See id. at § 2607(a), (c), (d); 40 C.F.R. Parts 716 and 717. Failure to comply with such TSCA requirements constitutes a violation of TSCA. See 15 U.S.C. § 2614. As indicated above, the information currently available to the Tennants indicates that DuPont has not reported to USEPA all information within DuPont's possession regarding C-8 that is required to be reported to USEPA under Section 8(a), (c), (d), and (e) of TSCA, 15 U.S.C. § 2607 (a), (c), (d), and (e), such as the results of the C-8 monkey studies and the Tennants' allegations of adverse health effects among themselves, their cattle, and area wildlife arising from exposure to DuPont's C-8. Notice is, therefore, hereby provided that the Tennants, on behalf of themselves and a class of others similarly situated, intend to file suit against DuPont, pursuant to Section 20(a)(1) of TSCA, within sixty (60) days of this notice to obtain appropriate relief for the violations of TSCA referenced herein.

C. DuPont's C-8 Releases From Its Washington Works Facility May Present An Imminent And Substantial Endangerment To Health Or The Environment Under RCRA.

Section 7002(a)(1)(B) of the Resource Conservation and Recovery Act ("RCRA") permits citizens to commence a civil action against:

[a]ny person ..., including any past or present generator, past or present transporter, or past or present owner or operator of a treatment, storage, or disposal facility, who has contributed or who is contributing to the past or present handling, storage, treatment, transportation, or disposal of any solid or hazardous waste which may present an imminent and substantial endangerment to health or the environment.

42 U.S.C. § 6972(a)(1)(B). As discussed above, DuPont's past and on-going disposal of C-8 into soil, water, and air from DuPont's Washington Works Facility has resulted in C-8 in soil, water, and air at and/or around the Washington Works Facility in amounts, levels, and/or concentrations which, based upon the currently-available information, may present an imminent and substantial endangerment to health or the environment. Notice is, therefore, hereby provided that the Tennants, on behalf of themselves and a class of others similarly situated, intend to file suit against DuPont, pursuant to Section 7002(a)(1)(B) or RCRA, within ninety (90) days of this notice to obtain appropriate relief for the imminent and substantial endangerment referenced herein.

Please confirm as soon as possible how your respective agencies plan to address our request for your involvement in this important public health and environmental matter. In that regard, please let us know if you will intervene in the Tennants' Federal Court proceedings or if

you would like to review any of the additional backup documentation maintained here at our Cincinnati offices. We would be happy to meet with you at your offices to discuss this matter in more detail. Thank you.

On behalf of the Tennants,

Robert A. Bilott

RAB/mdm Enclosures

cc: Larry A. Winter, Esq. (West Virginia Counsel for the Tennants) (w/o encls.)

Paula Durst Gillis, Esq. (Counsel for DuPont) (w/ encls.)

(by CERTIFIED MAIL NO: 70000600002406963531, RETURN RECEIPT REQUESTED & REGISTERED MAIL NO: R410009299, RETURN RECEIPT REQUESTED)

Registered Agent for E.I. duPont de Nemours & Co., Inc. (w/o encls.)

(CT Corporation System, 707 Virginia Street, East, Charleston, WV 25301

by CERTIFIED MAIL NO: 70000600002406963500)

H:\TENNANT\RequestLtr.wpd

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EXHIBIT M

Page 1

UNITED STATES DISTRICT COURT

FOR THE DISTRICT OF SOUTH CAROLINA

CHARLESTON DIVISION

FRIDAY, SEPTEMBER 11, 2020

CONFIDENTIAL - PURSUANT TO PROTECTIVE ORDER

CONTAINS HIGHLY CONFIDENTIAL PORTION

Remote videotaped deposition of Stephen Korzeniowski, held remotely at the location of the witness in Point Pleasant Beach, New Jersey, commencing at 9:05 a.m. Eastern Time, on the above date, before Carrie A. Campbell, Registered Diplomate Reporter and Certified Realtime Reporter.

GOLKOW LITIGATION SERVICES
877.370.3377 ph | 917.591.5672 fax
deps@golkow.com

Golkow Litigation Services - 877.370.DEPS

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Page 341
 1
 2
 3
 4
 5
 6
 7
 8
 9
10
11
12
13
14
15
                    (Korzeniowski Exhibit DL262
16
            marked for identification.)
17
      OUESTIONS BY MR. DOUGLAS:
18
                   All right. So I want to show
            Q.
      you -- and you asked me if I -- if you could
19
20
      show me some documents, so I want to show you
      some documents about that now. And let's
2.1
22
      look at DL262.
23
                   And you'll see this is -- start
      at the top -- an e-mail from Stephen H.
24
25
      Korzeniowski, which would be you, correct?
```

```
Page 342
 1
            Α.
                   It is.
 2
            Q.
                   And it was in July of 2002.
 3
                   You see that, sir?
 4
            Α.
                   I do.
 5
            Ο.
                   All right. And the subject is
 6
      "3M re: FYI," and you blind-copied yourself.
 7
                   So I assume you generated this
      and kept a copy in your own business files?
 8
 9
                   I -- I don't have any files,
            Α.
10
      so -- but, yes, that's what it would have
11
      said, yes.
12
            Q.
                 And I meant at the time.
13
            Α.
                   Yes.
14
                   So it says, "I have said this
            Q.
15
      many times: 3M knew what was coming in the
16
      mid-'90s since they had the data."
17
                   First of all, do you remember
18
      writing this e-mail?
19
                   Again, I wrote a lot of
            Α.
20
      e-mails, but the e-mail does look familiar.
2.1
      It is in my own hand, so -- so, yes, I wrote
22
      it.
23
                 Okay. And do you know what
            Ο.
24
      data you're referring to that -- when you say
25
      "3M knew it was coming since the mid-'90s
```

```
Page 343
      since they had the data"?
 1
 2
                   Well, I think if you take a
            Α.
 3
      look a little bit further that, again, this
      is -- what I say here, this is -- this is my
 4
 5
      view, and it's not based on actual facts but
 6
      my interpretation. So I'm basing this on --
 7
      as a scientist and looking at the series of
 8
      events that happened.
                   And so this was -- this was my
 9
      view of things. And as I say very clear,
10
11
      this is my personal view, not the company's.
12
      This is my view.
13
                   MR. DOUGLAS: I'll move to
14
            strike.
                     That wasn't my question.
15
      QUESTIONS BY MR. DOUGLAS:
16
                   I asked you, what is the data
            Q.
17
      that you're referring to in that sentence?
18
                   I believe they had the
            Α.
19
      toxicological data.
20
                   Okay. We took a look at a
            Q.
2.1
      series of tox -- we would agree, even though
22
      you're not a toxicologist, I showed you a
23
      number of toxicological studies earlier
24
      today, rat studies, monkey studies and a dog
25
      study.
```

	Page 344
1 Do you recall?)
2 A. You did, but t	this is this is
3 about PFAS, not about PFOA.	
4 MR. DOUGLAS:	That wasn't my
5 question. Move to st	rike the
6 nonresponsive.	
7 THE WITNESS:	I understand.
8 QUESTIONS BY MR. DOUGLAS:	
9 Q. Then you write	e, "They began
10 their replacement work at t	
11 can see from some other the	
	can you tell us
13 what patents you're referri	-
	e the these are
15 the C4 sulfonates. As I sa	
16 PFAS, and a replacement pro	
17 on C4.	
18 Q. Right.	
	nately and I've
20 been through this with some	
21 But they ultimately failed	
22 product that was a fluor	
23 product sufficient, from th	
24 in terms of performance for	-
25 Is that your u	
	-

```
Page 345
 1
            Α.
                   C4 products did not work very
 2
      well in AFFF, but they did work in other
 3
      markets.
 4
            0.
                   Right.
                   So they were able to continue
 5
 6
      their bigger markets like Scotchgard and
 7
      stuff like that with the C4 chemistry?
 8
                   That was my understanding. But
            Α.
 9
      again, I don't spend a lot of time looking at
10
      3M's business.
                   Okay. That's fine. You're
11
12
      talking a lot about 3M in this -- in this
13
      e-mail, so I want to ask you about it.
                   You write, "They were clever
14
15
      enough to, quote, 'work,' end quote, a deal
16
      with the EPA and appear to volunteer."
17
                   Do you see where you wrote
18
      that?
19
                   T did.
            Α.
20
                   So -- and again, what you're --
            Q.
2.1
      my reading, you tell me if this is -- if I'm
22
      wrong is you're suggesting that it wasn't
23
      really as voluntary as it appears to have
24
      been.
25
                   That's what you're -- that's
```

```
Page 346
      what you're personally expressing in this
 1
 2
      e-mail --
 3
            Α.
                   My personal opinion that this
 4
      was a negotiation.
 5
                   Yeah.
                          I appreciate you,
            Ο.
 6
      because that's what I -- that's exactly how I
      would describe it.
 7
 8
                   And you write, "Yes, I would
 9
      say they are very, very good at what they
      do."
10
11
                   And you do -- you do say, "This
12
      is my view, remember, and it is not based on
      actual facts but my interpretation."
13
14
                   Do you see where I'm reading
      from?
15
16
            Α.
                   I do.
17
            Ο.
                   Okay. But what you mean -- but
18
      you mean your interpretation of events that
19
      you were personally familiar with, right?
20
      Your personal knowledge?
2.1
                   It is my interpretation of the
            Α.
22
      events at the time and looking at the overall
23
      picture of what I saw and how I interpreted
24
      it.
25
                   Okay. I want to go down to
            Q.
```

```
Page 347
 1
      the bottom of this. And I think this is --
 2
      Charles Taylor is part of this e-mail chain.
 3
      And he's quoting from an attachment with
      respect to the 3M voluntary, quote/unquote,
 4
 5
      phase-out.
                   And he writes, "This is my
 6
 7
      favorite part."
 8
                   Do you see where I'm referring
 9
      to?
10
            Α.
                   I do.
11
                   And you were copied on this and
            Ο.
12
      responded to it.
13
                   Do you see the cc?
14
            Α.
                   I do see myself, yes.
15
                   Okay. And then the last
            Q.
16
      paragraph, "The capability is, in fact,
17
      strategic planning...they knew PFOS was dead.
18
      They built an inventory and a technology
19
      before the death occurred...and staged a
20
      voluntary, quote/unquote, green withdrawal,
2.1
      end quote, in the interim. Nicely done."
22
                   Do you see where I'm reading
23
      from?
24
            Α.
                    I do.
25
            Q.
                   So and this would be somebody
```

```
Page 348
      else -- Charles Taylor was also at DuPont at
 1
 2
      the time --
 3
            Α.
                   This was Charles Taylor's
      opinion of how he saw things.
 4
            Q. Okay. And his impression,
 5
      similar to yours, was that this so-called
 6
 7
      voluntary phase-out was really staged and
      wasn't so voluntary, this 3M?
 8
 9
                   This is what -- this is what
            Α.
10
      this Dr. Taylor said.
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
```

EXHIBIT N

Testimony of Daryl Roberts Chief Operations and Engineering Officer, DuPont de Nemours, Inc. Hearing before the House Oversight and Reform Committee Subcommittee on Environment September 10, 2019

Thank you Mr. Chairman and Members of the Subcommittee. My name is Daryl Roberts, and I am the Chief Operations and Engineering Officer for DuPont. I attended Howard University on an ROTC scholarship and earned a degree in chemical engineering. I served as a commissioned Army reserve officer for 8 years, during which time I started my career at Eastman Kodak and earned a Masters in Occupational Health and Safety from the University of Rochester and an MBA from the Rochester Institute of Technology. I then worked in health and safety roles in senior leadership at Arkema, a diversified chemicals company. Just over a year ago, I joined DuPont because I was—and I still am—excited about the opportunity to work for a mission-driven company that is focused on making the planet a better place for my daughters' generation and beyond.

The new DuPont appreciates this opportunity to address the Subcommittee's questions about PFAS. We're pleased to be here today to endorse specific legislative proposals and Congressional efforts to protect public health and the environment.

Let me first explain why I refer to my company as the "new DuPont." As shown in the appendix to my testimony, E. I. du Pont de Nemours and Company—which historically was known as "DuPont"—has evolved and transformed throughout the course of its history, often adding or removing business lines. For example, in 2004, the fibers business became a separate company called Invista, and in 2013, the coatings business became a separate company called Axalta. In 2015, the performance chemicals business became a separate company called Chemours. Chemours took the fluoroproducts technologies, operations, sites, customers, technical expertise and executive leadership. Most recently, historical DuPont merged with The Dow Chemical Company and then split into three separate, independent companies: Dow, Corteva, and the new DuPont, which I represent.

The new DuPont is a specialty products company dedicated to solving some of the world's most important and pressing challenges, including those identified in the United Nations Sustainable Development Goals. For example:

- One in nine people in the world today are undernourished, and we waste about one third of all food—so we have developed technologies to increase the shelf life of food products and probiotics to make food more nourishing;
- About a quarter of all greenhouse gas emissions come from the transportation sector—so we have developed technologies to improve motors and batteries in

electric vehicles and to replace heavy metal automotive parts with lightweight, highperformance transportation resins; and

• We can all agree that our first responders, who put their lives on the line every day to keep our communities safe, deserve the very best protective equipment—so we continue to make best-in-class performance fibers like Nomex® for flame-resistant materials for firefighters and Kevlar® for body armor for police.

We do all of this and more by employing more than 14,000 American workers across 28 states.

The focus of today's hearing is PFAS. The new DuPont does not manufacture PFAS. Like many other companies today, we use some PFAS materials. However, our use is extremely limited. Nevertheless, we recognize these are important issues, and that's why we support legislative proposals addressing PFAS. These are:

- Requiring EPA to set a National Primary Drinking Water Regulation for PFAS under the Safe Drinking Water Act within two years;
- Requiring Toxic Release Inventory reporting on certain PFAS, including PFOA and PFOS;
- Requiring EPA to set pretreatment and effluent standards for PFAS under the Clean Water Act by 2022; and
- Requiring EPA to list PFOA and PFOS as hazardous substances under CERCLA within one year.

We encourage Congress to take swift action to enact these proposals, which are under consideration as part of the 2020 National Defense Authorization Act.

While Congress considers this legislation, we're moving forward with our own commitments. I want to highlight some of those today. As this Subcommittee importantly recognized during its hearing in March, the vast majority of PFAS contamination in the United States is caused by the discharge of firefighting foams containing PFOS. We do not manufacture or sell firefighting foams. However, like countless other companies, we purchase firefighting foams for protection at our facilities. We are committed to ending all use of PFAS firefighting foams at our facilities by the end of 2021.

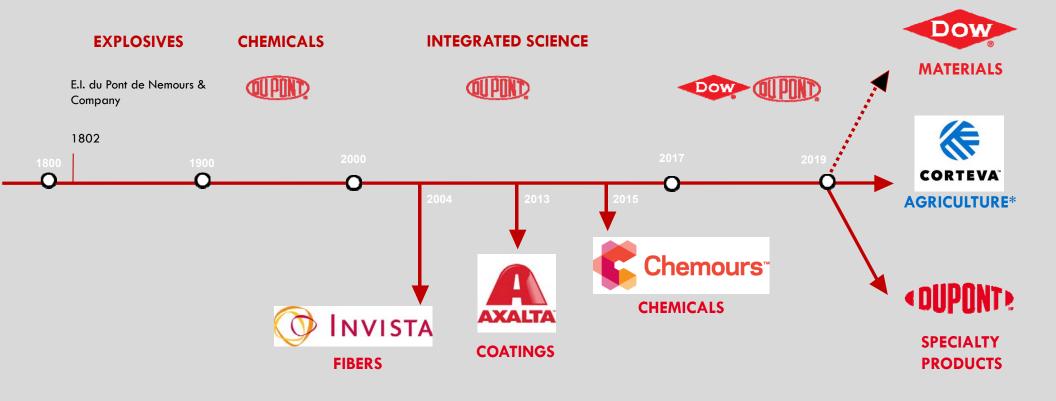
We have also reaffirmed our commitment to not make, buy, or use long-chain PFAS materials. Consistent with that, we will eliminate, by the end of this year, our limited use of long-chain PFAS in recently integrated operations, which is the only instance where we use it today.

Beginning next year, we will provide free access to our product stewardship software. We will also grant royalty-free licenses to others that want to pursue PFAS remediation using our PFAS water treatment resin technologies. And finally, we will fund grants to universities and other research institutes for new, innovative PFAS remediation technologies.

And we are continuing to fulfill our remediation responsibilities at three sites owned by new DuPont where a PFAS footprint has been found.

We look forward to today's hearing about how we can work together to further our shared goals of sustainability, innovation, and responsible product stewardship.

DUPONT'S HISTORY



*Corteva retains the E.I. du Pont de Nemours & Company legal entity 2:18-mn-02873-RMG Date Filed 10/15/23 Entry Number 3795-18 Page 1 of 129

EXHIBIT O

Linda S. Birnbaum, Ph.D., D.A.B.T., A.TS.

CURRICULUM VITAE

Last Updated March 2023

Date and Place of Birth: December 21, 1946; Passaic, New Jersey

Citizenship: United States

Marital Status: Married 1967, three children

Education

June 1967	B.A. (Biology) University of Rochester, Rochester, NY
June 1969	M.S. (Microbiology) University of Illinois, Urbana, IL
February 1972	Ph.D. (Microbiology, Biochemistry minor) University of Illinois, Urbana, IL (Thesis: Localization,
	Enrichment, and in vitro Transcription of Ribosomal RNA genes in Escherichia coli)
1982	Diplomate, American Board of Toxicology, recertified 1987, 1992, 1997, 2002, 2007, 2012, 2018,2023

Brief Chronology of Employment

1972	Visiting Assistant Professor of Microbiology at University of Illinois, Urbana, IL
1973 - 1974	Postdoctoral work at University of Massachusetts, Amherst, MA (Biochemistry)
1974 - 1975	Assistant Professor of Science at Kirkland (Hamilton) College, Clinton, NY
1975 - 1976	Research Associate, Masonic Medical Research Laboratory, Utica, NY
1976 - 1978	Research Fellow, Masonic Medical Research Laboratory, Utica, NY
1978 - 1979	Research Scientist, Masonic Medical Research Laboratory, Utica, NY
1979 - 1980	Senior Staff Fellow, National Toxicology Program, National Cancer Institute, Research Triangle Park, NC
1980 - 1987	Research Microbiologist, National Toxicology Program, NIEHS, Research Triangle Park, NC
1987 - 1989	Supervisory Research Microbiologist, National Toxicology Program, NIEHS, Research Triangle Park, NC
1989 - 1989	Head, Chemical Disposition Group, NIEHS, Research Triangle Park, NC
1989 - 1998	Director, Experimental Toxicology Division, National Health and Environmental Effects Research Laboratory, U.S. EPA, Research Triangle Park, NC
1998 - 1998	Acting Associate Director for Health, National Health and Environmental Effects Research Laboratory, U.S. EPA, Research Triangle Park, NC
1999 - 2008	Director, Experimental Toxicology Division, National Health and Environmental Effects Research Laboratory, U.S. EPA, Research Triangle Park, NC

2001 - 2002	Acting Director, Human Studies Division, National Health and Environmental Effects Research Laboratory, U.S. EPA, Chapel Hill, NC
2002 - 2009	Director, Experimental Toxicology Division, National Health and Environmental Effects Research Laboratory, U.S. EPA, Research Triangle Park, NC
2006- Present	Fellow, June 2006-June 2011; Board member, July 2007-June 2010, Academy of Toxicological Sciences
2008 - 2009 Park, NC	Senior Toxicologist, National Center for Environmental Assessment, U.S. EPA, Research Triangle
2009 –2019	Director, National Institute of Environmental Health Sciences and National Toxicology Program,
Research Triangle Park, NC	
2009 - 2019	Senior Investigator, National Cancer Institute
2019 - Present	Scientist Emeritus, Division of Translational Toxicology, NIEHS
2020 – Present	Scholar in Residence, Nicholas School of the Environment, Duke University

Societies

North Carolina Chapter, Society of Toxicology

Society of Toxicology (President 2004-2005)

American Society for Pharmacology and Experimental Therapeutics

ASPET Division of Toxicology (Chair, 1997-1998)

American Board of Toxicology

American Association for the Advancement of Science

Phi Beta Kappa

Phi Kappa Phi

Sigma X

Academy of Toxicological Sciences

International Union of Toxicology (Vice President 2007-2009)

Society for Risk Analysis

National Academy of Medicine

Interagency Autism Coordinating Committee

Toxicology Forum

Awards

Awaius	
1967-1972	NIH Predoctoral Traineeship
1971	Sigma Xi Award, University of Illinois
1973-1974	Damon Runyon Foundation Postdoctoral Fellowship
1974-1975	Mellon Foundation Research Grant
1976-1978	National Research Service Award
1978-1979	Career Employment and Training Award
1979	Young Investigator Grant - N.I.A.
1991	Scientific and Technological Achievement Award, Level III, U.S EPA
1992	Scientific and Technological Achievement Award, (2 awards) Level III, U.S. EPA
1993	Scientific and Technological Achievement Award, Level III, U.S. EPA
1994	Scientific and Technological Achievement Award, Level III, U.S. EPA (2 awards)
1996	National Wildlife Federation, Special Edition National Conservation Achievement Award
1996	First Ahlborg Memorial Award, Karolinska Institute, Sweden
1998	Scientific and Technological Achievement Award, Level III, U.S. EPA
1999	Best Risk Assessment Paper, SOT, New Orleans, LA
1999	Scientific and Technological Achievement Award, Level II, U.S. EPA
2000	Scientific and Technological Achievement Award, Honorable Mention
2000	Scientific and Technological Achievement Award, Honorable Mention
2001	Diversity Leadership Award, U.S. EPA
2002	Recognized as one of the top 100 cited authors in ISI Pharmacology
2002	U.S. EPA Gold Award for Scientific Achievement in the Health Sciences
2003	Society of Toxicology Risk Assessment Specialty Section (RASS) Blue Ribbon, best abstract
2003	Scientific and Technological Achievement Award, Level II, U.S. EPA
2004	U.S. EPA Bronze Medal (Region 5) to Emerging Pollutants Workshop Planning Group
2004	Society of Toxicology Risk Assessment Specialty Section (RASS) Blue Ribbon, best abstract
2004	Scientific and Technological Achievement Award, Level III, U.S. EPA
2005	Scientific and Technological Achievement Award, Level III, U.S. EPA
2006	Academy of Toxicological Sciences, Fellow
2006	Mid-Atlantic Chapter of the Society of Toxicology (MASOT) Ambassador Award
2006	Environmental Science & Technology Excellence in Review
2006	Society of Toxicology Public Communications Award
2007 - Present	Society of Toxicology Endowment Board
2007 - 2010	President-Elect/President for International Union of Toxicology (IUTOX)
2007 - Present	Official Advisor to the Endometriosis Association
2007 - Present	Editorial Board, Environmental Health Perspectives
2007	Scientific and Technological Achievement Award, Level I, U.S. EPA
2007	Scientific and Technological Achievement Award, Level III, U.S. EPA
2008	Society of Toxicology (SOT) 2008 Women in Toxicology (WIT) Elsevier Mentoring Award
2010	Elected to the Collegium Ramazzini
	_

2010	Honorary Doctorate from the University of Rochester
2010	College of Liberal Arts & Science Alumni Achievement Award, University of Illinois
2010	Elected to the Institute of Medicine of the National Academies of Science
2011	National Institutes of Health Director's Award
2011	Scientific and Technological Achievement Award, Level III, U.S. EPA
2012	Breast Cancer Fund Heroes Award
2012	National Research Center for Women's 2012 Health Policy Hero Award
2012	Scientific and Technological Achievement Award, Level III, U.S. EPA
2012	NIH Children's Environmental Health Network Child Health Science Advocate Honoree
2013	American Public Health Service Homer N. Calver Lecturer Award
2014	Mailman School of Public Health, Columbia University, Granville H. Sewell Distinguished Lecturer
2014	Honorary Doctorate from Ben-Gurion University, Israel
2014	Surgeon General's Medallion 2014
2014	EPA ORD Impact Award: Children's Environmental Health and Disease Prevention Research Centers
2011	
2014	National Institutes of Health Director's Award
2015	Honorary Professor, University of Queensland, Australia
2016	North Carolina Award for Science
2016	NIEHS Champion of Environmental Health Research
2017	Society of Toxicology Distinguished Toxicology Scholar Award
2017	Honorary Doctorate from the Amity University, India
2018	Arnold J. Lehman Award, Society of Toxicology
2018	Mildred S. Christian Career Achievement Award, Academy of Toxicological Sciences
2020	Frank Hatch Environmental Health Leadership Award, Defend Our Health
2021	Honorary Doctor of Science from the University of Rhode Island
2021	2021 Ramazzini Award, Collegium Ramazzini
2022	Society of Toxicology Merit Award
2022	Annual PFAS Meeting Lifetime Achievement Award
2022	Elected AAAS Fellow

Other Activities

1976	Adjunct Professor, Genetics, State University College of Technology, Utica, NY
1977 - 1979	Chairperson, Guest Speaker Program at Masonic Medical Research Laboratory
1978 - 1979	Consultant, Syracuse Research Corporation (detection of carcinogens as mutagens)
1979 - 1983	Member, Executive Board, American Aging Association
1980 - 1981	Vice President, American Aging Association
1980 - Present North Carolina	Adjunct Professor, Department of Environmental Science, School of Public Health, University of
1983 – Present	Curriculum in Toxicology, University of North Carolina
1985 – 1988	Editorial Board, AGE
1988 – 1994	Editorial Board, Environmental Health Perspectives
1989 – 1993	Editorial Board, Toxicology and Applied Pharmacology
1989 – 1993	Executive Committee, Curriculum in Toxicology, University of North Carolina
1992 – 1996	Member of the Chemical Manufacturers Association Butadiene Panel
1993 – 1998	Editorial Board, Environmental Health Perspectives
1993 – 1995	External Advisory Co Committee for NIEHS Planning Grant for an EHS Center
1993 – 2009	Editorial Board, Human and Experimental Toxicology
1994 – 1997	Elected to serve a three-year term on the Executive Committee of the Division of Toxicology, ASPET
1994 – Present	Reviewer for Medical Research Council of Canada Grants
1995 – 1998	CIIT Scientific Advisory Panel
1995 – Present	Adjunct Professor of Toxicology, Integrated Toxicology Program, Duke University
1999 – 2000	Chair, Division of Toxicology, ASPET
1999 – 2009	Editorial Board, Chemosphere
2000 – 2007	Executive Committee, Research Triangle Park Drug Metabolism Discussion Group
2000 – 2004	U.S. Delegate to AMAP/Health Effects Group
2002 – 2006	Board of Directors of SOT as Vice President Elect, Vice President, President, and Past President
2013 – Present	Editorial Board, Environment International
2016 – Present	Editorial Board, Current Opinions in Toxicology
2019 – Present	International Advisory Board Member, INSERM, French National Institute of Health and Medical Research
2021 – Present	International Organizing Committee, Dioxin2022
2021 – Present	International Organizing Committee, BFR2022
2021 – 2026	Professor Adjunct of Epidemiology, Department of Environmental Health Sciences, Yale School of Public Health

Invited Speaker

Liver and Aging, II (Japan, 1982)

SOT (Atlanta, 1984)

Organizer, Annual symposium, American Aging Association (1984)

Butadiene ISSRP Workshop (1985)

Toxicity and Aging Workshop (EPA/NIA, 1985)

Gerontology Society (New Orleans, 1985)

Strain Selection for Carcinogenesis (NIEHS, 1985)

Gerontology Society (Chicago, 1986)

Dioxin '87 (Las Vegas, 1987)

Pharmacokinetics Modeling and Risk Assessment (Asheville, NC, 1988)

ASPET (Montreal, 1988); WHO Workshop on Chemical Toxicity and Aging (Leningrad, 1988)

SOT (Atlanta, 1988)

FASEB (New Orleans, 1989)

North Carolina Academy of Sciences (Raleigh, 1989)

Human Health Effects of Pollution in the Great Lakes (Ontario, 1989)

NCASI Dioxin Research Needs Expert Panel (Rockville, MD,1989)

15th Symposium Environmental Pollutants and Toxicology (Japan, 1989)

PCB Workshop, Health Protection Branch, Health and Welfare (Ottawa, Canada, 1990)

International Cancer Congress (Hamburg, West Germany, 1990)

TEFs for PCBs (Washington, DC, 1990)

Women Administrators in North Carolina Higher Education Spring Forum meeting on "Women in Science" (Durham, NC, 1992)

State of North Carolina, Department of Environment, Health and Natural Resources, Division of Environmental

Management Commission's Water Quality Committee (Raleigh, NC, 1992)

SEGH International Conference on Lead and Other Trace Substances (1992)

Rifkin and Associates "Mechanisms of Dioxin Toxicity: Implications for Risk Assessment (Washington, D.C. 1993)

California Department of Health Services, Hazardous Materials Laboratory (Berkeley, California 1993)

Gordon Research Conference, "Dioxin Toxicity and Risk Assessment" (Meriden, New Hampshire, 1993)

American College of Toxicology (1993)

Health Protection Branch, Health and Welfare, Canada (1993)

Butadiene Peer Review Panel (1993)

HERL First Annual Symposium (1993)

Waste Technologies Incorporated Peer Review Workshop (1993)

North Carolina State Graduate Student Professional Development Workshop (1993)

HERL Symposium (1993)

NIEHS Sponsored Estrogens in the Environment III: Global Health Implications (1994)

National Symposium on Health Research and Needs to Ensure Environmental Justice (1994)

AEERL/ASME Seminar on PIC Formation and Control (1994)

Children's Environmental Health Network (1994)

EPA Colloquium on Environmental Hormones (1994)

NIEHS Second Annual Environmental Careers Symposium (1994)

Chemical Manufacturers Association, Chlorine Chemistry Council (1994)

University of Pittsburgh (1994)

Regional Risk Assessment Meeting (1994)

Great Lakes Human Health Effects Research Symposium (1994)

European Environmental Research Organization (1994)

Pennsylvania State 13th Summer Symposium in Molecular Biology (1994)

Rifkin & Associates (1994); 6th North American ISSX Meeting (1994)

HERL Second Annual Symposium (1994)

American Zoological Society (1995)

Mechanistic Studies - National Toxicology Program (1995)

Chlorination and Drinking Water; Dioxin Roundtable - SOT (1995)

International Joint Commission - Great Lake's Science Advisory Board (1995)

WHO (1995)

Freie University of Berlin (1995)

International Institute of Synthetic Rubber Producers, Inc. (1995)

International Congress of Toxicology (1995)

Working Group on the Assessment of Health Risk for Infants from Exposure to PCDDs, PCDFs, and PCBs (1995)

International Neurotoxicology Conference (1995)

Endometriosis Association (1995)

PCB Assessment Panel (1996)

Dioxin Risk Characterization Working Team (1996)

International Symposium of the Society of Toxicologic Pathologists (1996)

Ulf G. Ahlborg Memorial Lecture at Karolinska Institutes Nobel Forum (1996)

Russian-American Project with scientists, policymakers and citizen Stakeholder Uniting to Reduce dioxin levels in the

Environment and Human Beings, Russia (1996)

Dioxins in the Middle East Workshop, Israel (1996)

69th Meeting of the IARC Monographs Programme on the Evaluation of Carcinogenic Risks to Humans, France (1997)

WHO Workshop on Revision of I-TEFs, Sweden (1997)

Pellston/SETAC Workshop on Chemical Effects on Reproduction, Montana (1997)

ISSX Meeting, SC (1997)

WHO Workshop on TDI for Dioxins (1998)

CIIT Workshop on PBPK Modeling of 1,3-Butadiene (1998)

Dioxin1998, Sweden (1998); Autoimmune Disease Workshop (1998); FQPA Meeting (1999)

Workshop on Steroid Hormones & Brain Function, Breckenridge, CO (1999)

Drinking Water Research Needs Expert Workshop, Leesburg, VA (1999)

Human Exposure Assessment Workshop, Rockville, MD (1999)

College of Pharmacy, Washington State University, Pullman, WA (1999)

Symposium on Man-Made Chemicals/Hormones in the Environmental on Human Health, Mt. Holyoke College, South Hadley, MA (1999)

IPCS Planning Group Meeting on Integrated Risk Assessment, Philadelphia, PA (1999)

13th Working Group Meeting of the Arctic Monitoring and Assessment Program, Toronto, Canada (1999)

Workshop on Criteria for Phasing Out Persistent and Bioaccumulating Organic Chemicals, Stockholm, Sweden (1999)

Workshop on Diversity 2000: Managing the Third Wave (1999)

Endocrine Disruptors and Children's Health, Mt. Sinai School of Medicine, New York (2000)

Living Safely with Chemicals in the New Millennium (2000)

AMAP Workshop, Rovaniemi, Finland (2000)

PAS Proteins/ASPET, Boston, MA (2000)

CMA Workshop Biomarkers, RTP, NC (2000)

ASPET Program Committee (2000)

WHO Integrated Risk Assessment Workshop, Ispra, Italy (2001)

Brominated Flame Retardants (BFR) Stockholm, Sweden (2001)

WHO Expert Meeting on Rapid Assays, Brussels, Belgium (2001)

Conference on Endocrine Disrupters and Human Health, Universidade Independente, Lisbon, Portugal (2001)

Vietnam-United States Scientific Conference on Human Health and Environmental Effects of Agent Orange/Dioxin,

Hanoi, Vietnam (2002)

Federal-State Toxicology and Risk Analysis Committee, Washington, DC (2002)

European Commission Non-dioxin-like PCBs Workshop, Brussels, Belgium (2002)

Brominated Flame Retardants Roundtables, San Francisco, CA (2002)

Federal Women's Program, Women's History Month Event, Research Triangle Park, NC (2003)

Society of Toxicology Annual Meeting, Salt Lake City, Utah (2003)

Federal Women's Program, Women's History Month Event, Research Triangle Park, NC (2003) Brominated Flame

Retardants, Conference & Workshop, San Francisco, CA (2003)

SAIC Conference on Dioxin Threat Assessment, McLean, VA (2003)

Star Progress Review Workshop, Washington, DC (2003)

Senior Executive Service Meeting, Washington, DC (2003)

Emerging Pollutants Workshop, Boston, MA (2003)

Dioxin Workshop, Boston, MA (2003)

Cocktail Effect in Risk Assessment (CeiRA), Stresa, Italy (2003)

PBDE Workgroup, Washington, DC (2004)

19th Annual Regional Risk Assessors Meeting, Boston, MA (2004)

U.S. EPA Region I Risk Assessors, Boston, MA (2004)

PCB Workshop, University of Illinois, Urbana-Champaign, Illinois (2004)

EPSA Science Colloquium, Brussels, Belgium (2004)

ICTX Satellite & ICTX Meeting, Porvoo, Finland (2004)

Dioxin2004, Berlin, Germany (2004)

HEI Biomonitoring, Research Triangle Park, NC (2004)

Bear Mountain Superfund, Bear Mountain, NY (2004)

Region IV ERS, Atlanta, GA (2004)

NRP 50 Bern, Switzerland (2004)

Environmental Influences on the Induction and Incidence of Asthma, Research Triangle Park, NC (2004)

CHPAC Washington, DC (2004)

APHA, Washington, DC (2004)

University of Michigan Dioxin Exposure Study (UMDES) SAB, Ann Arbor, MI (2004-2009)

CASCADE, Orvieto, Italy (2005)

Society of Toxicology Annual Meeting, New Orleans, Louisiana (2005)

Credo Workshop on Endocrine Disrupters, Prague, Czech Republic (2005)

TEFs Re-Evaluation, World Health Organization, Geneva, Switzerland, (2005)

1st International Workshop on Modifiers of Chemical Toxicity, Poros/Athens, Greece (2005)

Children's Environmental Health Research, Research Triangle Park, NC (2005)

Dioxin2005, Toronto, Canada, (2005)

42nd Congress of the Federation of European Toxicologists & European Societies of Toxicologists (EUROTOX2005),

Krakow, Poland (2005)

National Forum on Contaminants in Fish, Baltimore, MD (2005)

Nicholas Institute for Environmental Policy Solutions, Inaugural, Duke University, Durham, NC (2005)

U.S. EPA Region II Science Day, New York, New York (2005)

40th Annual Meeting, American Academy of Environmental Medicine, Tucson, AZ (2005)

North Carolina Society of Toxicology Spring Meeting, 25th Anniversary Celebration, Research Triangle Park, NC (2006)

CASCADE 2nd Annual Meeting, St. Malo, France (2006)

Mid-Atlantic Society of Toxicology (MASOT) Meeting, Scotch Plains, New Jersey (2006)

Gordon Research Conferences, Environmental Endocrine Disruptors, Il Ciocco, Barga, Italy (2006)

28th International Congress on Occupational Health, Milan, Italy (2006)

International Brominated Flame Retardants (BFR) Meeting, Toronto, Canada (2006)

Bisphenol A: An Examination of the Relevance of Ecological, In Vitro and Laboratory Animal Studies for Assessing

Risks to Human Health – An Expert Panel, Chapel Hill, NC, (2006)

Environmental Challenges Meeting, San Francisco, CA (2007)

UCSF-CHE Summit on Environmental Challenges to Reproductive Health and Fertility, San Francisco, CA (2007)

State-of-the-Science Workshop: Issues and Approaches in Low Dose-Response Extrapolation for Environmental

Health Risk Assessment, Baltimore, MD (2007)

NERC Knowledge Transfer Network, 2nd Conference on Persistent Organic Pollutants: Legacy and Current-Use Pops,

The University of Birmingham, Birmingham, UK (2007)

LTIG Meeting, Chicago, IL (2007)

Moving Upstream Workshop, Berkeley, CA (2007)

International Congress of Toxicology, Montreal, Quebec, Canada (2007)

Dioxin2007 Satellite Symposium, Shibuya-ku, Tokyo, Japan (2007)

Dioxin2007 International Symposium, Tokyo, Japan (2007)

International Congress of Toxicology XI, Montreal, Ontario, Canada (2007)

Future Research on Endocrine Disruption, Durham, NC (2007)

NHEERL/OSWER Libby Action Plan Toxicology Studies, OU4 Technical Subgroup Meeting, Libby, MT (2007)

SETAC North America 28th Annual Meeting, Milwaukee, WI (2007)

Society of Risk Analysis 2007 Annual Meeting, San Antonio, TX (2007)

Meeting of the HESI Subcommittee on Risk Assessment for Sensitive Populations, Washington, DC (2007)

47th Annual Society of Toxicology & ToxExpo, Seattle, Washington (2008)

6th Expert Consultation Panel Meeting for Provisional Advisory Levels, Research Triangle Park, NC (2008)

5th PCB Workshop, Iowa City, IA (2008)

10th GRC on EED, PFAA Days, Research Triangle Park, NC (2008)

Woman Taking the Lead to Save our Planet, NIH, Washington, D.C. (2009)

Annual Society of Toxicology Conference, Baltimore, MD (2009)

Columbia Center for Children's Environmental Health Conference, New York, NY (2009)

Brominated Flame Retardants (BFR), Annual Meeting, Ottawa, Canada (2009)

Institute of Medicine Environmental Roundtable Meeting (2009)

Green Chemistry Conference (2009)

National Conversation on Public Health and Chemical Exposures Kick-Off Meeting (2009)

Toxicology Forum (2009)

Developmental Basis for Disease Workshop (2009)

29th International Symposium on Halogenated Persistent Organic Pollutants at Dioxin (2009)

Keynote at the Rachel Carson Legacy Conference, Pittsburgh, PA (2009)

Plenary at ISES Conference, Minneapolis, MN (2009)

Annual NIEHS-NCI BCERC Conference, Oakland, CA (2009)

Thyroid Biomarkers Workshop, San Francisco, CA (2009)

Joint Workshop on Environmental Pollution and Cancer in China and the U.S., Guangzhou, China (2010)

University Research Corridor Conference (2010)

Annual Society of Toxicology Conference, Salt Lake City, UT (2010)

UVA Plastic Project Workshop (2010)

Children's Environmental Health Task Force Workshop (2010)

Teratology Society Annual Meeting (2010)

Genetics and Environmental Mutagenesis Society Meeting, RTP, NC (May 2011)

Health Affairs Environmental Challenges for Health, Washington, DC (May 2011)

Congressman Price Science Panel, RTP, NC (June 2011)

National Medical Association Annual Meeting, Washington, DC (July 2011)

Gordon Research Conference on Cellular & Molecular Mechanisms of Toxicity, Andover, MA (August 2011)

Brussels Fire Retardant Dilemma Symposium, Brussels, Belgium (August 2011)

GlaxoSmithKline Women in Science Annual Meeting, RTP, NC (October 2011)

Los Angeles Community Forum, CA (October 2011)

Duke Integrated Toxicology Environmental Health Program, Durham, NC (November 2011)

Medical University of South Carolina, Charleston, SC (January 2012)

Parkinson's Action Network Panel, Washington, DC (February 2012)

Texas Women's University Annual Celebration of Science, Denton, TX (March 2012)

UNC Women in Science Series, Chapel Hill, NC (March 2012)

Environmental Health Sciences Seminar, UC-Davis, CA (March 2012)

South Atlantic National Research Conference, Raleigh, NC (March 2012)

Society of Toxicology Annual Meeting: Session on Career and Meet the Directors, San Francisco, CA (March 2012)

PPTOX III, Session XI: Future Agenda & Conference Conclusions, Paris, France (May 2012)

EU Conference on Endocrine Disrupters, Seminar & Panelist, Brussels, Belgium (June 2012)

University of Rochester, Toxicology Retreat, Rochester, NY (May 2012)

ENDO 2012, Presidential Symposium, Houston, TX (June 2012)

32nd International Symposium on Halogenated Persistent Organic Pollutants (DIOXIN), Endocrine Disruptor

Chemicals (Chair of session), Cairns, Australia (August 2012)

University of Michigan, Conference on the Developmental Origins of Metabolic Syndrome, MI (October 2012)

Pesticides & The Chesapeake Bay Watershed Project, Reisterstown, MD (October 2012)

Workshop: FutureTox: Building the Road for 21st Century Toxicology and Risk Assessment Practices, Arlington, VA (October 2012)

Association of Schools of Public Health Environmental and Occupational Health Council, San Francisco, CA (October 2012)

APHA, Gulf Oil Spill Session, San Francisco, CA (October 2012)

Breast Cancer and the Environment Research Program (BCERP) Annual Meeting, Keynote Address, San Francisco, CA (November 2012)

Climate Change, Workplace and the Lung Workshop, Keynote Address, Maulana Azad Medical College, New Delhi, India (December 2012)

EHS Research Retreat Global Environmental Health, Johns Hopkins, Baltimore, MD (January 2013)

Toxicology Forum Winter Meeting, Session on Low Dose Effects, Washington, DC (January 2013)

Collaborative Summit on Breast Cancer Research, Panelist, Washington, DC (February 2013)

Environmental Health 2013, Boston, MA (March 2013)

Society of Toxicology Annual Meeting: Session on Career and Meet the Directors, San Antonio, TX (March 2013)

13th International Congress on Combustion By-Products and Their Health Effects, New Orleans, LA (May 2013)

XIII International Congress of Toxicology, Genes and the Environment, Seoul, South Korea (July 2013)

National Environmental Monitoring Conference, Session on Low Dose Exposure of Environmental Chemicals, San Antonio, TX (August 2013)

45th Annual Symposium of the SOT of Canada, Plenary Speaker, Ottawa, Canada (December 2013)

Brunel University, Middlesex, United Kingdom: Keynote Speaker at a Roundtable on the Role of Chemicals in the Fetal Environment & Presenter of a Seminar at the Brunel University (February 2014)

Society of Toxicology Annual Meeting: Session on Career and Meet the Directors, Phoenix, AZ (March 2014)

Environment and Health Fund & Israeli Ministry of Health Meeting, Speaker, Hebrew University, Jerusalem, Israel (May 2014)

Tribal Environmental Health Summit: Building Collaborative Community Networks, Salish Kootenai College, Pablo, MT (June 2014)

Meeting on Women's Health sponsored by Representative Nita Lowey, Speaker, Mercy College, Dobbs Ferry, NY (July 2014)

Green Science Policy Meeting, Chair of Session on TBBPA and Presenting at Session on Integrating Toxicology & Epidemiology, Madrid, Spain (September 2014)

8th International PCB Workshop: PCBs in Schools, Presenter in Session on Anniston Community Health Survey, Woods Hole, MA (October 2014)

PPTOX IV, Opening Session, Boston, MA (October 2014)

Annual Biomedical Research Conference for Minority Students, Speaker at Professional Development Session, San Antonio, TX (November 2014)

APHA Annual Meeting, Speaker at Session on Gulf of Mexico Research Initiative: First 3 Years, New Orleans, LA (November 2014)

U.S. Environmental Protection Agency Cookstove Conference, Speaker on NIEHS Research on Cookstoves, RTP, NC (February 2015)

Tox21 Workshop and Bioassay Roundtable, Society of Toxicology, San Diego, CA (March 2015)

Targeting Environment and Neuro-Developmental Risks (TENDR), Warrenton, VA (June 2015)

Symposium on Endocrine Disrupting Chemicals, Tokyo, Japan (July 2015)

IX Congress of Toxicology in Developing Countries, XIX Congresso Brasileiro de Toxicologia, Natal, Brazil (November 2015)

International Society for Children's Environmental Health, Cuernavaca, Mexico (January 2016)

Society of Toxicology, New Orleans, LA (March 2016)

Invited Keynote Speaker, University of Wisconsin Madison Symposium: Toxicology and Urology (April 2016)

Speaker, Trans-NIH Transgenerational Inheritance Workshop (April 2016)

Opening Speaker at the NTP Workshop "Addressing Challenges in the Assessment of Botanical Dietary Supplement Safety," Bethesda, MD (April 2016)

Opening Remarks at TaRGET II Consortium Grantee Meeting, NIEHS, NC (May 2016)

Invited Speaker at the 2016 Tribal Environmental Health Summit, Flagstaff, AZ (June 2016)

Speaker, Appalachia/Kentucky Community Forum, Lexington & Hazard, Kentucky (July 2016)

Presented 5 talks at Dioxin 2016, Florence, Italy, and 2 talks at 28th Conference of the International Society for Environmental Epidemiology, Rome, Italy (August 2016)

Invited Speaker, Annual Regulatory Summit for American Home Furnishings Alliance, Hickory, NC (September 2016)

Speaker, Scientific Advisory Committee on Alternative Toxicological Methods (SACATM), NIEHS, NC (September 2016)

US Chapter of International Society for Developmental Origins of Health and Disease (DOHaD), Detroit, MI (October 2016)

The Korean Academy of Science and Technology (KAST), Seoul, Korea (November 2016)

Research and Policy Needs for Environmental Health Workshop, Israel Institute for Advanced Studies, Givat Ram, Israel (January 2017)

Society of Toxicology 56th Annual Meeting and ToxExpo Global Collaboration, Boston, MA (March 2017)

Society of Toxicology 56th Annual Meeting and ToxExpo Distinguished Toxicology Scholar Award Lecture, Boston, MA (March 2017)

US Senate Appropriations Subcommittee on Interior, Environment and Related Agencies Briefing on NIEHS Superfund Activities, Washington, DC (June 2017)

37th International Symposium on Halogenated Persistent Organic Pollutants - Dioxin 2017, Vancouver, British Columbia (August 2017)

Collegium Ramazzini Days, Carpi, Italy (October 2017)

Keynote Speaker at the 2017 American College of Toxicology Annual Meeting, Palm Springs, CA (November 2017) 12th Annual Breast Cancer and the Environment Research Program Meeting, Monrovia, CA (November 2017)

Keynote Speaker at the International Conference on Impact of Environment on Women's Health, Lucknow, India (November 2017)

Keynote Speaker at the Environmental and Health Fund Annual Conference, Jerusalem, Israel (December 2017)

Keynote Speaker at the American Academy of Allergy, Asthma and Immunology Meeting, Orlando, FL (March 2018)

Society of Toxicology Annual Meeting and Tox Expo, San Antonio, TX (March 2018)

Keynote Speaker at Baylor College of Medicine, Houston, TX (April 2018)

Toxicology and Risk Assessment Conference, Cincinnati, OH (April 2018)

Keynote Speaker at International Conference on Medicine One Science (ICOMOS), Minneapolis, MN (April 2018)

Closing Plenary at Tribal Environmental Health Summit at Oregon State University, Corvallis, Oregon (June 2018)

EHS Core Center and Community Forum, Davis, CA (July 2018)

American Association for Clinical Chemistry Annual Meeting and Clinical Lab Expo, Chicago, IL (August 2018)

ISEE/ISES Conference, Ottawa, Canada (August 2018)

Federal Hearing: The Federal Role in the Toxic PFAS Chemical Crisis, Washington, DC (September 2018)

North Carolina Central University Class Lecture, Durham, NC (October 2018)

ExxonMobil Biomedical Sciences, Inc., Annandale, NJ (October 2018)

National Academy of Medicine's 48th Annual Meeting, Washington, DC (October 2018)

University of Texas El Paso's 2017-2018 Centennial Lecture Series, El Paso, TX (October 2018)

Collegium Ramazzini Days, Carpi, Italy (November 2018)

Environment & Breast Cancer Transforming Data into Action Community Forum, Washington, DC (November 2018)

Sociedad de Toxicología de Chile Meeting, Valparaíso, Chile (November 2018)

George Washington University Seminar - Toward a Toxic-Free Supply Food Chain: Identifying Data Gaps and

Opportunities for Action, Washington, DC (December 2018)

Keynote Speaker at Health Canada Science Forum, Ottawa, Canada (January 2019)

Celsius-Linnaeus Lecture and Symposium at Uppsala University, Uppsala, Sweden (February 2019)

Tribal Environmental Health Summit, Tucson, AZ (February 2019)

Arizona Disaster Research and Response Exercise, Tucson, AZ (February 2019)

Society of Toxicology Annual Meeting, Baltimore, MD (March 2019)

Federal Hearing: Senate Environment and Public Works Committee Hearing on PFAS, Washington, DC (March 2019)

NC Central University's Women's Health Awareness Conference, Durham, NC (April 2019)

Lecturer at University of North Carolina Chapel Hill, Chapel Hill, NC (April 2019)

PFAS and Other Emerging Contaminants Conference, Raleigh, NC (April 2019)

Keynote Speaker at Northeastern University's PFAS Conference, Boston, MA (June 2019)

Keynote Speaker at Unwrapped: The Health Threats of Plastics and Food Packaging Chemicals, Scotts Valley, CA (June 2019)

Water Quality Community Forum and Tour at University of Iowa, Cedar Rapids, IA (June 2019)

EHS Core Center Meeting, Cedar Rapids, Iowa (June 2019)

Triangle Global Health Consortium, Research Triangle Park, NC (October 2019)

University of Modena, Modena, Italy (October 2019)

Collegium Ramazzini (Carpi, Italy (October 2019)

House Science Committee Congressional Briefing, Washington DC (November 2019)

University of Tel Aviv, Israel (December 2019)

HERA, Barcelona (January 2020)

ANSES, Paris (February 2020)

Ichan Mt Sinai School of Medicine, NY (March 2020)

FREIA, Paris (February 2020)

Pittsboro, NC Town Council (October 2020)

North Carolina State University (October 2020)

Southern California University School of Public Health (November 2020)

Defend Our Health (December 2020)

Yale University School of Medicine- Pediatric Grand Rounds (January 2021)

Yale University School of Public Health (February 2021)

Wisconsin Environmental Health Network (February 2021)

Wayne State University (February 2021)

New Hampshire Safe Water Alliance (March 2021)

Chicago Center for Health and the Environment, UICC (March 2021)

State of Maine Legislature (April 2021)

Council of Scientific Society Presidents (May 2021)

University of Pittsburgh School of Public Health Commencement Address (May 2021)

Columbia River Basin Restoration Program (May 2021)

Western Washington University (June 2021)

ISCHE Fluoride Webinar (June 2021)

NAS PFAS panel (July 2021')

EWG Conference on PFAS (July 2021)

University of Paris (November 2021)

Alaska Community Against Toxics (2021)

Michigan State University (January 2022)

Public Health Summit, Pittsburgh (February 2022)

State of Maryland Legislature (February and March 2022; February and March 2023))

State of Alaska Legislature (February 2022)

Invited Symposium/Workshop Speaker

Duke University (1982)

University of Buffalo (1983)

Rutgers University (1984)

EPA (Washington, DC, 1985)

University of Arizona (1985)

Duke VA (1986)

University of Nebraska (1986)

CIIT (1987)

Texas A&M University (1987)

St. John's University (1987)

Veterans Administration Medical Center, St. Louis (1987)

NTP Executive Committee (1988)

Senate Committee on Environment and Public Works (Staffers) (1989)

Health Effects Research Laboratory, Research Triangle Park, NC, 1989)

USEPA, Washington, DC (1989)

NIEHS Research Day, Research Triangle Park, NC (1989)

Duke University, Durham, NC (1990)

University of North Carolina, Chapel Hill, NC (1990)

Virginia Polytechnic Institute and State University (1990)

EOHSI; Panelist at the GLO 9 Graduation Program, Rutgers University (1991)

Cornell University (1991)

Colorado State University (1991)

Health Effects Institute (1991)

Toxicology Forum (1991)

Harvard School of Public Health (1991)

Symposium on the Health Effects of Gasoline (1991)

The Toxicology Forum (1992)

University of Connecticut (1992)

World Wildlife Fund (1992)

Genetic Toxicology Association Spring Meeting (1992)

North Carolina's Environmental Management Commission (EMC) Water Quality Committee (1992)

SEGH International Conference on Lead and Other Trace Substances (1992)

Harvard School of Public Health (1992)

University of Kansas Medical Center (1992)

Association for Governmental Toxicologist, Society for Environmental Geochemistry and Health (1992)

University of Texas (1992)

American Association for the Advancement of Science (1993)

Society of Toxicology (1993)

Air and Waste Management Association (1993)

Invited twice to NIEHS (1993)

International Congress on Health Effects of Hazardous Waste (1993)

National Conference on Dioxin (1993)

Committee to Coordinate Environmental Health and Related Programs (1993)

Duke University School for the Environment (1993)

Great Lakes Water Quality Board Meeting (1993)

NC State University Graduate Student Professional Development Workshop (1993)

Environmental Defense Fund (1993)

American College of Toxicology (1993)

Health Protection Branch, Health and Welfare Canada (1993)

Illinois Environmental Health Association (1993)

University of Illinois (1993)

Environmental Health Protectorate, Canada (1994); University of Pittsburgh (1994)

Chlorine Chemistry Council (1994)

NIEHS Second Annual Environmental Careers Symposium, Research Triangle Park, NC (1994)

Dioxin Reassessment Press Conference, Washington, DC (1994)

Dioxin Reassessment Press Conference, Chicago, Illinois (1994)

EPA Region 5 Dioxin Reassessment Press Conference (1994)

University of California, Davis, CA (1994)

Durham-Chapel Dietetic Association (1994)

North Carolina State University Workshop (1994)

Duke University Occupational Medicine Seminar Series (1994)

University of Kentucky, Graduate Center for Toxicology & Sigma Xi (1994)

NCSOT (1994)

National Academy of Sciences (1994)

Southern Illinois University (1994)

Air & Waste Management Association (1994)

North Carolina Bar Association (1995)

Cornell University (1995)

North American Commission for Environmental Cooperation (1995)

Tribal Council - St. Regis Mohawk Tribe Environment Division (1996)

National Wildlife Conservation (1996)

American Chemical Society (1996)

West Virginia University, Department of Pharmacology & Toxicology (1996)

University of Illinois (1996)

Cincinnati Medical Center - Institute of Environmental Health (1996)

International Symposium Dioxins and Furans, Heidelberg, Germany (1996)

University of Michigan - Consultant Program (1997)

NC State University - SCI-LINK Teachers Day, Raleigh, NC (1997)

Dosimetry for Persistent Chemicals, Washington, DC (1997)

University of Buffalo - Buffalo environmental health Sciences Conference, Buffalo, NY (1997)

Health Conference '97, Montreal, Canada (1997)

Dioxin '97 Symposium on Chlorinated Dioxins and Related Compounds, Indianapolis, IN (1997)

Southern Illinois University - Betram W. Carnow Memorial Symposia (1997)

50th Anniversary of the Korean Society of Pharmacology; The Dioxin Conference;

Pohang University, Seoul, Korea (1997)

Lineberger Cancer Center, University of NC at Chapel Hill (1998)

Endocrine Disruptor Workshop, Raleigh, NC (1998)

Chemical Mixtures Colloquium, Washington, DC (1998)

University of NC Research Integrity Conference (1998)

Butadiene Annual Research Review Meeting, Houston, TX (1998)

Cell Signaling Workshop, RTP, NC (1998)

Workshop on Ah Receptor-Controlled Responses in Tumor Promotion,

Germany; University of Maine, Orono, ME (1998)

Risk Characterization of Dioxin, EPA, RTP, NC (1998)

NIEHS/NTA Science Fair, RTP, NC (1998)

AMSA National Convention, Chicago, IL (1999)

Graduate Student Convocation, ASPET Meeting, Washington, DC (1999)

Washington State University, Pullman, WA (1999)

Environmental Mutagen Society (2000)

Bowman Gray School of Medicine (2000)

Endometriosis 2000, London (2000)

University of Wisconsin, Madison (2000)

Physicians for Social Responsibility, Washington, DC (2000)

Ecology and Health Conference, Raleigh, NC (2000)

Dioxin 2000, Monterey and Berkley, California (2000)

American Public Health Association Annual Meeting (2000)

University of New Mexico Toxicology Program (2000)

Cornell University (2001)

University of Zurich (2001)

Karolinska Institute (2001)

Local Motion, Detroit, MI (2001)

Michigan Department of Environmental Quality (2002)

University of Illinois, Chicago (2002)

North Carolina State University (2003)

Loma Linda University, CA (2003)

Boston City Council, Boston, MA (2003)

Boston City Council on Dioxin, Boston, MA (2003)

Research Triangle Park Career Evaluation, Research Triangle Park, NC (2003)

University of California at Los Angeles (2004)

Harvard Seminar, Boston, MA (2004)

EMS Panel Debate, Washington, DC (2004)

Duke University Integrated Toxicology Program, Durham, NC (2004)

Lone Tree Council, Saginaw Bay Watershed, Saginaw, MI (2005)

Porter School of Environmental Studies and Haifa University, Israel (2005)

Michigan Department of Environmental Quality, Midland, Michigan (2005)

University of Southern Maine, Portland, Maine (2005)

North Carolina State University, Dept. of Environmental and Molecular Toxicology Seminar, Raleigh, NC (2006)

Southwestern Medical University, Dallas, TX (2006)

University of Wisconsin, Madison, WI (2006)

DECA, Washington, DC (2006)

University of Michigan, Ann Arbor, Michigan (2006)

Brominated Flame Retardants (BFR), Washington, DC (2006)

Environmental Partnership Summit, Research Triangle Park, NC (2006)

232nd American Chemical Society Meeting & Exposition, San Francisco, CA (2006)

Weybridge + 10 Workshop, Helsinki, Finland (2006)

International Conference on Food Contaminants and Neurodevelopmental Disorders, Valencia, Spain (2006)

PALs Meeting, Crystal City, Arlington, VA (2006)

East Carolina University (2007)

U.S. EPA Region 8, Denver, CO (2007)

NIEHS Meeting, Research Triangle Park, NC (2007)

P.O.P. Culture, Santa Monica, CA (2007)

Evaluation of the human relevance of modes of action in animals,

University of North Carolina, Chapel Hill, North Carolina (2008)

Evaluating the human relevance of modes of action in Animals Workshop, ILSI Research Foundation University of North Carolina, Chapel Hill, NC (2008)

Duke ITP, Duke University, Durham, North Carolina (2008)

Indiana University, Bloomington, Indiana (2008)

National Public Radio (2009)

Frontline (2009)

CNN (2009)

Summers of Discovery Seminar Series, Research Triangle Park, NC (2009)

Computational Toxicology Webinar Series, Research Triangle Park, NC (2009)

National Conversation on Chemical Exposures, Washington, DC (2009)

Great Lakes Green Chemistry Network Seminar, College Park, MD (February 2010)

UNC Institute of the Environment, Chapel Hill, NC (March 2010)

University of Virginia Plastic Project, Charlottesville, VA (April 2010)

University of Illinois at Chicago School of Public Health (May 2010)

Wake Forest University, Wake Forest, NC (October 2010)

James L. Whittenburg Lecture, Boston, MA (December 2010)

Cutting Edge Research on Environmental Health, Israel (February 2011)

University of Haifa, Israel (February 2011)

University of Washington School of Public Health, Seattle, WA (March 2011)

Congressman Price Science Panel, Research Triangle Park, NC (June 2011)

Los Angeles Community Forum, CA (October 2011)

Duke Integrated Toxicology Environmental Health Program, Durham, NC (November 2011)

Texas Women's University Annual Celebration of Science, Denton, TX (March 2012)

University of Montana, Missoula, MT (May 2012)

The Horizons @ Heinz, Heinz, Center, Washington, DC (May 2012)

AAAS Barnard Lecture, Washington, DC (May 2012)

University of Rochester, Toxicology Retreat, Rochester, NY (May 2012)

Eunice Kennedy Shriver National Institute of Child Health and Human Development Washington, DC (November 2012)

University of Puerto Rico, San Juan, PR (February 2013)

Panelist on two panels at the Panels on Women's Cancers, Hosted by Fran Drescher, with Representative Deutch, Washington, DC (September 2013)

44th Annual Homer N. Calver Lecturer, APHA, Boston, MA (November 2013)

University of North Carolina Chapel Hill, School of Public Health, Chapel Hill, NC (March 2014)

Department of Molecular Biomedical Sciences Seminar Series, North Carolina State University, Raleigh, NC (April 2014)

U.S. Environmental Protection Agency Cutting Edge Speaker Series, RTP, NC (April 2014)

Rockland County Office of Aging, Invited to Speak to the AARP Group by Representative Lowey (NY) on the Environment and NIEHS, Rockland County AARP, Rockland County, NY (April 2014)

Mailman School of Public Health, Sewell Lecture Series Guest Lecturer, Columbia University, New York City, NY (April 2014)

Toxicology Scholars Colloquium Guest Lecturer, School of Pharmacy, University of Connecticut; Storrs, CT (April 2014)

Ben-Gurion University of the Negev, Seminar, Beer-Sheva, Israel (May 2014)

Environment and Health Fund & Israeli Ministry of Health Meeting, Hebrew University, Jerusalem, Israel (May 2014)

Meeting on Women's Health sponsored by Representative Lowey, Mercy College, Dobbs Ferry, NY (July 2014)

North Carolina State University Distinguished Speaker Series, Raleigh, NC (September 2014)

Yale University, Environmental Health Seminar Series, New Haven, CT (December 2014)

Office of Budget Management Tour of the National Center for Advancing Translational Sciences (NCATS) Tox21 Facility, Speaker on Tox21 Accomplishments, Rockville, MD (April 2015)

Invited Lecturer, NIH Leaders Seminar Series, University of Illinois at Urbana-Champaign, IL (April 2015)

Welcome Speaker, Women's Health Awareness Day, North Carolina Central University, NC (April 2015)

Georgetown University, Washington, DC (April 2015)

Brooklyn Community Conversation on Toxics, Climate Change & Health, Brooklyn, NY (May 2015)

Elucidating Environmental Dimensions of Neurological Disorders and Diseases: Understanding New Tools from Federal Chemical Testing Programs, University of California Davis, Davis, CA (June 2015)

Weill Cornell Medical School, New York, NY (February 2016)

Icahn School of Medicine at Mount Sinai, New York, NY (March 2016)

Invited Speaker, Fogarty Scholars and Fellows Orientation, Bethesda, MD (July 2016)

Invited Speaker, Northeastern University, Boston, MA (July 2016)

Triangle Global Health Consortium Annual Conference, Chapel Hill, NC (September 2016)

Research! Louisville 2016, University of Louisville, KY (October 2016)

Virginia Tech Carilion Research Institute, Roanoke, VA (October 2016)

Global Climate Change: Interdisciplinary Perspectives, University of North Carolina, Chapel Hill, NC (October 2016)

Friend of NIEHS 50th Anniversary Congressional Briefing, Washington, DC (November 2016)

Autism Grantee Meeting, Durham, NC (December 2016)

Environmental Health Science FEST, Durham, NC (December 2016)

Annual Friends of NIEHS Annual Meeting, Washington, DC (January 2017)

Jewish Community Center, Durham, NC (February 2017)

Center for Human Health and the Environment Science Symposium,

North Carolina State University, Raleigh, NC (February 2017)

Interagency Coordinating Committee on the Validation of Alternative Methods (ICCVAM) Workshop on Modernizing the Safety Assessment of Drugs and Chemicals, Bethesda, MD (February 2017)

Penn State Institutes for Energy and the Environment, Penn State University, University Park, PA (April 2017)

Keynote Address at Environmental Justice and the Future of Environmental Health Research, Rutgers University, New Brunswick, NJ (April 2017)

RTI Fellows Program Distinguished Lecture, Research Triangle Park, NC (May 2017)

Northeastern University Poly-Fluoroalkyl Substances (PFAS) Conference, Boston, MA (June 2017)

Fogarty Global Health Fellows Program Orientation, Bethesda, MD (July 2017)

Environmental Mutagenesis and Genomics Society Annual Meeting, Raleigh, NC (September 2017)

University of Buffalo, Buffalo, NY (September 2017)

Colorado State University, Fort Collins, CO (September 2017)

Triangle Global Health Consortium Annual Conference, Durham, NC (September 2017)

Michael J Fox Foundation, Washington, DC (January 2018)

Friends of NIEHS Annual Meeting, Washington, DC (January 2018)

Winter Toxicology Forum, Washington, DC (January 2018)

Triangle Global Health Consortium Career Day, Durham, NC (February 2018)

All Federal Coordination of PFAS, Bethesda, MD (February 2018)

NASEM Workshop: Informing Environmental Health Decisions through Data Integration, Washington, DC (February 2018)

NIEHS Superfund Congressional Briefing, Washington, DC (March 2018)

Friends of NIEHS Congressional Briefing on Neurological Disease, Washington, DC (March 2018)

Understanding the Combined Effects of Environmental Chemical and Non-Chemical Stressors: Atherosclerosis as a Model Workshop, Research Triangle Park, NC (April 2018)

Women's Health Awareness Day, Durham, NC (April 2018)

Earth Day Science and Music Event, Durham, NC (April 2018)

NIEHS Career Symposium, Research Triangle Park, NC (May 2018)

Free Radicals: Past, Present, and Future, Research Triangle Park, NC (May 2018)

NC Women of Color Research Network First Annual Spring Conference, Research Triangle Park, NC (May 2018)

NC State and NIEHS Summer Research Program, Research Triangle Park, NC (June 2018)

Congressional Briefing with HHS Deputy Secretary and NIH on NTP Systematic Review of Monograph on Sarin, Cell Phone Radiofrequency Radiation, CLAIRTY_BPA, Report on Carcinogens 15th Edition,

Washington, DC (July 2018)

PFAS Congressional Briefings with the Office of U.S. Senator Gary Peters of Michigan and the Office of U.S. Senator Jeanne Shaheen of New Hampshire, Washington, DC (July 2018)

Assembly of Scientists Summer Meeting, Research Triangle Park, NC (August 2018)

Developing a Data Science Competent EHS Workforce Workshop, Research Triangle Park, NC (August 2018)

Swedish Toxicology Sciences Research Center (SWETOX) Academy Workshop, Stockholm, Sweden (August 2018)

Science and Policy of Organohalogens Workshop, Ottawa, Canada (August 2018)

Metabolomics Common Fund Kick Off, Research Triangle Park, NC (September 2018)

NTP Workshop on Circulating, Cell-free DNA as a Strategy to Identify Novel Biomarkers and Mediators of Inflammation in Environmental Exposures and Disease, Research Triangle Park, NC (September 2018)

Environmental Epidemiology Workshop w/Health and Environmental Sciences Institute, Research Triangle Park NC (October 2018)

Friends of NIEHS Congressional Briefing for Child Health Month, Washington, DC (October 2018)

ORWH Pearls of Wisdom Video Interview, Washington, DC (October 2018)

NC Scholars Connect Program Seminar, Research Triangle Park, NC (October 2018)

NIEHS and EPA Children's Center Meeting, Research Triangle, Park, NC (October 2018)

Assembly of Scientists Winter Meeting, Research Triangle Park, NC (December 2018)

National Academy of Sciences Workshop: ESEHS Workshop 1 - Understanding the Interplay of Environmental Stressors, Infectious Disease, and Human Health, Washington, DC (January 2019)

Friends of NIEHS Annual Meeting, Washington, DC (January 2019)

NC Public Health Leaders Conference, Raleigh, NC (January 2019)

Triangle Global Health Consortium Career Day, Research Triangle Park, NC (February 2019)

North Carolina State University's CHHE 3rd Annual Symposium- Exploring PFAS in North Carolina: Impacts on the Environment and Human Health, Raleigh, NC (February 2019)

Four Corners Interior Congressional Briefing, Washington, DC (February 2019)

National Academy of Sciences Workshop: ESEHS Workshop 2: The Promise of Single Cell and Single Molecule Analysis Tools to Advance Environmental Health Research (March 2019)

International Agency for Research on Cancer – International Women's Day Symposium, Lyon, France (March 2019)

Third International Workshop on Chronic Kidney Disease of Unknown Origin (CKDu) in Mesoamerica and Other Regions, San José, Costa Rica (March 2019)

Trans-NIH Workshop on Inflammation Resolution Biology, Research Triangle Park, NC (March 2019)

National Trainees Assembly Spring GA Meeting, Research Triangle Park, NC (April 2019)

Video Interview: European TV Channel "Arte", Bethesda, MD (April 2019)

Congressional Briefing: Senate Environment and Public Works Committee Majority Staff on PFAS, Washington, DC (April 2019)

Congressional Briefing: FY 20 NIEHS Superfund-related activities briefing for House and Senate Interior & Environment Appropriations Subcommittee Staff, Washington, DC (April 2019)

NIEHS Career Symposium, Research Triangle Park, NC (April 2019)

NTP Workshop: Converging on Cancer, Washington, DC (April 2019)

Annual Symposium of the Society of Toxicologic Pathology, Raleigh, NC (June 2019)

Deichman Lecture, 16th International Congress on Toxicology, Honolulu, Hawaii (July 2019)

ICCVAM (October 2019)

Environmental Health Fund, Jerusalem, Israel (December 2019)

HERA Annual Meeting, Barcelona, Spain (January 2020)

ANSES, Paris, France (February 2020)

EURION Annual Meeting, Paris, France (February 2020)

University of Michigan "From PBBs to PFAS", Ann Arbor, Michigan (February 2020)

Icahn Mt. Sinai School of Medicine Exposome Symposium (March 2020)

Virtual Six Classes Retreat (May 2020)

Virtual 20th Anniversary of ICCVAM (May 2020)

Virtual Society of Birth Defects and Prevention (June 2020) -Josef Warkany Lecture

Virtual Symposium, Skaggs School of Pharmacy, University of Colorado (August 2020)

UCSF PRHE Science Response Network: Setting a new scientific agenda for chemical policy (September 2020)

URI STEER: PFAS In Our World (October 2020)

Yale School of Public Health (October 2020)

Toxic Free Future for our Children (December 2020)

BizNGO2020 (December 2020)

American Geophysical Union (December 2020)

University of Cincinnati Center for Environmental Genetics Research Symposium (March 2021)

Society of Toxicology Workshop on Flame Retardants (March 2021)

Columbia River Basin Restoration Program (May 2021)

ISCHE Fluoride Webinar (June 2021)

NAS PFAS panel (July 2021')

EWG Conference on PFAS (July 2021)

Chicago Waterworks – Argonne and EPA Region5, Keynote (October 2021)

INSERM-Sorbonne-University of Paris, History of Environmental Public Health Keynote (November 2021)

Gil Omenn and Margaret Darling Environmental Health Inaugural Lecture, University of Washington (December 2021)

Michigan State University (January 2022)

PPToxVII Keynote (January 2022)

Environmental Health Project Public Health Summit (February 2022)

Society of Toxicology Merit Award Lecture (March 2022)

Yale Winslow Award Lecture (April, 2022)

PFAS Disposal Symposium (May 2022)

Vietnam Veterans of America (August 2022)

NIEHS Breast Cancer Symposium (August 2023)

University of Arizona Global Health Symposium (September 2022)

Dioxin2023, International Symposium on POPs, Plenary (October 2023)

Duke Global Health Symposium (October 2022)

AAAS Seminar on PFAS and CERCLA (October 2022)

University of Southern California John Peters Memorial Lecture (November 2022)

Breast Cancer and Silent Spring (November 2022)

Duke Integrated Toxicology Program (January 2023)

CHE Café (February 2023)

Minnesota Legislature (March 2023)

University of California, Davis (April 2023)

Major Committee Responsibilities

NIEHS Radiation Safety Committee (1985-1989)

Mouse Strains for Carcinogenesis Studies (1985)

NIEHS Research Support Subcommittee (1986)

NIEHS Laboratory Casework Committee (1986-1989)

Judge, SOT Mechanism Section Graduate Student Awards (1985, 1986) Treasurer, NC SOT (1986-1988)

TRTP Promotion Committee (1984-1989), Chairman (1987-1989)

Vice President, NC SOT (1988-1989); President (1989-1990)

NAS Committee on Chemical Toxicity and Aging (1986-1988)

U.S. EPA Science Advisory Board - Halogenated Solvents Subcommittee (1987-1989)

N.J. EPA Science Advisory Board (1987-1989)

SOT Mechanism Section, Nominations Committee (1987-1989)

WHO, IPCS, Co-chair - Aging and Toxicity (1988-1993)

US EPA, Science Advisory Board - Dioxin Review (1988-1989)

DTRT, Ad Hoc Group on Future Research Priorities, Facilitator (1988-1989)

Education Committee, SOT (1989-1992)

NIOSH Peer Review Board on Dioxin Studies (1989-1994)

CIIT, Dioxin Review Panel (1990-1994); Scientific Advisory Panel (1990)

USEPA/ORD - Committee on Scientific Ethics (1990-1995)

ILSI Committee on Pharmacokinetics (1992-1996)

SOT, Nominating Committee (1993-1994)

SOT, Mechanisms Section (V.P. 1992-1993; Pres. 1993-1994)

HERL Symposium Committee (1992-present)

U.S. EPA Laboratory Implementation Committee, Science and Scientific Subcommittee,

Co-Chair of the Scientific and Scientific Career Subcommittee – Fellowship Committee Chair

Fellowship Committee (1994-1999)

Member - ORD Human Resources Committee (1999)

Member of the Chemical Manufacturers Association Butadiene Panel (1992-1996)

External Advisory Committee for the NIEHS Planning Grant for an EHS Center (1993-1995)

Executive Committee of the Division of Toxicology, ASPET (1994-1997)

SOT Council (1996-1999)

ORD/OW Arsenic External RFA Committee (1996-1998)

Executive Committee, International Society for the Study of Xenobiotics (1996-1999)

International Organizing Committee, Dioxin (1992-2007)

Awards Committee, SOT (1998-2000)

Liaison - NERL/NHEERL Interaction Workgroup (1998-2007)

Chair, Division of Toxicology, ASPET (1998-2000)

Executive Committee of the RTP Drug Metabolism Discussion Group (2003)

Agency Wide PBT Initiative (1998-2005)

Society of Toxicology – Presidential Chain (2002-2006)

HESI Biomonitoring Technical Committee (2006)

Institute of Medicine Roundtable on Public Health and the Environment (2010-2018)

National Academy of Science, Medicine, and Engineering: Emerging Environmental Health Issues (2018-2021)

Member of Scientific and Policy Advisory Board Global PFAS Science Panel, Swiss Federal Institute of Technology, Zurich Institute of Biogeochemistry and Pollutant Dynamics (2018)

Scientific Advisory Board, FREIA (2019-2023)

International Advisory Board, EURION (2019-2023)

International Advisory Board, HERA (2019-2023)

National Academy of Medicine: Standing committee to Advise the Department of State on Unexplained Health Effects on US Government Employees and their Families at Overseas Embassies (2019-2020)

Sloan Foundation Advisory Board on Indoor Air Contaminants (2020-2023)

National Academy of Medicine Workshop on Companion Animals as Sentinels for Environmental Exposure (2020-2022) – Chair

Science Advisory Board, EaRTH Center, UCSF (2020-2024)

Veterans Administration Air Force Health Study Committee Chair (2021-2025)

Research Advisor for

Dennis Darcey, MS, University of North Carolina, Department of Environmental Sciences and Engineering, 1982 Susan Borghoff, MS, Ph.D., University of North Carolina, Department of Environmental Sciences and Engineering, 1987 Chris Miller, MS, University of North Carolina, Department of Environmental Sciences and Engineering, 1985 Charles Hebert, Ph.D., University of North Carolina, Toxicology Curriculum, 1990

Laurie Couture-Haws, MS, Ph.D., University of North Carolina, Department of Environmental Sciences and Engineering and Toxicology Curriculum (MS 1987; Ph.D. 1990)

Yolanda Banks Anderson, Ph.D., University of North Carolina, Department of Environmental Sciences and Engineering, 1990

Lorrene Kedderis, Ph.D., University of North Carolina, Toxicology Curriculum, 1992

Mary K. McKinley, MS, Duke University, School of the Environment, 1992

Renu Batra, Ph.D., University of North Carolina, Department of Environmental Sciences and Engineering (deceased)

Krista Little Johnson, MS, University of North Carolina, Department of Environmental Sciences and Engineering, 1996

Christopher Hurst, Ph.D., University of North Carolina, Curriculum in Toxicology, 1999

Deborah Burgin, Ph.D., University of North Carolina, Curriculum in Toxicology, 2005

Daniele Staskal, Ph.D., University of North Carolina, Curriculum in Toxicology, 2005

Daniel Bauer, Ph.D., University of North Carolina, Curriculum in Toxicology, withdrew

Michele La Merrill, Ph.D., University of North Carolina, Curriculum in Toxicology, 2008

David Szabo, Ph.D., University of North Carolina, Curriculum in Toxicology, 2011

Alicia Richards, MPH, University of North Carolina, Department of Environmental Sciences and Engineering, 2018

Thesis Committee (Ph.D. Students)

Alan Jo Cato, University of North Carolina, School of Pharmacy
Charlie Sewall, University of North Carolina, Toxicology Curriculum
Joost DeJongh, University of Utrecht, The Netherlands
Angelique Van Birgelen, University of Utrecht, The Netherlands
George Monteverdi, Duke University, School of the Environment
Chia-Yang Chen, University of North Carolina, School of Public Health

Coralie Groenveld, Agricultural University of Wageningen, Wageningen, The Netherlands

Irene Kampen, Agricultural University of Wageningen, Wageningen, The Netherlands

Michael Wyde, UNC, Curriculum in Toxicology

Jie (Jane) Dong, Duke University, School of the Environment

Yo Chan Jeong, University of North Carolina, School of Public Health, 2005

Lieke Peters, University of Utrecht, The Netherlands, 2006

Oliver Hamblett, Harvard School of Public Health

Pamela Noyes, Duke School of the Environment

Thuy Lam, Harvard School of Medicine

Samantha Van Etten, University of Buffalo, 2021

Liora Fiksel, MPH, Yale University, 2022

Tess Leuthner, Duke, 2022-23

Postdoc Advisor

L.R. (Mark) Kao, 1984-1985

Dave Brewster, 1985-1987

Usha Gundimeda, 1986-1988

Barbara Abbott, 1987-1989

Tim McMahon, 1988-1990

Mike DeVito, 1991-1994

Angelique Van Birgelen, 1994-1997

Xiaofeng Wang, 1995-1997

Michael Santostefano, 1994-1999

Brian Slezak, 1997-1999

Jonathan Hamm, 1997-2000

Claude Emond, 2001-2004

Lisa Vinikoor, 2008-2009

Sally White, 2008-2009

Gabriel Knudsen, 2011-2014

Journal Articles

- 1. Page J, Whaley P, Bellingham M, Birnbaum LS, Cavoski A, Fetherston Dilke D, Garside R, Harrad S, Kelly F, Kortenkamp A, Martin O, Stec A, Woolley T. A new consensus on reconciling fire safety with environmental & health impacts of chemical flame retardants. Environment international. 2023:107782. doi: https://doi.org/10.1016/j.envint.2023.107782.
- 2. Woodruff TJ, Rayasam SDG, Axelrad DA, Koman PD, Chartres N, Bennett DH, Birnbaum LS, Brown P, Carignan CC, Cooper C, Cranor CF, Diamond ML, Franjevic S, Gartner EC, Hattis D, Hauser R, Heiger-Bernays W, Joglekar R, Lam J, Levy JI, MacRoy PM, Maffini MV, Marquez EC, Morello-Frosch R, Nachman KE, Nielsen GH, Oksas C, Abrahamsson DP, Patisaul HB, Patton S, Robinson JF, Rodgers KM, Rossi MS, Rudel RA, Sass JB, Sathyanarayana S, Schettler T, Shaffer RM, Shamasunder B, Shepard PM, Shrader-Frechette K, Solomon GM, Subra WA, Vandenberg LN, Varshavsky JR, White RF, Zarker K, Zeise L. A science-based agenda for health-protective chemical assessments and decisions: overview and consensus statement. Environ Health. 2023;21(Suppl 1):132. Epub 2023/01/13. doi: https://doi.org/10.1186/s12940-022-00930-3. PubMed PMID: 36635734.
- 3. Maffini MV, Rayasam SDG, Axelrad DA, Birnbaum LS, Cooper C, Franjevic S, MacRoy PM, Nachman KE, Patisaul HB, Rodgers KM, Rossi MS, Schettler T, Solomon GM, Woodruff TJ. Advancing the science on chemical classes. Environ Health. 2023;21(1):120. doi: https://doi.org/10.1186/s12940-022-00919-y. PubMed PMID: 36635752.
- 4. Ben Ishai P, Davis D, Taylor H, Birnbaum L. Problems in evaluating the health impacts of radio frequency radiation. Environmental research. 2023:115038. doi: https://doi.org/10.1016/j.envres.2022.115038.
- 5. Veneri F, Vinceti M, Generali L, Giannone ME, Mazzoleni E, Birnbaum LS, Consolo U, Filippini T. Fluoride exposure and cognitive neurodevelopment: Systematic review and dose-response meta-analysis. Environmental research. 2023:115239. doi: https://doi.org/10.1016/j.envres.2023.115239.
- 6. Wikoff D, Ring C, DeVito M, Walker N, Birnbaum L, Haws L. Development and Application of a Systematic and Quantitative Weighting Framework to Evaluate the Quality and Relevance of Relative Potency Estimates for Dioxin-Like Compounds (DLCs) for Human Health Risk Assessment. Regulatory Toxicology and Pharmacology. 2023;Submitted.
- 7. Birnbaum L. Environmental Health: Past, Present, and Future. Comité pour l'histoire de l'Inserm. 2022;2/2(4):72-6. doi: http://hdl.handle.net/10608/12454.
- 8. Kay JE, Cardona B, Rudel RA, Vandenberg LN, Soto AM, Christiansen S, Birnbaum LS, Fenton SE. Chemical Effects on Breast Development, Function, and Cancer Risk: Existing Knowledge and New

Opportunities. Current environmental health reports. 2022. Epub 2022/08/20. doi: https://doi.org/10.1007/s40572-022-00376-2. PubMed PMID: 35984634.

- 9. Chartres N, Sass JB, Gee D, Bălan SA, Birnbaum L, Cogliano VJ, Cooper C, Fedinick KP, Harrison RM, Kolossa-Gehring M, Mandrioli D, Mitchell MA, Norris SL, Portier CJ, Straif K, Vermeire T. Conducting evaluations of evidence that are transparent, timely and can lead to health-protective actions. Environmental health: a global access science source. 2022;21(1):123. Epub 2022/12/06. doi: https://doi.org/10.1186/s12940-022-00926-z. PubMed PMID: 36471342.
- 10. Rider CV, Birnbaum LS, DeVito MJ, Hertzberg RC, Rice GE, Teuschler LK. In Memoriam: Jane Ellen Simmons. Environmental health perspectives. 2022;130(10):101601. Epub 2022/10/28. doi: https://doi.org/10.1289/ehp12225. PubMed PMID: 36300649; PMCID: PMC9608555.
- 11. Cave MC, Pinkston CM, Rai SN, Wahlang B, Pavuk M, Head KZ, Carswell GK, Nelson GM, Klinge CM, Bell DA, Birnbaum LS, Chorley BN. Circulating MicroRNAs, Polychlorinated Biphenyls, and Environmental Liver Disease in the Anniston Community Health Survey. Environmental health perspectives. 2022;130(1):17003. Epub 2022/01/07. doi: https://doi.org/10.1289/ehp9467. PubMed PMID: 34989596; PMCID: PMC8734566.
- 12. Petriello MC, Mottaleb MA, Serio TC, Balyan B, Cave MC, Pavuk M, Birnbaum LS, Morris AJ. Serum concentrations of legacy and emerging per- and polyfluoroalkyl substances in the Anniston Community Health Surveys (ACHS I and ACHS II). Environment international. 2022;158:106907. Epub 2021/11/12. doi: https://doi.org/10.1016/j.envint.2021.106907. PubMed PMID: 34763231; PMCID: PMC9131314.
- 13. Dinse GE, Co CA, Parks CG, Weinberg CR, Xie G, Chan EKL, Birnbaum LS, Miller FW. Expanded assessment of xenobiotic associations with antinuclear antibodies in the United States, 1988-2012. Environment international. 2022;166:107376. Epub 2022/07/06. doi: https://doi.org/10.1016/j.envint.2022.107376. PubMed PMID: 35785669.
- 14. Birnbaum LS. Op-Ed: FDA fails to protect the public from chemicals health risks. Environmental Health News. 2022. doi: https://www.ehn.org/fda-chemical-regulation-2657184101/fdas-2013-review-a-commitment-unfulfilled.
- 15. Salvatore D, Mok K, Garrett KK, Poudrier G, Brown P, Birnbaum LS, Goldenman G, Miller MF, Patton S, Poehlein M, Varshavsky J, Cordner A. Presumptive Contamination: A New Approach to PFAS Contamination Based on Likely Sources. Environ Sci Technol Lett. 2022. doi: https://doi.org/10.1021/acs.estlett.2c00502.
- 16. Southerland E, Sussman R, Birnbaum L. Unjustified industry pushback on EPA's toxic chemical regulation. The Hill. 2022. doi: https://thehill.com/opinion/energy-environment/3495942-unjustified-industry-pushback-on-epas-toxic-chemical-regulation/.
- 17. Peecher JS, Stromberg A, Lu H, Quynh HT, Schecte AJ, Weng J, Crandall R, Birnbaum LS. Biomonitoring of Polybrominated Dioxins & Furans, Polychlorinated Dioxins & Furans, and Dioxin Like Polychlorinated Biphenyls in Vietnamese Female Electronic Waste Recyclers. Journal of occupational and environmental medicine. 2022;64(9):742-7. Epub 2022/02/06. doi: https://doi.org/10.1097/JOM.00000000000002506. PubMed PMID: 35121692; PMCID: PMC9680905.

- 18. Birnbaum LS, Taylor HS, Baldwin H, Ben-Ishai P, Davis D. RE: Cellular Telephone Use and the Risk of Brain Tumors: Update of the UK Million Women Study. Journal of the National Cancer Institute. 2022;114(11):1551-2. doi: https://doi.org/10.1093/jnci/djac110.
- 19. Post GB, Birnbaum LS, DeWitt JC, Goeden H, Heiger-Bernays WJ, Schlezinger JJ. Letter to the editors regarding "The conundrum of the PFOA human half-life, an international collaboration.". Regulatory Toxicology and Pharmacology. 2022. doi: https://doi.org/10.1016/j.yrtph.2022.105240.
- 20. Birnbaum LS, Bornehag CG. Phthalates Should Be Regulated as a Class to Protect the Brains of Our Children. American journal of public health. 2021;111(4):551-2. Epub 2021/03/11. doi: https://doi.org/10.2105/ajph.2021.306193. PubMed PMID: 33689442; PMCID: PMC7958052
- 21. Patisaul HB, Behl M, Birnbaum LS, Blum A, Diamond ML, Rojello Fernández S, Hogberg HT, Kwiatkowski CF, Page JD, Soehl A, Stapleton HM. Beyond Cholinesterase Inhibition: Developmental Neurotoxicity of Organophosphate Ester Flame Retardants and Plasticizers. Environmental health perspectives. 2021;129(10):105001. Epub 2021/10/07. doi: https://doi.org/10.1289/ehp9285. PubMed PMID: 34612677; PMCID: PMC8493874.
- 22. Barouki R, Kogevinas M, Audouze K, Belesova K, Bergman A, Birnbaum L, Boekhold S, Denys S, Desseille C, Drakvik E, Frumkin H, Garric J, Destoumieux-Garzon D, Haines A, Huss A, Jensen G, Karakitsios S, Klanova J, Koskela IM, Laden F, Marano F, Franziska Matthies-Wiesler E, Morris G, Nowacki J, Paloniemi R, Pearce N, Peters A, Rekola A, Sarigiannis D, Šebková K, Slama R, Staatsen B, Tonne C, Vermeulen R, Vineis P. The COVID-19 pandemic and global environmental change: Emerging research needs. Environment international. 2021;146:106272. Epub 2020/11/26. doi: https://doi.org/10.1016/j.envint.2020.106272. PubMed PMID: 33238229; PMCID: PMC7674147.
- 23. Cordner A, Goldenman G, Birnbaum LS, Brown P, Miller MF, Mueller R, Patton S, Salvatore DH, Trasande L. Correction to The True Cost of PFAS and the Benefits of Acting Now. Environmental science & technology. 2021. Epub 2021/09/03. doi: https://doi.org/10.1021/acs.est.1c04938. PubMed PMID: 34472851.
- 24. Cordner A, Goldenman G, Birnbaum LS, Brown P, Miller MF, Mueller R, Patton S, Salvatore DH, Trasande L. The True Cost of PFAS and the Benefits of Acting Now. Environmental science & technology. 2021;55(14):9630-3. Epub 2021/07/08. doi: https://doi.org/10.1021/acs.est.1c03565. PubMed PMID: 34231362; PMCID: PMC8296683.
- 25. Kwiatkowski CF, Andrews DQ, Birnbaum LS, Bruton TA, DeWitt JC, Knappe DRU, Maffini MV, Miller MF, Pelch KE, Reade A, Soehl A, Trier X, Venier M, Wagner CC, Wang ZY, Blum A. Response to "Comment on Scientific Basis for Managing PFAS as a Chemical Class". Environ Sci Technol Lett. 2021;8(2):195-7. doi: https://doi.org/10.1021/acs.estlett.1c00049.
- 26. Karlsson O, Rocklöv J, Lehoux AP, Bergquist J, Rutgersson A, Blunt MJ, Birnbaum LS. The human exposome and health in the Anthropocene. Int J Epidemiol. 2021;50(2):378-89. Epub 2020/12/23. doi: https://doi.org/10.1093/ije/dyaa231. PubMed PMID: 33349868; PMCID: PMC8128460.
- 27. Emond C, DeVito MJ, Birnbaum LS. A PBPK model describing the pharmacokinetics of γ-HBCD exposure in mice. Toxicology and applied pharmacology. 2021;428:115678. Epub 2021/08/15. doi: https://doi.org/10.1016/j.taap.2021.115678. PubMed PMID: 34390738; PMCID: PMC8674938.

- 28. Castro L, Liu J, Yu L, Burwell AD, Saddler TO, Santiago LA, Xue W, Foley JF, Staup M, Flagler ND, Shi M, Birnbaum LS, Dixon D. Differential Receptor Tyrosine Kinase Phosphorylation in the Uterus of Rats Following Developmental Exposure to Tetrabromobisphenol A. Toxicol Res Appl. 2021;5. Epub 2022/01/25. doi: https://doi.org/10.1177/23978473211047164. PubMed PMID: 35071781; PMCID: PMC8774279.
- 29. Knudsen TB, Fitzpatrick SC, De Abrew KN, Birnbaum LS, Chappelle A, Daston GP, Dolinoy DC, Elder A, Euling S, Faustman EM, Fedinick KP, Franzosa JA, Haggard DE, Haws L, Kleinstreuer NC, Buck Louis GM, Mendrick DL, Rudel R, Saili KS, Schug TT, Tanguay RL, Turley AE, Wetmore BA, White KW, Zurlinden TJ. FutureTox IV Workshop Summary: Predictive Toxicology for Healthy Children. Toxicological sciences: an official journal of the Society of Toxicology. 2021;180(2):198-211. Epub 2021/02/09. doi: https://doi.org/10.1093/toxsci/kfab013. PubMed PMID: 33555348; PMCID: PMC8041457.
- 30. VanEtten SL, Bonner MR, Ren X, Birnbaum LS, Kostyniak PJ, Wang J, Olson JR. Effect of exposure to 2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD) and polychlorinated biphenyls (PCBs) on mitochondrial DNA (mtDNA) copy number in rats. Toxicology. 2021;454:152744. Epub 2021/03/08. doi: https://doi.org/10.1016/j.tox.2021.152744. PubMed PMID: 33677009; PMCID: PMC8220889.
- 31. Lichtveld M, Birnbaum L. Advances in Environmental Health and Disaster Research 15 Years After Hurricane Katrina. American journal of public health. 2020;110(10):1478-9. Epub 2020/09/10. doi: https://doi.org/10.2105/ajph.2020.305739. PubMed PMID: 32903076; PMCID: PMC7483094.
- 32. Gaston SA, Birnbaum LS, Jackson CL. Synthetic Chemicals and Cardiometabolic Health Across the Life Course Among Vulnerable Populations: a Review of the Literature from 2018 to 2019. Current environmental health reports. 2020;7(1):30-47. Epub 2020/02/11. doi: https://doi.org/10.1007/s40572-020-00265-6. PubMed PMID: 32037478; PMCID: PMC7187897.
- 33. Cannon RE, Richards AC, Trexler AW, Juberg CT, Sinha B, Knudsen GA, Birnbaum LS. Effect of GenX on P-Glycoprotein, Breast Cancer Resistance Protein, and Multidrug Resistance-Associated Protein 2 at the Blood-Brain Barrier. Environmental health perspectives. 2020;128(3):37002. Epub 2020/03/28. doi: https://doi.org/10.1289/ehp5884. PubMed PMID: 32212926; PMCID: PMC7137913.
- 34. Sasso AF, Pirow R, Andra SS, Church R, Nachman RM, Linke S, Kapraun DF, Schurman SH, Arora M, Thayer KA, Bucher JR, Birnbaum LS. Pharmacokinetics of bisphenol A in humans following dermal administration. Environment international. 2020;144:106031. Epub 2020/08/18. doi: https://doi.org/10.1016/j.envint.2020.106031. PubMed PMID: 32798798; PMCID: PMC9210257.
- 35. Lanphear BP, Till C, Birnbaum LS. It is time to protect kids' developing brains from fluoride. Environmental Health News. 2020. doi: https://www.ehn.org/fluoride-and-childrens-health-2648120286.html.
- 36. Birnbaum LS, Heindel JJ. Endocrine-disrupting chemicals weaken us in our COVID-19 battle. Environmental Health News. 2020. doi: https://www.ehn.org/chemical-exposure-coronavirus-2645785581.html.
- 37. Kwiatkowski CF, Andrews DQ, Birnbaum LS, Bruton TA, Dewitt JC, Knappe DRU, Maffini MV, Miller MF, Pelch KE, Reade A, Soehl A, Trier X, Venier M, Wagner CC, Wang Z, Blum A. Scientific Basis for Managing PFAS as a Chemical Class. Environmental Science and Technology Letters. 2020;7(8):532-43.

Epub 2021/07/27. doi: https://doi.org/10.1021/acs.estlett.0c00255. PubMed PMID: 34307722; PMCID: PMC8297807.

- 38. Pittman GS, Wang X, Campbell MR, Coulter SJ, Olson JR, Pavuk M, Birnbaum LS, Bell DA. Polychlorinated biphenyl exposure and DNA methylation in the Anniston Community Health Survey. Epigenetics. 2020;15(4):337-57. Epub 2019/10/15. doi: https://doi.org/10.1080/15592294.2019.1666654. PubMed PMID: 31607210; PMCID: PMC7153539.
- 39. Verner MA, Salame H, Housand C, Birnbaum LS, Bouchard MF, Chevrier J, Aylward LL, Naiman DQ, LaKind JS. How Many Urine Samples Are Needed to Accurately Assess Exposure to Non-Persistent Chemicals? The Biomarker Reliability Assessment Tool (BRAT) for Scientists, Research Sponsors, and Risk Managers. International journal of environmental research and public health. 2020;17(23). Epub 2020/12/10. doi: https://doi.org/10.3390/ijerph17239102. PubMed PMID: 33291237; PMCID: PMC7730379.
- 40. Volkow ND, Gordon JA, Koob GF, Birnbaum LS, Clayton JA, Koroshetz WJ, Bianchi DW, Gibbons GH, Riley WT, Perez-Stable EJ, Croyle RT. An Examination of Child and Adolescent Neurodevelopment Through National Institutes of Health Studies. Public health reports (Washington, DC: 1974). 2020;135(2):169-72. Epub 2020/01/23. doi: https://doi.org/10.1177/0033354919900889. PubMed PMID: 31968205; PMCID: PMC7036611.
- 41. Fenton SE, Birnbaum LS. CHDS: A national treasure that keeps on giving. Reproductive toxicology (Elmsford, NY). 2020;92:11-3. Epub 2020/02/26. doi: https://doi.org/10.1016/j.reprotox.2020.02.007. PubMed PMID: 32097706; PMCID: PMC7864627.
- 42. Pittman GS, Wang X, Campbell MR, Coulter SJ, Olson JR, Pavuk M, Birnbaum LS, Bell DA. Dioxin-like compound exposures and DNA methylation in the Anniston Community Health Survey Phase II. The Science of the total environment. 2020;742:140424. Epub 2020/07/07. doi: https://doi.org/10.1016/j.scitotenv.2020.140424. PubMed PMID: 32629249; PMCID: PMC7574543.
- 43. Birnbaum LS, Kripke M. The National Cancer Institute needs to publish information about chemical exposure and cancer risk. Stat. 2020. doi: https://www.statnews.com/2020/11/21/national-cancer-institute-publish-information-chemical-exposure-cancer-risk/.
- 44. VanEtten SL, Bonner MR, Ren X, Birnbaum LS, Kostyniak PJ, Wang J, Olson JR. Telomeres as targets for the toxicity of 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) and polychlorinated biphenyls (PCBs) in rats. Toxicology and applied pharmacology. 2020;408:115264. Epub 2020/10/07. doi: https://doi.org/10.1016/j.taap.2020.115264. PubMed PMID: 33022284.
- 45. Knudsen GA, Chapman M, Trexler AW, Juberg CT, Birnbaum LS. 2,4,6-Tribromophenol Disposition and Kinetics in Pregnant and Nursing Sprague Dawley Rats. Toxicological sciences: an official journal of the Society of Toxicology. 2020;178(1):36-43. Epub 2020/08/12. doi: https://doi.org/10.1093/toxsci/kfaa133. PubMed PMID: 32780832; PMCID: PMC7818898.
- 46. Pavuk M, Serio TC, Cusack C, Cave M, Rosenbaum PF, Birnbaum LS. Hypertension in Relation to Dioxins and Polychlorinated Biphenyls from the Anniston Community Health Survey Follow-Up. Environmental health perspectives. 2019;127(12):127007. Epub 2019/12/21. doi: https://doi.org/10.1289/ehp5272. PubMed PMID: 31858832; PMCID: PMC6957279.

- 47. Blum A, Behl M, Birnbaum LS, Diamond ML, Phillips A, Singla V, Sipes NS, Stapleton HM, Venier M. Organophosphate Ester Flame Retardants: Are They a Regrettable Substitution for Polybrominated Diphenyl Ethers? Environ Sci Technol Lett. 2019;6(11):638-49. Epub 2020/06/05. doi: https://doi.org/10.1021/acs.estlett.9b00582. PubMed PMID: 32494578; PMCID: PMC7269169.
- 48. Rock KD, Gillera SEA, Devarasetty P, Horman B, Knudsen GA, Birnbaum LS, Fenton SE, Patisaul HB. Sex-specific behavioral effects following developmental exposure to tetrabromobisphenol A (TBBPA) in Wistar rats. Neurotoxicology. 2019;75:136-47. Epub 2019/09/18. doi: https://doi.org/10.1016/j.neuro.2019.09.003. PubMed PMID: 31541695; PMCID: PMC6935469.
- 49. Knudsen GA, Hughes MF, Birnbaum LS. Dermal disposition of Tetrabromobisphenol A Bis(2,3-dibromopropyl) ether (TBBPA-BDBPE) using rat and human skin. Toxicology letters. 2019;301:108-13. Epub 2018/11/28. doi: http://dx.doi.org/10.1016/j.toxlet.2018.11.011. PubMed PMID: 30481582; PMCID: PMC6309208.
- Trexler AW, Knudsen GA, Nicklisch SCT, Birnbaum LS, Cannon RE. 2,4,6-Tribromophenol Exposure Decreases P-glycoprotein Transport at the Blood-Brain Barrier. Toxicological sciences: an official journal of the Society of Toxicology. 2019. Epub 2019/08/02. doi: https://doi.org/10.1093/toxsci/kfz155. PubMed PMID: 31368499; PMCID: PMC6760274.
- 51. Knudsen GA, Trexler AW, Richards AC, Hall SM, Hughes MF, Birnbaum LS. 2,4,6-Tribromophenol Disposition and Kinetics in Rodents: Effects of Dose, Route, Sex, and Species. Toxicological sciences: an official journal of the Society of Toxicology. 2019;169(1):167-79. Epub 2019/02/16. doi: https://doi.org/10.1093/toxsci/kfz044. PubMed PMID: 30768125; PMCID: PMC6804416.
- Behl M, Ryan K, Hsieh JH, Parham F, Shapiro AJ, Collins BJ, Sipes NS, Birnbaum LS, Bucher JR, Foster PMD, Walker NJ, Paules RS, Tice RR. Screening for Developmental Neurotoxicity at the National Toxicology Program: The Future Is Here. Toxicological sciences: an official journal of the Society of Toxicology. 2019;167(1):6-14. Epub 2018/11/30. doi: https://doi.org/10.1093/toxsci/kfy278. PubMed PMID: 30496580; PMCID: PMC6657567.
- 53. Cannon RE, Trexler AW, Knudsen GA, Evans RA, Birnbaum LS. Tetrabromobisphenol A (TBBPA) Alters ABC Transport at the Blood-Brain Barrier. Toxicol Sci. 2019;169(2):475-84. Epub 2019/03/05. doi: https://doi.org/10.1093/toxsci/kfz059. PubMed PMID: 30830211; PMCID: PMC6542337.
- 54. Tredan O, Zelichov O, Barbash Z, Daitsh Y, Birnbaum L, Tarcic G, You B, Cassier P, de la Fouchardiere C, Ray-Coquard IL, Brahmi M, Wang Q, Attignon V, Baudet C, Fournier Garin G, Agrapart V, Dargenio A, Chabaud S, Perol D, Blay JY. Correlation between an automated functional assay that predicts targeted agent (TA) sensitivity and the tumor response of the sorafenib treatment evaluated within the MOST clinical trial. Ann Oncol. 2018;29 Suppl 6:vi15-vi6. Epub 2018/09/01. doi: https://doi.org/10.1093/annonc/mdy318.025. PubMed PMID: 32177592.
- 55. Knudsen GA, Hall SM, Richards AC, Birnbaum LS. TBBPA disposition and kinetics in pregnant and nursing Wistar Han IGS rats. Chemosphere. 2018;192:5-13. Epub 2017/11/02. doi: http://dx.doi.org/10.1016/j.chemosphere.2017.10.122. PubMed PMID: 29091796; PMCID: PMC5696050.

- 56. Birnbaum LS. Moving NIEHS Forward for the Next Five Years. Environmental health perspectives. 2018;126(9):91001. Epub 2018/09/12. doi: https://doi.org/10.1289/EHP4356. PubMed PMID: 30203991; PMCID: PMC6375384.
- 57. Collman GW, Berridge BR, Hall JE, Woychik R, Zeldin DC, Birnbaum LS. NIEHS: Making a Mark on Translational Research Science. Environmental health perspectives. 2018;126(8):081001. Epub 2018/08/04. doi: http://dx.doi.org/10.1289/ehp4075. PubMed PMID: 30073951; PMCID: PMC6108839.
- 58. Birnbaum LS. Identifying Cost Savings Associated with NIEHS-Funded Research. Environmental health perspectives. 2018;126(6):061001. Epub 2018/06/23. doi: http://dx.doi.org/10.1289/ehp3841. PubMed PMID: 29929944; PMCID: PMC6084847.
- 59. Petriello MC, Charnigo R, Sunkara M, Soman S, Pavuk M, Birnbaum LS, Morris AJ, Hennig B. Relationship between serum trimethylamine N-oxide and exposure to dioxin-like pollutants. Environmental research. 2018;162:211-8. Epub 2018/01/22. doi: http://dx.doi.org/10.1016/j.envres.2018.01.007. PubMed PMID: 29353125; PMCID: PMC5811317.
- 60. Shipkowski KA, Betz JM, Birnbaum LS, Bucher JR, Coates PM, Hopp DC, MacKay D, Oketch-Rabah H, Walker NJ, Welch C, Rider CV. Naturally complex: Perspectives and challenges associated with Botanical Dietary Supplement Safety assessment. Food and chemical toxicology: an international journal published for the British Industrial Biological Research Association. 2018;118:963-71. Epub 2018/04/08. doi: https://doi.org/10.1016/j.fct.2018.04.007. PubMed PMID: 29626579; PMCID: PMC6087675.
- 61. Birnbaum LS. How Did I Ever Get Here? The 2018 Mildred S. Christian Award Winner. International journal of toxicology. 2018;37(4):272-5. Epub 2018/07/19. doi: http://dx.doi.org/10.1177/1091581818781316. PubMed PMID: 30016916.
- Werder EJ, Gam KB, Engel LS, Kwok RK, Ekenga CC, Curry MD, Chambers DM, Blair A, Miller AK, Birnbaum LS, Sandler DP. Predictors of blood volatile organic compound levels in Gulf coast residents. Journal of exposure science & environmental epidemiology. 2018;28(4):358-70. Epub 2017/12/31. doi: http://dx.doi.org/10.1038/s41370-017-0010-0. PubMed PMID: 29288257; PMCID: PMC6013310.
- 63. Schecter A, Kincaid J, Quynh HT, Lanceta J, Tran HTT, Crandall R, Shropshire W, Birnbaum LS. Biomonitoring of Metals, Polybrominated Diphenyl Ethers, Polychlorinated Biphenyls, and Persistent Pesticides in Vietnamese Female Electronic Waste Recyclers. Journal of occupational and environmental medicine. 2018;60(2):191-7. Epub 2017/11/04. doi: http://dx.doi.org/10.1097/jom.00000000000001200. PubMed PMID: 29099469; PMCID: PMC6108319.
- 64. Yang E, Pavuk M, Sjodin A, Lewin M, Jones R, Olson J, Birnbaum LS. Exposure of dioxin-like chemicals in participants of the Anniston community health survey follow-up. The Science of the total environment. 2018;637-638:881-91. Epub 2018/05/16. doi: http://dx.doi.org/10.1016/j.scitotenv.2018.05.074. PubMed PMID: 29763869; PMCID: PMC6236674.
- 65. Emond C, DeVito MJ, Diliberto JJ, Birnbaum LS. The Influence of Obesity on the Pharmacokinetics of Dioxin in Mice: An Assessment Using Classical and PBPK Modeling. Toxicological sciences: an official journal of the Society of Toxicology. 2018;164(1):218-28. Epub 2018/03/30. doi: http://dx.doi.org/10.1093/toxsci/kfy078. PubMed PMID: 29596651; PMCID: PMC6016688.

- 66. Birnbaum LS. Dioxin and the AH receptor: Synergy of discovery. Current Opinion in Toxicology. 2017;2:120-3. Epub 2017/02/01. doi: https://doi.org/10.1016/j.cotox.2017.01.009. PubMed PMID: 31815207; PMCID: PMC6897361.
- 67. Szabo DT, Pathmasiri W, Sumner S, Birnbaum LS. Serum Metabolomic Profiles in Neonatal Mice following Oral Brominated Flame Retardant Exposures to Hexabromocyclododecane (HBCD) Alpha, Gamma, and Commercial Mixture. Environmental health perspectives. 2017;125(4):651-9. Epub 2016/11/05. doi: http://dx.doi.org/10.1289/ehp242. PubMed PMID: 27814246; PMCID: PMC5381977.
- 68. Kwok RK, Engel LS, Miller AK, Blair A, Curry MD, Jackson WB, Stewart PA, Stenzel MR, Birnbaum LS, Sandler DP. The GuLF STUDY: A Prospective Study of Persons Involved in the Deepwater Horizon Oil Spill Response and Clean-Up. Environmental health perspectives. 2017;125(4):570-8. Epub 2017/04/01. doi: http://dx.doi.org/10.1289/ehp715. PubMed PMID: 28362265; PMCID: PMC5382003.
- 69. Birnbaum LS. Updating the NIEHS Strategic Plan. Environmental health perspectives. 2017;125(7):071001. Epub 2017/07/28. doi: http://dx.doi.org/10.1289/ehp2502. PubMed PMID: 28749368; PMCID: PMC5744721.
- 70. Callahan CL, Pavuk M, Birnbaum LS, Ren X, Olson JR, Bonner MR. Serum polychlorinated biphenyls and leukocyte telomere length in a highly-exposed population: The Anniston Community Health Survey. Environment international. 2017;108:212-20. Epub 2017/09/09. doi: http://dx.doi.org/10.1016/j.envint.2017.08.018. PubMed PMID: 28886414; PMCID: PMC5623110.
- 71. Birnbaum LS, Suk WA, Landrigan PJ. In Memoriam: Herbert L. Needleman. Environmental health perspectives. 2017;125(9):2. doi: http://dx.doi.org/10.1289/ehp2636.
- 72. Thigpen Tart K, Dilworth CH, Birnbaum LS, Balbus JM. The Epidemiologic Silver Lining of Climate Change. Epidemiology (Cambridge, Mass). 2017;28(3):313-5. Epub 2016/12/17. doi: http://dx.doi.org/10.1097/ede.00000000000000013. PubMed PMID: 27984422.
- 73. Gross L, Birnbaum LS. Regulating toxic chemicals for public and environmental health. PLoS biology. 2017;15(12):e2004814. Epub 2017/12/19. doi: http://dx.doi.org/10.1371/journal.pbio.2004814. PubMed PMID: 29252982; PMCID: PMC5734678.
- 74. Hall SM, Coulter SJ, Knudsen GA, Sanders JM, Birnbaum LS. Gene expression changes in immune response pathways following oral administration of tetrabromobisphenol A (TBBPA) in female Wistar Han rats. Toxicology letters. 2017;272:68-74. Epub 2017/03/17. doi: http://dx.doi.org/10.1016/j.toxlet.2017.03.008. PubMed PMID: 28300664; PMCID: PMC5425951.
- 75. Knudsen GA, Sanders JM, Birnbaum LS. Disposition of the emerging brominated flame retardant, bis(2-ethylhexyl) tetrabromophthalate, in female Sprague Dawley rats: effects of dose, route and repeated administration. Xenobiotica; the fate of foreign compounds in biological systems. 2017;47(3):245-54. Epub 2016/04/22. doi: http://dx.doi.org/10.1080/00498254.2016.1174793. PubMed PMID: 27098498; PMCID: PMC5531283.
- 76. Knudsen GA, Sanders JM, Hughes MF, Hull EP, Birnbaum LS. The biological fate of decabromodiphenyl ethane following oral, dermal or intravenous administration. Xenobiotica; the fate

- of foreign compounds in biological systems. 2017;47(10):894-902. Epub 2016/10/30. doi: http://dx.doi.org/10.1080/00498254.2016.1250180. PubMed PMID: 27771980; PMCID: PMC5463998.
- 77. Balbus JM, Tart KG, Dilworth CH, Birnbaum LS. Changing the Climate of Respiratory Clinical Practice. Insights from the 2016 Climate and Health Assessment of the U.S. Global Change Research Program. Annals of the American Thoracic Society. 2016;13(8):1202-4. Epub 2016/08/11. doi: http://dx.doi.org/10.1513/AnnalsATS.201607-535ED. PubMed PMID: 27509146; PMCID: PMC5461996.
- 78. Birnbaum LS. My Winding Road: From Microbiology to Toxicology and Environmental Health. Annual review of pharmacology and toxicology. 2016;56:1-17. Epub 2015/10/31. doi: http://dx.doi.org/10.1146/annurev-pharmtox-010715-103255. PubMed PMID: 26514198.
- 79. Thayer KA, Pelch KE, Birnbaum LS, Bucher JR. Bisphenols: More unnecessary surprises. Endocrine Disruptors. 2016;4(1). doi: https://doi.org/10.1080/23273747.2015.1131032.
- 80. Birnbaum LS. 25 Years of Endocrine Disruption: Past Lessons And Future Directions. Endocrine News. 2016:49. doi: https://www.niehs.nih.gov/news/events/pastmtg/2016/endocrine/index.cfm.
- 81. Allen JG, Gale S, Zoeller RT, Spengler JD, Birnbaum LS, McNeely E. PBDE flame retardants, thyroid disease, and menopausal status in U.S. women. Environmental health: a global access science source. 2016;15(1):60. Epub 2016/05/25. doi: http://dx.doi.org/10.1186/s12940-016-0141-0. PubMed PMID: 27215290; PMCID: PMC4877989.
- 82. Dinse GE, Jusko TA, Whitt IZ, Co CA, Parks CG, Satoh M, Chan EK, Rose KM, Walker NJ, Birnbaum LS, Zeldin DC, Weinberg CR, Miller FW. Associations Between Selected Xenobiotics and Antinuclear Antibodies in the National Health and Nutrition Examination Survey, 1999-2004. Environmental health perspectives. 2016;124(4):426-36. Epub 2015/08/08. doi: http://dx.doi.org/10.1289/ehp.1409345. PubMed PMID: 26252071; PMCID: PMC4829978.
- 83. Thayer KA, Taylor KW, Garantziotis S, Schurman SH, Kissling GE, Hunt D, Herbert B, Church R, Jankowich R, Churchwell MI, Scheri RC, Birnbaum LS, Bucher JR. Bisphenol A, Bisphenol S, and 4-Hydroxyphenyl 4-Isoprooxyphenylsulfone (BPSIP) in Urine and Blood of Cashiers. Environmental health perspectives. 2016;124(4):437-44. Epub 2015/08/27. doi: http://dx.doi.org/10.1289/ehp.1409427. PubMed PMID: 26309242; PMCID: PMC4824622.
- 84. Heacock M, Kelly CB, Asante KA, Birnbaum LS, Bergman AL, Brune MN, Buka I, Carpenter DO, Chen A, Huo X, Kamel M, Landrigan PJ, Magalini F, Diaz-Barriga F, Neira M, Omar M, Pascale A, Ruchirawat M, Sly L, Sly PD, Van den Berg M, Suk WA. E-Waste and Harm to Vulnerable Populations: A Growing Global Problem. Environmental health perspectives. 2016;124(5):550-5. Epub 2015/09/30. doi: http://dx.doi.org/10.1289/ehp.1509699. PubMed PMID: 26418733; PMCID: PMC4858409.
- 85. Mitro SD, Birnbaum LS, Needham BL, Zota AR. Cross-sectional Associations between Exposure to Persistent Organic Pollutants and Leukocyte Telomere Length among U.S. Adults in NHANES, 2001-2002. Environmental health perspectives. 2016;124(5):651-8. Epub 2015/10/10. doi: http://dx.doi.org/10.1289/ehp.1510187. PubMed PMID: 26452299; PMCID: PMC4858394.
- 86. Carlin DJ, Naujokas MF, Bradham KD, Cowden J, Heacock M, Henry HF, Lee JS, Thomas DJ, Thompson C, Tokar EJ, Waalkes MP, Birnbaum LS, Suk WA. Arsenic and Environmental Health: State of

the Science and Future Research Opportunities. Environmental health perspectives. 2016;124(7):890-9. Epub 2015/11/21. doi: http://dx.doi.org/10.1289/ehp.1510209. PubMed PMID: 26587579; PMCID: PMC4937867.

- 87. Birnbaum LS. NIEHS Celebrates 50 Years of Environmental Health Research at the NIH. Environmental health perspectives. 2016;124(1):A5. Epub 2016/01/01. doi: http://dx.doi.org/10.1289/ehp.1511015. PubMed PMID: 26719977; PMCID: PMC4710612.
- 88. Birnbaum LS, Burke TA, Jones JJ. Informing 21st-Century Risk Assessments with 21st-Century Science. Environmental health perspectives. 2016;124(4):A60-3. Epub 2016/04/02. doi: http://dx.doi.org/10.1289/ehp.1511135. PubMed PMID: 27035154; PMCID: PMC4829990.
- 89. Birnbaum LS, Balbus JM, Tart KT. Marking a New Understanding of Climate and Health. Environmental health perspectives. 2016;124(4):A59. Epub 2016/04/02. doi: http://dx.doi.org/10.1289/ehp.1611410. PubMed PMID: 27035485; PMCID: PMC4830000.
- 90. Lind L, Lind PM, Lejonklou MH, Dunder L, Bergman A, Guerrero-Bosagna C, Lampa E, Lee HK, Legler J, Nadal A, Pak YK, Phipps RP, Vandenberg LN, Zalko D, Agerstrand M, Oberg M, Blumberg B, Heindel JJ, Birnbaum LS. Uppsala Consensus Statement on Environmental Contaminants and the Global Obesity Epidemic. Environmental health perspectives. 2016;124(5):A81-3. Epub 2016/05/03. doi: http://dx.doi.org/10.1289/ehp.1511115. PubMed PMID: 27135406; PMCID: PMC4858400.
- 91. Birnbaum LS, Balbus JM, Tart KT. Erratum: "Marking a New Understanding of Climate and Health". Environmental health perspectives. 2016;124(6):A105. Epub 2016/06/02. doi: http://dx.doi.org/10.1289/ehp350. PubMed PMID: 27248290; PMCID: PMC4892902.
- 92. Bennett D, Bellinger DC, Birnbaum LS, Bradman A, Chen A, Cory-Slechta DA, Engel SM, Fallin MD, Halladay A, Hauser R, Hertz-Picciotto I, Kwiatkowski CF, Lanphear BP, Marquez E, Marty M, McPartland J, Newschaffer CJ, Payne-Sturges D, Patisaul HB, Perera FP, Ritz B, Sass J, Schantz SL, Webster TF, Whyatt RM, Woodruff TJ, Zoeller RT, Anderko L, Campbell C, Conry JA, DeNicola N, Gould RM, Hirtz D, Huffling K, Landrigan PJ, Lavin A, Miller M, Mitchell MA, Rubin L, Schettler T, Tran HL, Acosta A, Brody C, Miller E, Miller P, Swanson M, Witherspoon NO. Project TENDR: Targeting Environmental Neuro-Developmental Risks The TENDR Consensus Statement. Environmental health perspectives. 2016;124(7):A118-22. Epub 2016/08/02. doi: http://dx.doi.org/10.1289/ehp358. PubMed PMID: 27479987; PMCID: PMC4937840.
- 93. Cui Y, Balshaw DM, Kwok RK, Thompson CL, Collman GW, Birnbaum LS. The Exposome: Embracing the Complexity for Discovery in Environmental Health. Environmental health perspectives. 2016;124(8):A137-40. Epub 2016/08/02. doi: http://dx.doi.org/10.1289/ehp412. PubMed PMID: 27479988; PMCID: PMC4977033.
- 94. Cote I, Andersen ME, Ankley GT, Barone S, Birnbaum LS, Boekelheide K, Bois FY, Burgoon LD, Chiu WA, Crawford-Brown D, Crofton KM, DeVito M, Devlin RB, Edwards SW, Guyton KZ, Hattis D, Judson RS, Knight D, Krewski D, Lambert J, Maull EA, Mendrick D, Paoli GM, Patel CJ, Perkins EJ, Poje G, Portier CJ, Rusyn I, Schulte PA, Simeonov A, Smith MT, Thayer KA, Thomas RS, Thomas R, Tice RR, Vandenberg JJ, Villeneuve DL, Wesselkamper S, Whelan M, Whittaker C, White R, Xia M, Yauk C, Zeise L, Zhao J, DeWoskin RS. The Next Generation of Risk Assessment Multi-Year Study-Highlights of Findings, Applications to Risk Assessment, and Future Directions. Environmental health perspectives.

- 2016;124(11):1671-82. Epub 2016/11/02. doi: http://dx.doi.org/10.1289/ehp233. PubMed PMID: 27091369; PMCID: PMC5089888.
- 95. Bucher JR, Birnbaum LS. Commemorating Toxicology at the National Institute of Environmental Health Sciences on the Occasion of Its 50th Anniversary. Environmental health perspectives. 2016;124(11):A192-a5. Epub 2016/11/02. doi: http://dx.doi.org/10.1289/ehp463. PubMed PMID: 27801649; PMCID: PMC5089890.
- 96. Emond C, DeVito M, Warner M, Eskenazi B, Mocarelli P, Birnbaum LS. An assessment of dioxin exposure across gestation and lactation using a PBPK model and new data from Seveso. Environment international. 2016;92-93:23-32. Epub 2016/04/06. doi: http://dx.doi.org/10.1016/j.envint.2016.03.015. PubMed PMID: 27045706; PMCID: PMC4902767.
- 97. Birnbaum LS, Dutton ND, Cusack C, Mennemeyer ST, Pavuk M. Anniston community health survey: Follow-up and dioxin analyses (ACHS-II)--methods. Environmental science and pollution research international. 2016;23(3):2014-21. Epub 2015/05/20. doi: http://dx.doi.org/10.1007/s11356-015-4684-3. PubMed PMID: 25982988; PMCID: PMC4648703.
- 98. Schug TT, Johnson AF, Birnbaum LS, Colborn T, Guillette LJ, Jr., Crews DP, Collins T, Soto AM, Vom Saal FS, McLachlan JA, Sonnenschein C, Heindel JJ. Endocrine Disruptors: Past Lessons and Future Directions. Molecular endocrinology (Baltimore, Md). 2016;30(8):833-47. Epub 2016/08/02. doi: http://dx.doi.org/10.1210/me.2016-1096. PubMed PMID: 27477640; PMCID: PMC4965846.
- 99. Collins FS, Anderson JM, Austin CP, Battey JF, Birnbaum LS, Briggs JP, Clayton JA, Cuthbert B, Eisinger RW, Fauci AS, Gallin JI, Gibbons GH, Glass RI, Gottesman MM, Gray PA, Green ED, Greider FB, Hodes R, Hudson KL, Humphreys B, Katz SI, Koob GF, Koroshetz WJ, Lauer MS, Lorsch JR, Lowy DR, McGowan JJ, Murray DM, Nakamura R, Norris A, Perez-Stable EJ, Pettigrew RI, Riley WT, Rodgers GP, Sieving PA, Somerman MJ, Spong CY, Tabak LA, Volkow ND, Wilder EL. Basic science: Bedrock of progress. Science (New York, NY). 2016;351(6280):1405. Epub 2016/03/26. doi: http://dx.doi.org/10.1126/science.351.6280.1405-a. PubMed PMID: 27013720; PMCID: PMC5101936.
- 100. Sanders JM, Coulter SJ, Knudsen GA, Dunnick JK, Kissling GE, Birnbaum LS. Disruption of estrogen homeostasis as a mechanism for uterine toxicity in Wistar Han rats treated with tetrabromobisphenol A. Toxicology and applied pharmacology. 2016;298:31-9. Epub 2016/03/19. doi: http://dx.doi.org/10.1016/j.taap.2016.03.007. PubMed PMID: 26988606; PMCID: PMC4825186.
- 101. Knudsen GA, Hughes MF, Sanders JM, Hall SM, Birnbaum LS. Estimation of human percutaneous bioavailability for two novel brominated flame retardants, 2-ethylhexyl 2,3,4,5-tetrabromobenzoate (EH-TBB) and bis(2-ethylhexyl) tetrabromophthalate (BEH-TEBP). Toxicology and applied pharmacology. 2016;311:117-27. Epub 2016/10/26. doi: http://dx.doi.org/10.1016/j.taap.2016.10.005. PubMed PMID: 27732871; PMCID: PMC5090262.
- 102. Szabo ST, Harry GJ, Hayden KM, Szabo DT, Birnbaum LS. Comparison of Metal Levels between Postmortem Brain and Ventricular Fluid in Alzheimer's Disease and Nondemented Elderly Controls. Toxicological sciences: an official journal of the Society of Toxicology. 2016;150(2):292-300. Epub 2016/01/02. doi: http://dx.doi.org/10.1093/toxsci/kfv325. PubMed PMID: 26721301; PMCID: PMC4881830.

- 103. Knudsen GA, Sanders JM, Birnbaum LS. Disposition of the Emerging Brominated Flame Retardant, 2-Ethylhexyl 2,3,4,5-Tetrabromobenzoate, in Female SD Rats and Male B6C3F1 Mice: Effects of Dose, Route, and Repeated Administration. Toxicological sciences: an official journal of the Society of Toxicology. 2016;154(2):392-402. Epub 2016/09/11. doi: http://dx.doi.org/10.1093/toxsci/kfw176. PubMed PMID: 27613714; PMCID: PMC5139073.
- 104. Heindel JJ, Balbus J, Birnbaum LS, Brune-Drisse MN, Grandjean P, Gray K, Landrigan PJ, Sly PD, Suk W, Cory Slechta D, Thompson C, Hanson M. Developmental Origins of Health and Disease: Integrating Environmental Influences. Endocrinology. 2015;156(10):3416-21. Epub 2015/08/05. doi: http://dx.doi.org/10.1210/en.2015-1394. PubMed PMID: 26241070; PMCID: PMC4588819.
- 105. Birnbaum LS, Miller MF. Prenatal Programming and Toxicity (PPTOX) Introduction. Endocrinology. 2015;156(10):3405-7. Epub 2015/08/05. doi: http://dx.doi.org/10.1210/en.2015-1458. PubMed PMID: 26241073; PMCID: PMC4588826.
- 106. Hoffman K, Garantziotis S, Birnbaum LS, Stapleton HM. Monitoring indoor exposure to organophosphate flame retardants: hand wipes and house dust. Environmental health perspectives. 2015;123(2):160-5. Epub 2014/10/25. doi: http://dx.doi.org/10.1289/ehp.1408669. PubMed PMID: 25343780; PMCID: PMC4314253.
- Pearce N, Blair A, Vineis P, Ahrens W, Andersen A, Anto JM, Armstrong BK, Baccarelli AA, Beland 107. FA, Berrington A, Bertazzi PA, Birnbaum LS, Brownson RC, Bucher JR, Cantor KP, Cardis E, Cherrie JW, Christiani DC, Cocco P, Coggon D, Comba P, Demers PA, Dement JM, Douwes J, Eisen EA, Engel LS, Fenske RA, Fleming LE, Fletcher T, Fontham E, Forastiere F, Frentzel-Beyme R, Fritschi L, Gerin M, Goldberg M, Grandjean P, Grimsrud TK, Gustavsson P, Haines A, Hartge P, Hansen J, Hauptmann M, Heederik D, Hemminki K, Hemon D, Hertz-Picciotto I, Hoppin JA, Huff J, Jarvholm B, Kang D, Karagas MR, Kjaerheim K, Kjuus H, Kogevinas M, Kriebel D, Kristensen P, Kromhout H, Laden F, Lebailly P, LeMasters G, Lubin JH, Lynch CF, Lynge E, t Mannetje A, McMichael AJ, McLaughlin JR, Marrett L, Martuzzi M, Merchant JA, Merler E, Merletti F, Miller A, Mirer FE, Monson R, Nordby KC, Olshan AF, Parent ME, Perera FP, Perry MJ, Pesatori AC, Pirastu R, Porta M, Pukkala E, Rice C, Richardson DB, Ritter L, Ritz B, Ronckers CM, Rushton L, Rusiecki JA, Rusyn I, Samet JM, Sandler DP, de Sanjose S, Schernhammer E, Costantini AS, Seixas N, Shy C, Siemiatycki J, Silverman DT, Simonato L, Smith AH, Smith MT, Spinelli JJ, Spitz MR, Stallones L, Stayner LT, Steenland K, Stenzel M, Stewart BW, Stewart PA, Symanski E, Terracini B, Tolbert PE, Vainio H, Vena J, Vermeulen R, Victora CG, Ward EM, Weinberg CR, Weisenburger D, Wesseling C, Weiderpass E, Zahm SH. IARC monographs: 40 years of evaluating carcinogenic hazards to humans. Environmental health perspectives. 2015;123(6):507-14. Epub 2015/02/26. doi: http://dx.doi.org/10.1289/ehp.1409149. PubMed PMID: 25712798; PMCID: PMC4455595.
- 108. Grossman E, Vandenberg LN, Thayer K, Birnbaum LS. Theodora (Theo) Colborn: 1927-2014. Environmental health perspectives. 2015;123(3):A54. Epub 2015/03/03. doi: http://dx.doi.org/10.1289/ehp.1509743. PubMed PMID: 25730706; PMCID: PMC4348749.
- 109. Birnbaum LS, Grandjean P. Alternatives to PFASs: perspectives on the science. Environmental health perspectives. 2015;123(5):A104-5. Epub 2015/05/02. doi: http://dx.doi.org/10.1289/ehp.1509944. PubMed PMID: 25932670; PMCID: PMC4421778.

- 110. Lam T, Williams PL, Lee MM, Korrick SA, Birnbaum LS, Burns JS, Sergeyev O, Revich B, Altshul LM, Patterson DG, Jr., Hauser R. Prepubertal Serum Concentrations of Organochlorine Pesticides and Age at Sexual Maturity in Russian Boys. Environmental health perspectives. 2015;123(11):1216-21. Epub 2015/05/27. doi: http://dx.doi.org/10.1289/ehp.1409022. PubMed PMID: 26009253; PMCID: PMC4629743.
- 111. Langley G, Austin CP, Balapure AK, Birnbaum LS, Bucher JR, Fentem J, Fitzpatrick SC, Fowle JR, 3rd, Kavlock RJ, Kitano H, Lidbury BA, Muotri AR, Peng SQ, Sakharov D, Seidle T, Trez T, Tonevitsky A, van de Stolpe A, Whelan M, Willett C. Lessons from Toxicology: Developing a 21st-Century Paradigm for Medical Research. Environmental health perspectives. 2015;123(11):A268-72. Epub 2015/11/03. doi: http://dx.doi.org/10.1289/ehp.1510345. PubMed PMID: 26523530; PMCID: PMC4629751.
- 112. Thayer KA, Doerge DR, Hunt D, Schurman SH, Twaddle NC, Churchwell MI, Garantziotis S, Kissling GE, Easterling MR, Bucher JR, Birnbaum LS. Pharmacokinetics of bisphenol A in humans following a single oral administration. Environment international. 2015;83:107-15. Epub 2015/06/27. doi: http://dx.doi.org/10.1016/j.envint.2015.06.008. PubMed PMID: 26115537; PMCID: PMC4545316.
- 113. Birnbaum LS, Lorber M, Schecter A, Paepke O, Shropshire W, Christensen K. Exposure assessment of adult intake of bisphenol A (BPA) with emphasis on canned food dietary exposures. Environ Internation. 2015;77:55-62. Epub 2015/02/04. doi: http://dx.doi.org/10.1016/j.envint.2015.01.008. PubMed PMID: 25645382; PMCID: PMC4469126.
- 114. Fenton SE, Birnbaum LS. Timing of Environmental Exposures as a Critical Element in Breast Cancer Risk. The Journal of clinical endocrinology and metabolism. 2015;100(9):3245-50. Epub 2015/07/28. doi: http://dx.doi.org/10.1210/jc.2015-2848. PubMed PMID: 26214118; PMCID: PMC4570175.
- 115. Forman MR, Winn DM, Collman GW, Rizzo J, Birnbaum LS. Environmental exposures, breast development and cancer risk: Through the looking glass of breast cancer prevention. Reproductive toxicology (Elmsford, NY). 2015;54:6-10. Epub 2014/12/17. doi: http://dx.doi.org/10.1016/j.reprotox.2014.10.019. PubMed PMID: 25499721.
- 116. Miller A, Birnbaum LS. Preparing for disasters. Science (New York, NY). 2015;348(6236):766-7. Epub 2015/05/16. doi: http://dx.doi.org/10.1126/science.348.6236.766-c. PubMed PMID: 25977543.
- 117. Knudsen GA, Hughes MF, McIntosh KL, Sanders JM, Birnbaum LS. Estimation of tetrabromobisphenol A (TBBPA) percutaneous uptake in humans using the parallelogram method. Toxicology and applied pharmacology. 2015;289(2):323-9. Epub 2015/09/22. doi: http://dx.doi.org/10.1016/j.taap.2015.09.012. PubMed PMID: 26387765; PMCID: PMC4651786.
- 118. Parks CG, Miller FW, Satoh M, Chan EK, Andrushchenko Z, Birnbaum LS, Jusko TA, Kissling GE, Patel MD, Rose KM, Weinberg C, Zeldin DC, Sandler DP. Reproductive and hormonal risk factors for antinuclear antibodies (ANA) in a representative sample of U.S. women. Cancer epidemiology, biomarkers & prevention: a publication of the American Association for Cancer Research, cosponsored by the American Society of Preventive Oncology. 2014;23(11):2492-502. Epub 2014/08/03. doi: http://dx.doi.org/10.1158/1055-9965.Epi-14-0429. PubMed PMID: 25086100; PMCID: PMC4361940.

- 119. Birnbaum LS, Schug TT. Phthalates in our food. Endocrine Disruptors. 2014;1(1). doi: https://doi.org/10.4161/endo.25078.
- 120. Birnbaum LS. Retirement of Hugh A. Tilson [Editorial]. Environmental health perspectives. 2014;122(8). doi: http://dx.doi.org/10.1289/ehp.1408430.
- 121. Pedersen LC, Birnbaum LS, Gosavi RA, Knudsen GA. Crystallographic analysis and mimicking of estradiol binding: Pedersen et al. Respond. Environmental health perspectives. 2014;122(4):A91-2. Epub 2014/04/03. doi: http://dx.doi.org/10.1289/ehp.1307987R. PubMed PMID: 24691124; PMCID: PMC3984220.
- Hoffman K, Fang M, Horman B, Patisaul HB, Garantziotis S, Birnbaum LS, Stapleton HM. Urinary tetrabromobenzoic acid (TBBA) as a biomarker of exposure to the flame retardant mixture Firemaster® 550. Environmental health perspectives. 2014;122(9):963-9. Epub 2014/05/16. doi: http://dx.doi.org/10.1289/ehp.1308028. PubMed PMID: 24823833; PMCID: PMC4154220.
- 123. Thayer KA, Wolfe MS, Rooney AA, Boyles AL, Bucher JR, Birnbaum LS. Intersection of systematic review methodology with the NIH reproducibility initiative. Environmental health perspectives. 2014;122(7):A176-7. Epub 2014/07/02. doi: http://dx.doi.org/10.1289/ehp.1408671. PubMed PMID: 24984224; PMCID: PMC4080520.
- 124. Birnbaum LS, Tart KT. Protecting our children from climate change. Environmental health perspectives. 2014;122(10):A260-1. Epub 2014/10/02. doi: http://dx.doi.org/10.1289/ehp.1409165. PubMed PMID: 25271472; PMCID: PMC4181937.
- 125. Lam T, Williams PL, Lee MM, Korrick SA, Birnbaum LS, Burns JS, Sergeyev O, Revich B, Altshul LM, Patterson DG, Jr., Turner WE, Hauser R. Prepubertal organochlorine pesticide concentrations and age of pubertal onset among Russian boys. Environment international. 2014;73:135-42. Epub 2014/08/15. doi: http://dx.doi.org/10.1016/j.envint.2014.06.020. PubMed PMID: 25118086; PMCID: PMC4194160.
- 126. Segars JH, Parrott EC, Nagel JD, Guo XC, Gao X, Birnbaum LS, Pinn VW, Dixon D. Proceedings from the Third National Institutes of Health International Congress on Advances in Uterine Leiomyoma Research: comprehensive review, conference summary and future recommendations. Human reproduction update. 2014;20(3):309-33. Epub 2014/01/10. doi: http://dx.doi.org/10.1093/humupd/dmt058. PubMed PMID: 24401287; PMCID: PMC3999378.
- 127. Cesta MF, Malarkey DE, Herbert RA, Brix A, Hamlin MH, 2nd, Singletary E, Sills RC, Bucher JR, Birnbaum LS. The National Toxicology Program Web-based nonneoplastic lesion atlas: a global toxicology and pathology resource. Toxicologic pathology. 2014;42(2):458-60. Epub 2014/02/04. doi: http://dx.doi.org/10.1177/0192623313517304. PubMed PMID: 24488020; PMCID: PMC6880752.
- 128. Knudsen GA, Sanders JM, Sadik AM, Birnbaum LS. Disposition and kinetics of Tetrabromobisphenol A in female Wistar Han rats. Toxicology reports. 2014;1:214-23. Epub 2014/07/01. doi: http://dx.doi.org/10.1016/j.toxrep.2014.03.005. PubMed PMID: 24977115; PMCID: PMC4071299.
- 129. Frawley R, DeVito M, Walker NJ, Birnbaum L, White K, Jr., Smith M, Maynor T, Recio L, Germolec D. Relative potency for altered humoral immunity induced by polybrominated and polychlorinated

dioxins/furans in female B6C3F1/N mice. Toxicological sciences: an official journal of the Society of Toxicology. 2014;139(2):488-500. Epub 2014/04/10. doi: http://dx.doi.org/10.1093/toxsci/kfu041. PubMed PMID: 24713691; PMCID: PMC4031622.

- 130. Sueyoshi T, Li L, Wang H, Moore R, Kodavanti PR, Lehmler HJ, Negishi M, Birnbaum LS. Flame retardant BDE-47 effectively activates nuclear receptor CAR in human primary hepatocytes. Toxicological sciences: an official journal of the Society of Toxicology. 2014;137(2):292-302. Epub 2013/11/13. doi: http://dx.doi.org/10.1093/toxsci/kft243. PubMed PMID: 24218150; PMCID: PMC3908718.
- 131. Humblet O, Korrick SA, Williams PL, Sergeyev O, Emond C, Birnbaum LS, Burns JS, Altshul LM, Patterson DG, Jr., Turner WE, Lee MM, Revich B, Hauser R. Genetic modification of the association between peripubertal dioxin exposure and pubertal onset in a cohort of Russian boys. Environmental health perspectives. 2013;121(1):111-7. Epub 2012/10/13. doi: http://dx.doi.org/10.1289/ehp.1205278. PubMed PMID: 23060366; PMCID: PMC3546349.
- 132. La Merrill M, Emond C, Kim MJ, Antignac JP, Le Bizec B, Clement K, Birnbaum LS, Barouki R. Toxicological function of adipose tissue: focus on persistent organic pollutants. Environmental health perspectives. 2013;121(2):162-9. Epub 2012/12/12. doi: http://dx.doi.org/10.1289/ehp.1205485. PubMed PMID: 23221922; PMCID: PMC3569688.
- 133. Birnbaum LS. Designing safer chemicals. Environmental health perspectives. 2013;121(1):A9. Epub 2013/01/05. doi: http://dx.doi.org/10.1289/ehp.1206349. PubMed PMID: 23287533; PMCID: PMC3553447.
- 134. Birnbaum LS. 15 years out: reinventing ICCVAM. Environmental health perspectives. 2013;121(2):a40. Epub 2013/02/06. doi: http://dx.doi.org/10.1289/ehp.1206292. PubMed PMID: 23380598; PMCID: PMC3569695.
- 135. Schug TT, Johnson AF, Balshaw DM, Garantziotis S, Walker NJ, Weis C, Nadadur SS, Birnbaum LS. ONE Nano: NIEHS's strategic initiative on the health and safety effects of engineered nanomaterials. Environmental health perspectives. 2013;121(4):410-4. Epub 2013/02/15. doi: http://dx.doi.org/10.1289/ehp.1206091. PubMed PMID: 23407114; PMCID: PMC3620765.
- 136. Carlin DJ, Rider CV, Woychik R, Birnbaum LS. Unraveling the health effects of environmental mixtures: an NIEHS priority. Environmental health perspectives. 2013;121(1):A6-8. Epub 2013/02/15. doi: http://dx.doi.org/10.1289/ehp.1206182. PubMed PMID: 23409283; PMCID: PMC3553446.
- 137. Schecter A, Lorber M, Guo Y, Wu Q, Yun SH, Kannan K, Hommel M, Imran N, Hynan LS, Cheng D, Colacino JA, Birnbaum LS. Phthalate concentrations and dietary exposure from food purchased in New York State. Environmental health perspectives. 2013;121(4):473-94. Epub 2013/03/07. doi: http://dx.doi.org/10.1289/ehp.1206367. PubMed PMID: 23461894; PMCID: PMC3620091.
- 138. Birnbaum LS. State of the science of endocrine disruptors. Environmental health perspectives. 2013;121(4):A107. Epub 2013/04/04. doi: http://dx.doi.org/10.1289/ehp.1306695. PubMed PMID: 23548815; PMCID: PMC3620755.

- 139. Birnbaum LS, Thayer KA, Bucher JR, Wolfe MS. Implementing systematic review at the National Toxicology Program: status and next steps. Environmental health perspectives. 2013;121(4):A108-9. Epub 2013/04/04. doi: http://dx.doi.org/10.1289/ehp.1306711. PubMed PMID: 23548834; PMCID: PMC3620750.
- 140. Taylor KW, Novak RF, Anderson HA, Birnbaum LS, Blystone C, Devito M, Jacobs D, Kohrle J, Lee DH, Rylander L, Rignell-Hydbom A, Tornero-Velez R, Turyk ME, Boyles AL, Thayer KA, Lind L. Evaluation of the association between persistent organic pollutants (POPs) and diabetes in epidemiological studies: a national toxicology program workshop review. Environmental health perspectives. 2013;121(7):774-83. Epub 2013/05/09. doi: http://dx.doi.org/10.1289/ehp.1205502. PubMed PMID: 23651634; PMCID: PMC3701910.
- 141. Birnbaum LS, Aungst J, Schug TT, Goodman JL. Working together: research- and science-based regulation of BPA. Environmental health perspectives. 2013;121(7):A206-7. Epub 2013/07/03. doi: http://dx.doi.org/10.1289/ehp.1306963. PubMed PMID: 23817036; PMCID: PMC3702012.
- 142. Lam T, Williams PL, Burns JS, Sergeyev O, Korrick SA, Lee MM, Birnbaum LS, Revich B, Altshul LM, Patterson DG, Jr., Turner WE, Hauser R. Predictors of serum chlorinated pesticide concentrations among prepubertal Russian boys. Environmental health perspectives. 2013;121(11-12):1372-7. Epub 2013/08/21. doi: http://dx.doi.org/10.1289/ehp.1306480. PubMed PMID: 23955839; PMCID: PMC3855511.
- 143. Gosavi RA, Knudsen GA, Birnbaum LS, Pedersen LC. Mimicking of estradiol binding by flame retardants and their metabolites: a crystallographic analysis. Environmental health perspectives. 2013;121(10):1194-9. Epub 2013/08/21. doi: http://dx.doi.org/10.1289/ehp.1306902. PubMed PMID: 23959441; PMCID: PMC3801471.
- 144. Balbus JM, Barouki R, Birnbaum LS, Etzel RA, Gluckman PD, Sr., Grandjean P, Hancock C, Hanson MA, Heindel JJ, Hoffman K, Jensen GK, Keeling A, Neira M, Rabadan-Diehl C, Ralston J, Tang KC. Early-life prevention of non-communicable diseases. Lancet (London, England). 2013;381(9860):3-4. Epub 2013/01/08. doi: http://dx.doi.org/10.1016/s0140-6736(12)61609-2. PubMed PMID: 23290956; PMCID: PMC3849695.
- 145. Landrigan PJ, Wright RO, Birnbaum LS. Mercury toxicity in children. Science (New York, NY). 2013;342(6165):1447. Epub 2013/12/21. doi: http://dx.doi.org/10.1126/science.342.6165.1447. PubMed PMID: 24357301.
- 146. Emond C, Sanders JM, Wikoff D, Birnbaum LS. Proposed mechanistic description of dose-dependent BDE-47 urinary elimination in mice using a physiologically based pharmacokinetic model. Toxicology and applied pharmacology. 2013;273(2):335-44. Epub 2013/09/24. doi: http://dx.doi.org/10.1016/j.taap.2013.09.007. PubMed PMID: 24055880; PMCID: PMC3913262.
- 147. van den Berg M, Denison MS, Birnbaum LS, Devito MJ, Fiedler H, Falandysz J, Rose M, Schrenk D, Safe S, Tohyama C, Tritscher A, Tysklind M, Peterson RE. Polybrominated dibenzo-p-dioxins, dibenzofurans, and biphenyls: inclusion in the toxicity equivalency factor concept for dioxin-like compounds. Toxicological sciences: an official journal of the Society of Toxicology. 2013;133(2):197-208.

Epub 2013/03/16. doi: http://dx.doi.org/10.1093/toxsci/kft070. PubMed PMID: 23492812; PMCID: PMC3663561.

- 148. Sanders JM, Knudsen GA, Birnbaum LS. The fate of beta-hexabromocyclododecane in female C57BL/6 mice. Toxicological sciences: an official journal of the Society of Toxicology. 2013;134(2):251-7. Epub 2013/06/05. doi: http://dx.doi.org/10.1093/toxsci/kft121. PubMed PMID: 23733921; PMCID: PMC3707439.
- 149. Burns KA, Zorrilla LM, Hamilton KJ, Reed CE, Birnbaum LS, Korach KS. A single gestational exposure to 2,3,7,8-tetrachlorodibenzo-p-dioxin disrupts the adult uterine response to estradiol in mice. Toxicological sciences: an official journal of the Society of Toxicology. 2013;136(2):514-26. Epub 2013/09/21. doi: http://dx.doi.org/10.1093/toxsci/kft208. PubMed PMID: 24052564; PMCID: PMC3858195.
- 150. Birnbaum LS. When environmental chemicals act like uncontrolled medicine. Trends in endocrinology and metabolism: TEM. 2013;24(7):321-3. Epub 2013/05/11. doi: http://dx.doi.org/10.1016/j.tem.2012.12.005. PubMed PMID: 23660158; PMCID: PMC6338420.
- 151. Satoh M, Chan EK, Ho LA, Rose KM, Parks CG, Cohn RD, Jusko TA, Walker NJ, Germolec DR, Whitt IZ, Crockett PW, Pauley BA, Chan JY, Ross SJ, Birnbaum LS, Zeldin DC, Miller FW. Prevalence and sociodemographic correlates of antinuclear antibodies in the United States. Arthritis and rheumatism. 2012;64(7):2319-27. Epub 2012/01/13. doi: http://dx.doi.org/10.1002/art.34380. PubMed PMID: 22237992; PMCID: PMC3330150.
- 152. Schecter A, Malik-Bass N, Calafat AM, Kato K, Colacino JA, Gent TL, Hynan LS, Harris TR, Malla S, Birnbaum LS. Polyfluoroalkyl compounds in Texas children from birth through 12 years of age. Environmental health perspectives. 2012;120(4):590-4. Epub 2011/12/21. doi: http://dx.doi.org/10.1289/ehp.1104325. PubMed PMID: 22182702; PMCID: PMC3339466.
- 153. Birnbaum LS. Environmental chemicals: evaluating low-dose effects. Environmental health perspectives. 2012;120(4):A143-4. Epub 2012/04/04. doi: http://dx.doi.org/10.1289/ehp.1205179. PubMed PMID: 22470049; PMCID: PMC3339483.
- 154. Landrigan PJ, Lambertini L, Birnbaum LS. A research strategy to discover the environmental causes of autism and neurodevelopmental disabilities. Environmental health perspectives. 2012;120(7):a258-60. Epub 2012/05/01. doi: http://dx.doi.org/10.1289/ehp.1104285. PubMed PMID: 22543002; PMCID: PMC3404655.
- 155. Schecter A, Szabo DT, Miller J, Gent TL, Malik-Bass N, Petersen M, Paepke O, Colacino JA, Hynan LS, Harris TR, Malla S, Birnbaum LS. Hexabromocyclododecane (HBCD) stereoisomers in U.S. food from Dallas, Texas. Environmental health perspectives. 2012;120(9):1260-4. Epub 2012/06/01. doi: http://dx.doi.org/10.1289/ehp.1204993. PubMed PMID: 22647707; PMCID: PMC3440131.
- 156. Birnbaum LS. Is supersize more than just too much food? Environmental health perspectives. 2012;120(6):A223-4. Epub 2012/06/05. doi: http://dx.doi.org/10.1289/ehp.1205200. PubMed PMID: 22659294; PMCID: PMC3385460.

- 157. Drew CH, Pettibone KG, O'Fallon LR, Collman GW, Birnbaum LS. Measuring partnership activities: partnerships in environmental public health evaluation metrics manual. Environmental health perspectives. 2012;120(7):a261-2. Epub 2012/07/05. doi: http://dx.doi.org/10.1289/ehp.1205512. PubMed PMID: 22759358; PMCID: PMC3404686.
- 158. Reid BC, Ghazarian AA, DeMarini DM, Sapkota A, Jack D, Lan Q, Winn DM, Birnbaum LS. Research opportunities for cancer associated with indoor air pollution from solid-fuel combustion. Environmental health perspectives. 2012;120(11):1495-8. Epub 2012/08/01. doi: http://dx.doi.org/10.1289/ehp.1204962. PubMed PMID: 22846419; PMCID: PMC3556624.
- 159. Birnbaum LS. NIEHS's new strategic plan. Environmental health perspectives. 2012;120(8):a298. Epub 2012/08/03. doi: http://dx.doi.org/10.1289/ehp.1205642. PubMed PMID: 22853936; PMCID: PMC3440102.
- 160. Cote I, Anastas PT, Birnbaum LS, Clark RM, Dix DJ, Edwards SW, Preuss PW. Advancing the next generation of health risk assessment. Environmental health perspectives. 2012;120(11):1499-502. Epub 2012/08/10. doi: http://dx.doi.org/10.1289/ehp.1104870. PubMed PMID: 22875311; PMCID: PMC3556615.
- 161. Birnbaum LS, Bucher JR, Collman GW, Zeldin DC, Johnson AF, Schug TT, Heindel JJ. Consortium-based science: the NIEHS's multipronged, collaborative approach to assessing the health effects of bisphenol A. Environmental health perspectives. 2012;120(12):1640-4. Epub 2012/10/12. doi: http://dx.doi.org/10.1289/ehp.1205330. PubMed PMID: 23052487; PMCID: PMC3548284.
- 162. Bergman A, Ryden A, Law RJ, de Boer J, Covaci A, Alaee M, Birnbaum LS, Petreas M, Rose M, Sakai S, Van den Eede N, van der Veen I. A novel abbreviation standard for organobromine, organochlorine and organophosphorus flame retardants and some characteristics of the chemicals. Environment international. 2012;49:57-82. Epub 2012/09/18. doi: http://dx.doi.org/10.1016/j.envint.2012.08.003. PubMed PMID: 22982223; PMCID: PMC3483428.
- 163. Hakk H, Szabo DT, Huwe J, Diliberto J, Birnbaum LS. Novel and distinct metabolites identified following a single oral dose of alpha- or gamma-hexabromocyclododecane in mice. Environmental science & technology. 2012;46(24):13494-503. Epub 2012/11/23. doi: http://dx.doi.org/10.1021/es303209g. PubMed PMID: 23171393; PMCID: PMC3608416.
- 164. Birnbaum LS. Environmental health science for regulatory decisionmaking. Duke Environ Law Pol Forum 2011;21(2):259-93. doi: https://scholarship.law.duke.edu/delpf/vol21/iss2/3.
- 165. Humblet O, Sergeyev O, Altshul L, Korrick SA, Williams PL, Emond C, Birnbaum LS, Burns JS, Lee MM, Revich B, Shelepchikov A, Feshin D, Hauser R. Temporal trends in serum concentrations of polychlorinated dioxins, furans, and PCBs among adult women living in Chapaevsk, Russia: a longitudinal study from 2000 to 2009. Environmental health: a global access science source. 2011;10:62. Epub 2011/06/24. doi: http://dx.doi.org/10.1186/1476-069x-10-62. PubMed PMID: 21696632; PMCID: PMC3142486.
- 166. Birnbaum LS. SOT at 50: A proud legacy, a vibrant future. Environmental health perspectives. 2011;119(3):a110-1. Epub 2011/03/02. doi: http://dx.doi.org/10.1289/ehp.1103511. PubMed PMID: 21356627; PMCID: PMC3060008.

- 167. Bucher JR, Thayer K, Birnbaum LS. The Office of Health Assessment and Translation: a problem-solving resource for the National Toxicology Program. Environmental health perspectives. 2011;119(5):A196-7. Epub 2011/05/03. doi: http://dx.doi.org/10.1289/ehp.1103645. PubMed PMID: 21531652; PMCID: PMC3094430.
- 168. Humblet O, Williams PL, Korrick SA, Sergeyev O, Emond C, Birnbaum LS, Burns JS, Altshul L, Patterson DG, Jr., Turner WE, Lee MM, Revich B, Hauser R. Dioxin and polychlorinated biphenyl concentrations in mother's serum and the timing of pubertal onset in sons. Epidemiology (Cambridge, Mass). 2011;22(6):827-35. Epub 2011/10/05. doi: http://dx.doi.org/10.1097/EDE.0b013e318230b0d1. PubMed PMID: 21968773; PMCID: PMC3741104.
- 169. Bookman EB, McAllister K, Gillanders E, Wanke K, Balshaw D, Rutter J, Reedy J, Shaughnessy D, Agurs-Collins T, Paltoo D, Atienza A, Bierut L, Kraft P, Fallin MD, Perera F, Turkheimer E, Boardman J, Marazita ML, Rappaport SM, Boerwinkle E, Suomi SJ, Caporaso NE, Hertz-Picciotto I, Jacobson KC, Lowe WL, Goldman LR, Duggal P, Gunnar MR, Manolio TA, Green ED, Olster DH, Birnbaum LS. Geneenvironment interplay in common complex diseases: forging an integrative model-recommendations from an NIH workshop. Genetic epidemiology. 2011;35(4):217-25. Epub 2011/02/11. doi: http://dx.doi.org/10.1002/gepi.20571. PubMed PMID: 21308768; PMCID: PMC3228883.
- 170. Birnbaum LS, Jung P. From endocrine disruptors to nanomaterials: advancing our understanding of environmental health to protect public health. Health affairs (Project Hope). 2011;30(5):814-22. Epub 2011/05/11. doi: http://dx.doi.org/10.1377/hlthaff.2010.1225. PubMed PMID: 21555467.
- 171. La Merrill M, Birnbaum LS. Childhood obesity and environmental chemicals. The Mount Sinai journal of medicine, New York. 2011;78(1):22-48. Epub 2011/01/25. doi: http://dx.doi.org/10.1002/msj.20229. PubMed PMID: 21259261; PMCID: PMC3076189.
- 172. Szabo DT, Diliberto JJ, Hakk H, Huwe JK, Birnbaum LS. Toxicokinetics of the flame retardant hexabromocyclododecane alpha: effect of dose, timing, route, repeated exposure, and metabolism. Toxicological sciences: an official journal of the Society of Toxicology. 2011;121(2):234-44. Epub 2011/03/29. doi: http://dx.doi.org/10.1093/toxsci/kfr059. PubMed PMID: 21441408.
- 173. Szabo DT, Diliberto JJ, Huwe JK, Birnbaum LS. Differences in tissue distribution of HBCD alpha and gamma between adult and developing mice. Toxicological sciences: an official journal of the Society of Toxicology. 2011;123(1):256-63. Epub 2011/06/28. doi: http://dx.doi.org/10.1093/toxsci/kfr161. PubMed PMID: 21705717.
- 174. Schecter A, Colacino J, Haffner D, Patel K, Opel M, Papke O, Birnbaum LS. Perfluorinated compounds, polychlorinated biphenyls, and organochlorine pesticide contamination in composite food samples from Dallas, Texas, USA. Environmental health perspectives. 2010;118(6):796-802. Epub 2010/02/12. doi: http://dx.doi.org/10.1289/ehp.0901347. PubMed PMID: 20146964; PMCID: PMC2898856.
- 175. Vinikoor LC, Larson TC, Bateson TF, Birnbaum LS. Exposure to asbestos-containing vermiculite ore and respiratory symptoms among individuals who were children while the mine was active in Libby, Montana. Environmental health perspectives. 2010;118(7):1033-28. Epub 2010/03/25. doi: http://dx.doi.org/10.1289/ehp.0901680. PubMed PMID: 20332072; PMCID: PMC2920904.

- 176. Schecter A, Haffner D, Colacino J, Patel K, Papke O, Opel M, Birnbaum LS. Polybrominated diphenyl ethers (PBDEs) and hexabromocyclodecane (HBCD) in composite U.S. food samples. Environmental health perspectives. 2010;118(3):357-62. Epub 2010/01/13. doi: http://dx.doi.org/10.1289/ehp.0901345. PubMed PMID: 20064778; PMCID: PMC2854763.
- 177. Birnbaum LS. TSCA reform under way in Congress. Environmental health perspectives. 2010;118(3):A 106. Epub 2010/03/04. doi: http://dx.doi.org/10.1289/ehp.1001917. PubMed PMID: 20197245; PMCID: PMC2854777.
- 178. Birnbaum LS, Stokes WS. Safety testing: moving toward alternative methods. Environmental health perspectives. 2010;118(1):A12-3. Epub 2010/03/20. doi: http://dx.doi.org/10.1289/ehp.0901704. PubMed PMID: 20238452; PMCID: PMC2831976.
- 179. Birnbaum LS. Applying research to public health questions: biologically relevant exposures. Environmental health perspectives. 2010;118(4):A152. Epub 2010/04/07. doi: http://dx.doi.org/10.1289/ehp.1002015. PubMed PMID: 20368121; PMCID: PMC2854739.
- 180. La Merrill M, Harper R, Birnbaum LS, Cardiff RD, Threadgill DW. Maternal dioxin exposure combined with a diet high in fat increases mammary cancer incidence in mice. Environmental health perspectives. 2010;118(5):596-601. Epub 2010/05/04. doi: http://dx.doi.org/10.1289/ehp.0901047. PubMed PMID: 20435547; PMCID: PMC2866672.
- 181. Birnbaum LS, Schroeder JC, Tilson HA. A repeat call for the banning of asbestos. Environmental health perspectives. 2010;118(7):A280-1. Epub 2010/07/06. doi: http://dx.doi.org/10.1289/ehp.1002419. PubMed PMID: 20601328; PMCID: PMC2920923.
- 182. Birnbaum LS, Jung P. Evolution in environmental health: incorporating the infectious disease paradigm. Environmental health perspectives. 2010;118(8):a327-8. Epub 2010/08/03. doi: http://dx.doi.org/10.1289/ehp.1002661. PubMed PMID: 20675264; PMCID: PMC2920094.
- 183. Birnbaum LS, Bergman A. Brominated and chlorinated flame retardants: the San Antonio Statement. Environmental health perspectives. 2010;118(12):A514-5. Epub 2010/12/03. doi: http://dx.doi.org/10.1289/ehp.1003088. PubMed PMID: 21123139; PMCID: PMC3002201.
- 184. Birnbaum LS, Staskal-Wikoff DS. 5th International PCB Workshop—summary and implications. Environment international. 2010;36(8):814-8. Epub 2010/08/24. doi: http://dx.doi.org/10.1016/j.envint.2010.06.011. PubMed PMID: 20728937; PMCID: PMC2975397.
- 185. Humblet O, Williams PL, Korrick SA, Sergeyev O, Emond C, Birnbaum LS, Burns JS, Altshul L, Patterson DG, Turner WE, Lee MM, Revich B, Hauser R. Predictors of serum dioxin, furan, and PCB concentrations among women from Chapaevsk, Russia. Environmental science & technology. 2010;44(14):5633-40. Epub 2010/06/29. doi: http://dx.doi.org/10.1021/es100976j. PubMed PMID: 20578718; PMCID: PMC3128795.
- 186. Lakind JS, Birnbaum LS. Out of the frying pan and out of the fire: the indispensable role of exposure science in avoiding risks from replacement chemicals. Journal of exposure science & environmental epidemiology. 2010;20(2):115-6. Epub 2010/02/18. doi: http://dx.doi.org/10.1038/jes.2009.71. PubMed PMID: 20160736.

- 187. Shaw SD, Blum A, Weber R, Kannan K, Rich D, Lucas D, Koshland CP, Dobraca D, Hanson S, Birnbaum LS. Halogenated flame retardants: do the fire safety benefits justify the risks? Reviews on environmental health. 2010;25(4):261-305. Epub 2011/01/28. doi: http://dx.doi.org/10.1515/REVEH.2010.25.4.261. PubMed PMID: 21268442.
- Emond C, Raymer JH, Studabaker WB, Garner CE, Birnbaum LS. A physiologically based 188. pharmacokinetic model for developmental exposure to BDE-47 in rats. Toxicology and applied pharmacology. 2010;242(3):290-8. Epub 2009/11/04. doi: http://dx.doi.org/10.1016/j.taap.2009.10.019. PubMed PMID: 19883674.
- Hines RN, Sargent D, Autrup H, Birnbaum LS, Brent RL, Doerrer NG, Cohen Hubal EA, Juberg DR, 189. Laurent C, Luebke R, Olejniczak K, Portier CJ, Slikker W. Approaches for assessing risks to sensitive populations: lessons learned from evaluating risks in the pediatric population. Toxicological sciences: an official journal of the Society of Toxicology. 2010;113(1):4-26. Epub 2009/09/23. doi: http://dx.doi.org/10.1093/toxsci/kfp217. PubMed PMID: 19770482; PMCID: PMC3469276.
- 190. Kodavanti PR, Coburn CG, Moser VC, MacPhail RC, Fenton SE, Stoker TE, Rayner JL, Kannan K, Birnbaum LS. Developmental exposure to a commercial PBDE mixture, DE-71: neurobehavioral, hormonal, and reproductive effects. Toxicological sciences: an official journal of the Society of Toxicology. 2010;116(1):297-312. Epub 2010/04/09. doi: http://dx.doi.org/10.1093/toxsci/kfq105. PubMed PMID: 20375078.
- Szabo DT, Diliberto JJ, Hakk H, Huwe JK, Birnbaum LS. Toxicokinetics of the flame retardant hexabromocyclododecane gamma: effect of dose, timing, route, repeated exposure, and metabolism. Toxicological sciences: an official journal of the Society of Toxicology. 2010;117(2):282-93. Epub 2010/06/22. doi: http://dx.doi.org/10.1093/toxsci/kfq183. PubMed PMID: 20562218.
- 192. La Merrill M, Baston DS, Denison MS, Birnbaum LS, Pomp D, Threadgill DW. Mouse breast cancer model-dependent changes in metabolic syndrome-associated phenotypes caused by maternal dioxin exposure and dietary fat. American journal of physiology Endocrinology and metabolism. 2009;296(1):E203-10. Epub 2008/10/09. doi: http://dx.doi.org/10.1152/ajpendo.90368.2008. PubMed PMID: 18840765; PMCID: PMC2636987.
- Birnbaum LS, Zenick H, Branche CM. Environmental justice: a continuing commitment to an 193. evolving concept. American journal of public health. 2009;99 Suppl 3:S487-9. Epub 2009/11/06. doi: http://dx.doi.org/10.2105/ajph.2009.179010. PubMed PMID: 19890144; PMCID: PMC2774167.
- 194. Schecter A, Needham L, Pavuk M, Michalek J, Colacino J, Ryan J, Papke O, Birnbaum LS. Agent Orange exposure, Vietnam war veterans, and the risk of prostate cancer. Cancer. 2009;115(14):3369-71. Epub 2009/05/06. doi: http://dx.doi.org/10.1002/cncr.24365. PubMed PMID: 19415730.
- 195. Scott LL, Staskal DF, Williams ES, Luksemburg WJ, Urban JD, Nguyen LM, Haws LC, Birnbaum LS, Paustenbach DJ, Harris MA. Levels of polychlorinated dibenzo-p-dioxins, dibenzofurans, and biphenyls in southern Mississippi catfish and estimation of potential health risks. Chemosphere. 2009;74(7):1002-10. Epub 2008/12/26. doi: http://dx.doi.org/10.1016/j.chemosphere.2008.09.090. PubMed PMID: 19108868.

- 196. Glass R, Rosenthal J, Jessup CM, Birnbaum LS, Portier C. Tackling the research challenges of health and climate change. Environmental health perspectives. 2009;117(12):A534. Epub 2010/01/06. doi: http://dx.doi.org/10.1289/ehp.0901171. PubMed PMID: 20049179; PMCID: PMC2799475.
- 197. Birnbaum LS. Leading the world's premier environmental health organization: a message from Linda Birnbaum. Environmental health perspectives. 2009;117(4):A138. Epub 2009/05/15. doi: http://dx.doi.org/10.1289/ehp.12670. PubMed PMID: 19440468; PMCID: PMC2679615.
- 198. La Merrill M, Kuruvilla BS, Pomp D, Birnbaum LS, Threadgill DW. Dietary fat alters body composition, mammary development, and cytochrome p450 induction after maternal TCDD exposure in DBA/2J mice with low-responsive aryl hydrocarbon receptors. Environmental health perspectives. 2009;117(9):1414-9. Epub 2009/09/15. doi: http://dx.doi.org/10.1289/ehp.0800530. PubMed PMID: 19750107; PMCID: PMC2737019.
- 199. Birnbaum LS. Applying research to public health questions: timing and the environmentally relevant dose. Environmental health perspectives. 2009;117(11):A478. Epub 2010/01/06. doi: http://dx.doi.org/10.1289/ehp.0901417. PubMed PMID: 20049095; PMCID: PMC2801180.
- 200. White SS, Birnbaum LS. An overview of the effects of dioxins and dioxin-like compounds on vertebrates, as documented in human and ecological epidemiology. Journal of environmental science and health Part C, Environmental carcinogenesis & ecotoxicology reviews. 2009;27(4):197-211. Epub 2009/12/03. doi: http://dx.doi.org/10.1080/10590500903310047. PubMed PMID: 19953395; PMCID: PMC2788749.
- 201. Birnbaum LS. NIEHS supports partnerships in environmental public health. Progress in community health partnerships: research, education, and action. 2009;3(3):195-6. Epub 2009/01/01. doi: http://dx.doi.org/10.1353/cpr.0.0076. PubMed PMID: 20208218.
- 202. Hakk H, Diliberto JJ, Birnbaum LS. The effect of dose on 2,3,7,8-TCDD tissue distribution, metabolism and elimination in CYP1A2 (-/-) knockout and C57BL/6N parental strains of mice. Toxicology and applied pharmacology. 2009;241(1):119-26. Epub 2009/08/22. doi: http://dx.doi.org/10.1016/j.taap.2009.08.009. PubMed PMID: 19695277.
- 203. Szabo DT, Richardson VM, Ross DG, Diliberto JJ, Kodavanti PR, Birnbaum LS. Effects of perinatal PBDE exposure on hepatic phase I, phase II, phase III, and deiodinase 1 gene expression involved in thyroid hormone metabolism in male rat pups. Toxicological sciences: an official journal of the Society of Toxicology. 2009;107(1):27-39. Epub 2008/11/04. doi: http://dx.doi.org/10.1093/toxsci/kfn230. PubMed PMID: 18978342; PMCID: PMC2638650.
- 204. Humblet O, Birnbaum LS, Rimm E, Mittleman MA, Hauser R. Dioxins and cardiovascular disease mortality. Environmental health perspectives. 2008;116(11):1443-8. Epub 2008/12/06. doi: http://dx.doi.org/10.1289/ehp.11579. PubMed PMID: 19057694; PMCID: PMC2592261.
- 205. Woodruff TJ, Zeise L, Axelrad DA, Guyton KZ, Janssen S, Miller M, Miller GG, Schwartz JM, Alexeeff G, Anderson H, Birnbaum LS, Bois F, Cogliano VJ, Crofton K, Euling SY, Foster PM, Germolec DR, Gray E, Hattis DB, Kyle AD, Luebke RW, Luster MI, Portier C, Rice DC, Solomon G, Vandenberg J, Zoeller RT. Meeting report: moving upstream-evaluating adverse upstream end points for improved risk assessment and decision-making. Environmental health perspectives. 2008;116(11):1568-75. Epub

- 2008/12/06. doi: http://dx.doi.org/10.1289/ehp.11516. PubMed PMID: 19057713; PMCID: PMC2592280.
- 206. Weintraub M, Birnbaum LS. Catfish consumption as a contributor to elevated PCB levels in a non-Hispanic black subpopulation. Environmental research. 2008;107(3):412-7. Epub 2008/04/15. doi: http://dx.doi.org/10.1016/j.envres.2008.03.001. PubMed PMID: 18407261.
- 207. Huwe JK, Hakk H, Smith DJ, Diliberto JJ, Richardson V, Stapleton HM, Birnbaum LS. Comparative absorption and bioaccumulation of polybrominated diphenyl ethers following ingestion via dust and oil in male rats. Environmental science & technology. 2008;42(7):2694-700. Epub 2008/05/29. doi: http://dx.doi.org/10.1021/es702644k. PubMed PMID: 18505018.
- 208. Staskal DF, Scott LL, Haws LC, Luksemburg WJ, Birnbaum LS, Urban JD, Williams ES, Paustenbach DJ, Harris MA. Assessment of polybrominated diphenyl ether exposures and health risks associated with consumption of southern Mississippi catfish. Environmental science & technology. 2008;42(17):6755-61. Epub 2008/09/20. doi: http://dx.doi.org/10.1021/es800613k. PubMed PMID: 18800560.
- 209. Huwe JK, Hakk H, Birnbaum LS. Tissue distribution of polybrominated diphenyl ethers in male rats and implications for biomonitoring. Environmental science & technology. 2008;42(18):7018-24. Epub 2008/10/16. doi: http://dx.doi.org/10.1021/es801344a. PubMed PMID: 18853825.
- 210. Birnbaum LS. The effect of environmental chemicals on human health. Fertility and sterility. 2008;89(2 Suppl):e31. Epub 2008/03/20. doi: http://dx.doi.org/10.1016/j.fertnstert.2007.12.022. PubMed PMID: 18308056.
- 211. Jeong YC, Walker NJ, Burgin DE, Kissling G, Gupta M, Kupper L, Birnbaum LS, Swenberg JA. Accumulation of M1dG DNA adducts after chronic exposure to PCBs, but not from acute exposure to polychlorinated aromatic hydrocarbons. Free radical biology & medicine. 2008;45(5):585-91. Epub 2008/06/07. doi: http://dx.doi.org/10.1016/j.freeradbiomed.2008.04.043. PubMed PMID: 18534201; PMCID: PMC2570591.
- 212. Martin R, O'Shea J, Birnbaum LS, Luebke R. Community corner. Striking the balance in multiple sclerosis. Nature medicine. 2008;14(5):491. Epub 2008/05/09. doi: http://dx.doi.org/10.1038/nm0508-491. PubMed PMID: 18463656.
- 213. Richardson VM, Staskal DF, Ross DG, Diliberto JJ, DeVito MJ, Birnbaum LS. Possible mechanisms of thyroid hormone disruption in mice by BDE 47, a major polybrominated diphenyl ether congener. Toxicology and applied pharmacology. 2008;226(3):244-50. Epub 2007/10/30. doi: https://doi.org/10.1016/j.taap.2007.09.015. PubMed PMID: 17964624.
- 214. Smialowicz RJ, DeVito MJ, Williams WC, Birnbaum LS. Relative potency based on hepatic enzyme induction predicts immunosuppressive effects of a mixture of PCDDS/PCDFS and PCBS. Toxicology and applied pharmacology. 2008;227(3):477-84. Epub 2008/01/15. doi: http://dx.doi.org/10.1016/j.taap.2007.11.018. PubMed PMID: 18190939.
- 215. Dye JA, Venier M, Zhu L, Ward CR, Hites RA, Birnbaum LS. Elevated PBDE levels in pet cats: sentinels for humans? Environmental science & technology. 2007;41(18):6350-6. Epub 2007/10/24. doi: http://dx.doi.org/10.1021/es0708159. PubMed PMID: 17948778.

- 216. Richter CA, Birnbaum LS, Farabollini F, Newbold RR, Rubin BS, Talsness CE, Vandenbergh JG, Walser-Kuntz DR, vom Saal FS. In vivo effects of bisphenol A in laboratory rodent studies. Reproductive toxicology (Elmsford, NY). 2007;24(2):199-224. Epub 2007/08/09. doi: http://dx.doi.org/10.1016/j.reprotox.2007.06.004. PubMed PMID: 17683900; PMCID: PMC2151845.
- 217. vom Saal FS, Akingbemi BT, Belcher SM, Birnbaum LS, Crain DA, Eriksen M, Farabollini F, Guillette LJ, Jr., Hauser R, Heindel JJ, Ho SM, Hunt PA, Iguchi T, Jobling S, Kanno J, Keri RA, Knudsen KE, Laufer H, LeBlanc GA, Marcus M, McLachlan JA, Myers JP, Nadal A, Newbold RR, Olea N, Prins GS, Richter CA, Rubin BS, Sonnenschein C, Soto AM, Talsness CE, Vandenbergh JG, Vandenberg LN, Walser-Kuntz DR, Watson CS, Welshons WV, Wetherill Y, Zoeller RT. Chapel Hill bisphenol A expert panel consensus statement: integration of mechanisms, effects in animals and potential to impact human health at current levels of exposure. Reproductive toxicology (Elmsford, NY). 2007;24(2):131-8. Epub 2007/09/05. doi: http://dx.doi.org/10.1016/j.reprotox.2007.07.005. PubMed PMID: 17768031; PMCID: PMC2967230.
- 218. Emond C, Birnbaum LS, DeVito MJ. Use of a physiologically based pharmacokinetic model for rats to study the influence of body fat mass and induction of CYP1A2 on the pharmacokinetics of TCDD. Environmental health perspectives. 2006;114(9):1394-400. Epub 2006/09/13. doi: http://dx.doi.org/10.1289/ehp.8805. PubMed PMID: 16966094; PMCID: PMC1570044.
- 219. Birnbaum LS, Cohen Hubal EA. Polybrominated diphenyl ethers: a case study for using biomonitoring data to address risk assessment questions. Environmental health perspectives. 2006;114(11):1770-5. Epub 2006/11/17. doi: http://dx.doi.org/10.1289/ehp.9061. PubMed PMID: 17107866; PMCID: PMC1665443.
- 220. Schecter A, Birnbaum LS, Ryan JJ, Constable JD. Dioxins: an overview. Environmental research. 2006;101(3):419-28. Epub 2006/02/01. doi: http://dx.doi.org/10.1016/j.envres.2005.12.003. PubMed PMID: 16445906.
- 221. Haws LC, Su SH, Harris M, Devito MJ, Walker NJ, Farland WH, Finley B, Birnbaum LS. Development of a refined database of mammalian relative potency estimates for dioxin-like compounds. Toxicological sciences: an official journal of the Society of Toxicology. 2006;89(1):4-30. Epub 2005/08/27. doi: http://dx.doi.org/10.1093/toxsci/kfi294. PubMed PMID: 16120753.
- 222. Staskal DF, Diliberto JJ, Birnbaum LS. Impact of repeated exposure on the toxicokinetics of BDE 47 in mice. Toxicological sciences: an official journal of the Society of Toxicology. 2006;89(2):380-5. Epub 2005/11/11. doi: http://dx.doi.org/10.1093/toxsci/kfj038. PubMed PMID: 16280385.
- 223. Staskal DF, Diliberto JJ, Birnbaum LS. Disposition of BDE 47 in developing mice. Toxicological sciences: an official journal of the Society of Toxicology. 2006;90(2):309-16. Epub 2006/01/13. doi: http://dx.doi.org/10.1093/toxsci/kfj098. PubMed PMID: 16407092.
- 224. Van den Berg M, Birnbaum LS, Denison M, De Vito M, Farland W, Feeley M, Fiedler H, Hakansson H, Hanberg A, Haws L, Rose M, Safe S, Schrenk D, Tohyama C, Tritscher A, Tuomisto J, Tysklind M, Walker N, Peterson RE. The 2005 World Health Organization reevaluation of human and Mammalian toxic equivalency factors for dioxins and dioxin-like compounds. Toxicological sciences: an

- official journal of the Society of Toxicology. 2006;93(2):223-41. Epub 2006/07/11. doi: http://dx.doi.org/10.1093/toxsci/kfl055. PubMed PMID: 16829543; PMCID: PMC2290740.
- 225. Staskal DF, Hakk H, Bauer D, Diliberto JJ, Birnbaum LS. Toxicokinetics of polybrominated diphenyl ether congeners 47, 99, 100, and 153 in mice. Toxicological sciences: an official journal of the Society of Toxicology. 2006;94(1):28-37. Epub 2006/08/29. doi: http://dx.doi.org/10.1093/toxsci/kfl091. PubMed PMID: 16936226.
- 226. Emond C, Michalek JE, Birnbaum LS, DeVito MJ. Comparison of the use of a physiologically based pharmacokinetic model and a classical pharmacokinetic model for dioxin exposure assessments. Environmental health perspectives. 2005;113(12):1666-8. Epub 2005/12/07. doi: http://dx.doi.org/10.1289/ehp.8016. PubMed PMID: 16330344; PMCID: PMC1314902.
- 227. Windal I, Denison MS, Birnbaum LS, Van Wouwe N, Baeyens W, Goeyens L. Chemically activated luciferase gene expression (CALUX) cell bioassay analysis for the estimation of dioxin-like activity: critical parameters of the CALUX procedure that impact assay results. Environmental science & technology. 2005;39(19):7357-64. Epub 2005/10/26. doi: http://dx.doi.org/10.1021/es0504993. PubMed PMID: 16245802.
- 228. Van Larebeke NA, Birnbaum LS, Boogaerts MA, Bracke M, Davis DL, Demarini DM, Hooper K, Huff J, Kleinjans JC, Legator MS, Schoeters G, Vahakangas K. Unrecognized or potential risk factors for childhood cancer. International journal of occupational and environmental health. 2005;11(2):199-201. Epub 2005/05/07. doi: http://dx.doi.org/10.1179/oeh.2005.11.2.199. PubMed PMID: 15875896.
- 229. Staskal DF, Diliberto JJ, DeVito MJ, Birnbaum LS. Toxicokinetics of BDE 47 in female mice: effect of dose, route of exposure, and time. Toxicological sciences: an official journal of the Society of Toxicology. 2005;83(2):215-23. Epub 2004/10/29. doi: http://dx.doi.org/10.1093/toxsci/kfi018. PubMed PMID: 15509665.
- 230. Staskal DF, Diliberto JJ, Devito MJ, Birnbaum LS. Inhibition of human and rat CYP1A2 by TCDD and dioxin-like chemicals. Toxicological sciences: an official journal of the Society of Toxicology. 2005;84(2):225-31. Epub 2005/01/22. doi: http://dx.doi.org/10.1093/toxsci/kfi090. PubMed PMID: 15659567.
- 231. Schwetz BA, Lehman-McKeeman L, Birnbaum LS. Toxicological research involving humans: ethical and regulatory considerations. Toxicological sciences: an official journal of the Society of Toxicology. 2005;85(1):419-21. Epub 2005/04/14. doi: http://dx.doi.org/10.1093/toxsci/kfi140. PubMed PMID: 15827268.
- 232. Kodavanti PR, Ward TR, Ludewig G, Robertson LW, Birnbaum LS. Polybrominated diphenyl ether (PBDE) effects in rat neuronal cultures: 14C-PBDE accumulation, biological effects, and structure-activity relationships. Toxicological sciences: an official journal of the Society of Toxicology. 2005;88(1):181-92. Epub 2005/08/19. doi: http://dx.doi.org/10.1093/toxsci/kfi289. PubMed PMID: 16107548.
- 233. Birnbaum LS, Staskal DF. Brominated flame retardants: cause for concern? Environmental health perspectives. 2004;112(1):9-17. Epub 2003/12/31. doi: http://dx.doi.org/10.1289/ehp.6559. PubMed PMID: 14698924; PMCID: PMC1241790.

- 234. Badr MZ, Birnbaum LS. Enhanced potential for oxidative stress in livers of senescent rats by the peroxisome proliferator-activated receptor alpha agonist perfluorooctanoic acid. Mechanisms of ageing and development. 2004;125(1):69-75. Epub 2004/01/07. doi: http://dx.doi.org/10.1016/j.mad.2003.10.006. PubMed PMID: 14706239.
- 235. Emond C, Birnbaum LS, DeVito MJ. Physiologically based pharmacokinetic model for developmental exposures to TCDD in the rat. Toxicological sciences: an official journal of the Society of Toxicology. 2004;80(1):115-33. Epub 2004/04/02. doi: http://dx.doi.org/10.1093/toxsci/kfh117. PubMed PMID: 15056810.
- 236. Smialowicz RJ, Burgin DE, Williams WC, Diliberto JJ, Setzer RW, Birnbaum LS. CYP1A2 is not required for 2,3,7,8-tetrachlorodibenzo-p-dioxin-induced immunosuppression. Toxicology. 2004;197(1):15-22. Epub 2004/03/09. doi: http://dx.doi.org/10.1016/j.tox.2003.11.016. PubMed PMID: 15003330.
- 237. Birnbaum LS, Fenton SE. Cancer and developmental exposure to endocrine disruptors. Environmental health perspectives. 2003;111(4):389-94. Epub 2003/04/05. doi: http://dx.doi.org/10.1289/ehp.5686. PubMed PMID: 12676588; PMCID: PMC1241417.
- 238. Rice C, Birnbaum LS, Cogliano J, Mahaffey K, Needham L, Rogan WJ, vom Saal FS. Exposure assessment for endocrine disruptors: some considerations in the design of studies. Environmental health perspectives. 2003;111(13):1683-90. Epub 2003/10/07. doi: http://dx.doi.org/10.1289/ehp.5798. PubMed PMID: 14527851; PMCID: PMC1241694.
- 239. Birnbaum LS, Staskal DF, Diliberto JJ. Health effects of polybrominated dibenzo-p-dioxins (PBDDs) and dibenzofurans (PBDFs). Environment international. 2003;29(6):855-60. Epub 2003/07/10. doi: http://dx.doi.org/10.1016/s0160-4120(03)00106-5. PubMed PMID: 12850101.
- 240. Youssef JA, Birnbaum LS, Swift LL, Morrow JD, Badr MZ. Age-independent, gray matter-localized, brain-enhanced oxidative stress in male fischer 344 rats: brain levels of F(2)-isoprostanes and F(4)-neuroprostanes. Free radical biology & medicine. 2003;34(12):1631-5. Epub 2003/06/06. doi: http://dx.doi.org/10.1016/S0891-5849(03)00215-6. PubMed PMID: 12788483.
- 241. Ross PS, Birnbaum LS. Integrated human and ecological risk assessment: A case study of persistent organic pollutants (POPs) in humans and wildlife. Hum Ecol Risk Assess. 2003;9(1):303-24. doi: http://dx.doi.org/10.1080/727073292.
- 242. Hamm JT, Chen CY, Birnbaum LS. A mixture of dioxins, furans, and non-ortho PCBs based upon consensus toxic equivalency factors produces dioxin-like reproductive effects. Toxicological sciences: an official journal of the Society of Toxicology. 2003;74(1):182-91. Epub 2003/05/06. doi: http://dx.doi.org/10.1093/toxsci/kfg107. PubMed PMID: 12730615.
- 243. Chen CY, Hamm JT, Hass JR, Albro PW, Birnbaum LS. A mixture of polychlorinated dibenzo-p-dioxins (PCDDs), dibenzofurans (PCDFs), and non-ortho polychlorinated biphenyls (PCBs) changed the lipid content of pregnant Long Evans rats. Chemosphere. 2002;46(9-10):1501-4. Epub 2002/05/11. doi: http://dx.doi.org/10.1016/S0045-6535(01)00271-5. PubMed PMID: 12002482.

- 244. Birnbaum LS, Cummings AM. Dioxins and endometriosis: a plausible hypothesis. Environmental health perspectives. 2002;110(1):15-21. Epub 2002/01/10. doi: https://doi.org/10.1289/ehp.0211015. PubMed PMID: 11781160; PMCID: PMC1240688.
- 245. Slezak BP, Hamm JT, Reyna J, Hurst CH, Birnbaum LS. TCDD-mediated oxidative stress in male rat pups following perinatal exposure. Journal of biochemical and molecular toxicology. 2002;16(2):49-52. Epub 2002/04/30. doi: http://dx.doi.org/10.1002/jbt.10024. PubMed PMID: 11979421.
- 246. Chao C, Youssef J, Rezaiekhaleigh M, Birnbaum LS, Badr M. Senescence-associated decline in hepatic peroxisomal enzyme activities corresponds with diminished levels of retinoid X receptor alpha, but not peroxisome proliferator-activated receptor alpha. Mechanisms of ageing and development. 2002;123(11):1469-76. Epub 2002/11/12. doi: http://dx.doi.org/10.1016/S0047-6374(02)00086-6. PubMed PMID: 12425954.
- 247. Hurst CH, Abbott B, Schmid JE, Birnbaum LS. 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) disrupts early morphogenetic events that form the lower reproductive tract in female rat fetuses. Toxicological sciences: an official journal of the Society of Toxicology. 2002;65(1):87-98. Epub 2001/12/26. doi: http://dx.doi.org/10.1093/toxsci/65.1.87. PubMed PMID: 11752688.
- 248. Fenton SE, Hamm JT, Birnbaum LS, Youngblood GL. Persistent abnormalities in the rat mammary gland following gestational and lactational exposure to 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD). Toxicological sciences: an official journal of the Society of Toxicology. 2002;67(1):63-74. Epub 2002/04/19. doi: http://dx.doi.org/10.1093/toxsci/67.1.63. PubMed PMID: 11961217.
- 249. Kodavanti PR, Kannan N, Yamashita N, Derr-Yellin EC, Ward TR, Burgin DE, Tilson HA, Birnbaum LS. Differential effects of two lots of aroclor 1254: congener-specific analysis and neurochemical end points. Environmental health perspectives. 2001;109(11):1153-61. Epub 2001/11/20. doi: http://dx.doi.org/10.1289/ehp.011091153. PubMed PMID: 11713001; PMCID: PMC1240477.
- 250. Burgin DE, Diliberto JJ, Derr-Yellin EC, Kannan N, Kodavanti PR, Birnbaum LS. Differential effects of two lots of aroclor 1254 on enzyme induction, thyroid hormones, and oxidative stress. Environmental health perspectives. 2001;109(11):1163-8. Epub 2001/11/20. doi: http://dx.doi.org/10.2307/3454864. PubMed PMID: 11713002; PMCID: PMC1240478.
- 251. Chen CY, Hamm JT, Hass JR, Birnbaum LS. Disposition of polychlorinated dibenzo-p-dioxins, dibenzofurans, and non-ortho polychlorinated biphenyls in pregnant long evans rats and the transfer to offspring. Toxicology and applied pharmacology. 2001;173(2):65-88. Epub 2001/06/01. doi: http://dx.doi.org/10.1006/taap.2001.9143. PubMed PMID: 11384209.
- 252. Diliberto JJ, DeVito MJ, Ross DG, Birnbaum LS. Subchronic Exposure of [3H]- 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) in female B6C3F1 mice: relationship of steady-state levels to disposition and metabolism. Toxicological sciences: an official journal of the Society of Toxicology. 2001;61(2):241-55. Epub 2001/05/16. doi: http://dx.doi.org/10.1093/toxsci/61.2.241. PubMed PMID: 11353133.
- 253. Birnbaum LS, Tuomisto J. Non-carcinogenic effects of TCDD in animals. Food additives and contaminants. 2000;17(4):275-88. Epub 2000/07/27. doi: http://dx.doi.org/10.1080/026520300283351. PubMed PMID: 10912242.

- 254. Ross PS, Vos JG, Birnbaum LS, Osterhaus AD. PCBs are a health risk for humans and wildlife. Science (New York, NY). 2000;289(5486):1878-9. Epub 2000/09/30. doi: http://dx.doi.org/10.1126/science.289.5486.1878d. PubMed PMID: 11012359.
- 255. DeVito MJ, Menache MG, Diliberto JJ, Ross DG, Birnbaum LS. Dose-response relationships for induction of CYP1A1 and CYP1A2 enzyme activity in liver, lung, and skin in female mice following subchronic exposure to polychlorinated biphenyls. Toxicology and applied pharmacology. 2000;167(3):157-72. Epub 2000/09/14. doi: http://dx.doi.org/10.1006/taap.2000.9010. PubMed PMID: 10986007.
- 256. Hurst CH, DeVito MJ, Setzer RW, Birnbaum LS. Acute administration of 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) in pregnant Long Evans rats: association of measured tissue concentrations with developmental effects. Toxicological sciences: an official journal of the Society of Toxicology. 2000;53(2):411-20. Epub 2000/03/04. doi: http://dx.doi.org/10.1093/toxsci/53.2.411. PubMed PMID: 10696789.
- 257. Slezak BP, Hatch GE, DeVito MJ, Diliberto JJ, Slade R, Crissman K, Hassoun E, Birnbaum LS. Oxidative stress in female B6C3F1 mice following acute and subchronic exposure to 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD). Toxicological sciences: an official journal of the Society of Toxicology. 2000;54(2):390-8. Epub 2000/04/25. doi: http://dx.doi.org/10.1093/toxsci/54.2.390. PubMed PMID: 10774821.
- 258. Hamm JT, Sparrow BR, Wolf D, Birnbaum LS. In utero and lactational exposure to 2,3,7,8-tetrachlorodibenzo-p-dioxin alters postnatal development of seminal vesicle epithelium. Toxicological sciences: an official journal of the Society of Toxicology. 2000;54(2):424-30. Epub 2000/04/25. doi: http://dx.doi.org/10.1093/toxsci/54.2.424. PubMed PMID: 10774825.
- 259. Wang X, Santostefano MJ, DeVito MJ, Birnbaum LS. Extrapolation of a PBPK model for dioxins across dosage regimen, gender, strain, and species. Toxicological sciences: an official journal of the Society of Toxicology. 2000;56(1):49-60. Epub 2000/06/28. doi: http://dx.doi.org/10.1093/toxsci/56.1.49. PubMed PMID: 10869453.
- 260. Hurst CH, DeVito MJ, Birnbaum LS. Tissue disposition of 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) in maternal and developing long-evans rats following subchronic exposure. Toxicological sciences: an official journal of the Society of Toxicology. 2000;57(2):275-83. Epub 2000/09/28. doi: http://dx.doi.org/10.1093/toxsci/57.2.275. PubMed PMID: 11006357.
- 261. Slezak BP, Diliberto JJ, Birnbaum LS. 2,3,7,8-Tetrachlorodibenzo-p-dioxin-mediated oxidative stress in CYP1A2 knockout (CYP1A2-/-) mice. Biochemical and biophysical research communications. 1999;264(2):376-9. Epub 1999/10/26. doi: http://dx.doi.org/10.1006/bbrc.1999.1518. PubMed PMID: 10529372.
- 262. Birnbaum LS, Slezak BP. Dietary exposure to PCBs and dioxins in children. Environmental health perspectives. 1999;107(1):1. Epub 1999/03/06. doi: http://dx.doi.org/10.2307/3434282. PubMed PMID: 10068291; PMCID: PMC1566291.
- 263. Brouwer A, Longnecker MP, Birnbaum LS, Cogliano J, Kostyniak P, Moore J, Schantz S, Winneke G. Characterization of potential endocrine-related health effects at low-dose levels of exposure to PCBs.

- Environmental health perspectives. 1999;107 Suppl 4:639-49. Epub 1999/07/28. doi: http://dx.doi.org/10.2307/3434557. PubMed PMID: 10421775; PMCID: PMC1567499.
- 264. Birnbaum LS, Culpepper BT. Research integrity: a government perspective. Quality assurance (San Diego, Calif). 1999;7(4):217-24. Epub 2001/02/24. doi: http://dx.doi.org/10.1080/105294199750061335. PubMed PMID: 11191122.
- 265. Diliberto JJ, Burgin DE, Birnbaum LS. Effects of CYP1A2 on disposition of 2,3,7, 8-tetrachlorodibenzo-p-dioxin, 2,3,4,7,8-pentachlorodibenzofuran, and 2,2',4,4',5,5'-hexachlorobiphenyl in CYP1A2 knockout and parental (C57BL/6N and 129/Sv) strains of mice. Toxicology and applied pharmacology. 1999;159(1):52-64. Epub 1999/08/17. doi: http://dx.doi.org/10.1006/taap.1999.8720. PubMed PMID: 10448125.
- 266. Santostefano MJ, Richardson VM, Walker NJ, Blanton J, Lindros KO, Lucier GW, Alcasey SK, Birnbaum LS. Dose-dependent localization of TCDD in isolated centrilobular and periportal hepatocytes. Toxicological sciences: an official journal of the Society of Toxicology. 1999;52(1):9-19. Epub 1999/11/24. doi: http://dx.doi.org/10.1093/toxsci/52.1.9. PubMed PMID: 10568693.
- 267. Cummings AM, Hedge JM, Birnbaum LS. Effect of prenatal exposure to TCDD on the promotion of endometriotic lesion growth by TCDD in adult female rats and mice. Toxicological sciences: an official journal of the Society of Toxicology. 1999;52(1):45-9. Epub 1999/11/24. doi: http://dx.doi.org/10.1093/toxsci/52.1.45. PubMed PMID: 10568697.
- 268. Richardson VM, Santostefano MJ, Birnbaum LS. Daily cycle of bHLH-PAS proteins, Ah receptor and Arnt, in multiple tissues of female Sprague-Dawley rats. Biochemical and biophysical research communications. 1998;252(1):225-31. Epub 1998/11/14. doi: http://dx.doi.org/10.1006/bbrc.1998.9634. PubMed PMID: 9813174.
- 269. Hamm JT, Ross DG, Richardson VM, Diliberto JJ, Birnbaum LS. Methoxyresorufin: an inappropriate substrate for CYP1A2 in the mouse. Biochemical pharmacology. 1998;56(12):1657-60. Epub 1999/02/11. doi: https://doi.org/10.1016/S0006-2952(98)00241-X. PubMed PMID: 9973187.
- 270. Jackson JA, Birnbaum LS, Diliberto JJ. Effects of age, sex, and pharmacologic agents on the biliary elimination of 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) in F344 rats. Drug metabolism and disposition: the biological fate of chemicals. 1998;26(7):714-9. Epub 1998/07/14. doi: http://www.ncbi.nlm.nih.gov/pubmed/9660856. PubMed PMID: 9660856.
- 271. Van Den Berg M, Birnbaum LS, Bosveld ATC, Brunström B, Cook P, Feeley M, Giesy JP, Hanberg A, Hasegawa R, Kennedy SW, Kubiak T, Larsen JC, Van Leeuwen FXR, Liem AKD, Nolt C, Peterson RE, Poellinger L, Safe S, Schrenk D, Tillitt D, Tysklind M, Younes M, Wærn F, Zacharewski T. Toxic equivalency factors (TEFs) for PCBs, PCDDs, PCDFs for humans and wildlife. Environmental health perspectives. 1998;106(12):775-92. doi: https://doi.org/10.1289/ehp.98106775.
- 272. Viluksela M, Stahl BU, Birnbaum LS, Schramm KW, Kettrup A, Rozman KK. Subchronic/chronic toxicity of a mixture of four chlorinated dibenzo-p-dioxins in rats. I. Design, general observations, hematology, and liver concentrations. Toxicology and applied pharmacology. 1998;151(1):57-69. Epub 1998/08/26. doi: http://dx.doi.org/10.1006/taap.1998.8384. PubMed PMID: 9705887.

- 273. Viluksela M, Stahl BU, Birnbaum LS, Rozman KK. Subchronic/chronic toxicity of a mixture of four chlorinated dibenzo-p-dioxins in rats. II. Biochemical effects. Toxicology and applied pharmacology. 1998;151(1):70-8. Epub 1998/08/26. doi: http://dx.doi.org/10.1006/taap.1998.8412. PubMed PMID: 9705888.
- 274. Santostefano MJ, Wang X, Richardson VM, Ross DG, DeVito MJ, Birnbaum LS. A pharmacodynamic analysis of TCDD-induced cytochrome P450 gene expression in multiple tissues: dose-and time-dependent effects. Toxicology and applied pharmacology. 1998;151(2):294-310. Epub 1998/08/26. doi: http://dx.doi.org/10.1006/taap.1998.8466. PubMed PMID: 9707506.
- 275. Pollenz RS, Santostefano MJ, Klett E, Richardson VM, Necela B, Birnbaum LS. Female Sprague-Dawley rats exposed to a single oral dose of 2,3,7,8-tetrachlorodibenzo-p-dioxin exhibit sustained depletion of aryl hydrocarbon receptor protein in liver, spleen, thymus, and lung. Toxicological sciences: an official journal of the Society of Toxicology. 1998;42(2):117-28. Epub 1998/05/14. doi: http://dx.doi.org/10.1006/toxs.1998.2439. PubMed PMID: 9579024.
- 276. Hassoun EA, Wilt SC, Devito MJ, Van Birgelen A, Alsharif NZ, Birnbaum LS, Stohs SJ. Induction of oxidative stress in brain tissues of mice after subchronic exposure to 2,3,7,8-tetrachlorodibenzo-p-dioxin. Toxicological sciences: an official journal of the Society of Toxicology. 1998;42(1):23-7. Epub 1998/05/30. doi: http://dx.doi.org/10.1006/toxs.1997.2411. PubMed PMID: 9538044.
- 277. Hurst CH, Abbott BD, DeVito MJ, Birnbaum LS. 2,3,7,8-Tetrachlorodibenzo-p-dioxin in pregnant Long Evans rats: disposition to maternal and embryo/fetal tissues. Toxicological sciences: an official journal of the Society of Toxicology. 1998;45(2):129-36. Epub 1998/12/16. doi: http://dx.doi.org/10.1006/toxs.1998.2520. PubMed PMID: 9848119.
- 278. DeVito MJ, Ross DG, Dupuy AE, Jr., Ferrario J, McDaniel D, Birnbaum LS. Dose-response relationships for disposition and hepatic sequestration of polyhalogenated dibenzo-p-dioxins, dibenzofurans, and biphenyls following subchronic treatment in mice. Toxicological sciences: an official journal of the Society of Toxicology. 1998;46(2):223-34. Epub 1999/02/27. doi: http://dx.doi.org/10.1006/toxs.1998.2530. PubMed PMID: 10048125.
- 279. Santostefano MJ, Ross DG, Savas U, Jefcoate CR, Birnbaum LS. Differential time-course and dose-response relationships of TCDD-induced CYP1B1, CYP1A1, and CYP1A2 proteins in rats. Biochemical and biophysical research communications. 1997;233(1):20-4. Epub 1997/04/07. doi: http://dx.doi.org/10.1006/bbrc.1997.6389. PubMed PMID: 9144388.
- 280. Diliberto JJ, Burgin D, Birnbaum LS. Role of CYP1A2 in hepatic sequestration of dioxin: studies using CYP1A2 knock-out mice. Biochemical and biophysical research communications. 1997;236(2):431-3. Epub 1997/07/18. doi: http://dx.doi.org/10.1006/bbrc.1997.6973. PubMed PMID: 9240455.
- 281. Fawell J, Robinson D, Bull R, Birnbaum LS, Boorman G, Butterworth B, Daniel P, Galal-Gorchev H, Hauchman F, Julkunen P, Klaassen C, Krasner S, Orme-Zavaleta J, Reif J, Tardiff R. Disinfection by-products in drinking water: critical issues in health effects research. Environmental health perspectives. 1997;105(1):108-9. Epub 1997/01/01. doi: http://dx.doi.org/10.1289/ehp.97105108. PubMed PMID: 9074890; PMCID: PMC1469844.

- 282. Johnson KL, Cummings AM, Birnbaum LS. Promotion of endometriosis in mice by polychlorinated dibenzo-p-dioxins, dibenzofurans, and biphenyls. Environmental health perspectives. 1997;105(7):750-5. Epub 1997/07/01. doi: http://dx.doi.org/10.1289/ehp.97105750. PubMed PMID: 9294722; PMCID: PMC1470109.
- 283. Smialowicz RJ, DeVito MJ, Riddle MM, Williams WC, Birnbaum LS. Opposite effects of 2,2',4,4',5,5'-hexachlorobiphenyl and 2,3,7,8-tetrachlorodibenzo-p-dioxin on the antibody response to sheep erythrocytes in mice. Fundamental and applied toxicology: official journal of the Society of Toxicology. 1997;37(2):141-9. Epub 1997/06/01. doi: http://dx.doi.org/10.1006/faat.1997.2323. PubMed PMID: 9242587.
- 284. Andersen ME, Eklund CR, Mills JJ, Barton HA, Birnbaum LS. A multicompartment geometric model of the liver in relation to regional induction of cytochrome P450s. Toxicology and applied pharmacology. 1997;144(1):135-44. Epub 1997/05/01. doi: http://dx.doi.org/10.1006/taap.1996.8066. PubMed PMID: 9169077.
- 285. Andersen ME, Birnbaum LS, Barton HA, Eklund CR. Regional hepatic CYP1A1 and CYP1A2 induction with 2,3,7,8-tetrachlorodibenzo-p-dioxin evaluated with a multicompartment geometric model of hepatic zonation. Toxicology and applied pharmacology. 1997;144(1):145-55. Epub 1997/05/01. doi: http://dx.doi.org/10.1006/taap.1996.8067. PubMed PMID: 9169078.
- 286. Viluksela M, Stahl BU, Birnbaum LS, Schramm KW, Kettrup A, Rozman KK. Subchronic/chronic toxicity of 1,2,3,4,6,7,8-heptachlorodibenzo-p-dioxin (HpCDD) in rats. Part I. Design, general observations, hematology, and liver concentrations. Toxicology and applied pharmacology. 1997;146(2):207-16. Epub 1997/11/05. doi: http://dx.doi.org/10.1006/taap.1997.8239. PubMed PMID: 9344888.
- 287. Viluksela M, Stahl BU, Birnbaum LS, Rozman KK. Subchronic/chronic toxicity of 1,2,3,4,6,7,8-heptachlorodibenzo-p-dioxin (HpCDD) in rats. Part II. Biochemical effects. Toxicology and applied pharmacology. 1997;146(2):217-26. Epub 1997/11/05. doi: http://dx.doi.org/10.1006/taap.1997.8240. PubMed PMID: 9344889.
- Wang X, Santostefano MJ, Evans MV, Richardson VM, Diliberto JJ, Birnbaum LS. Determination of parameters responsible for pharmacokinetic behavior of TCDD in female Sprague-Dawley rats. Toxicology and applied pharmacology. 1997;147(1):151-68. Epub 1997/11/14. doi: http://dx.doi.org/10.1006/taap.1997.8242. PubMed PMID: 9356318.
- 289. DeVito MJ, Diliberto JJ, Ross DG, Menache MG, Birnbaum LS. Dose-response relationships for polyhalogenated dioxins and dibenzofurans following subchronic treatment in mice. I. CYP1A1 and CYP1A2 enzyme activity in liver, lung, and skin. Toxicology and applied pharmacology. 1997;147(2):267-80. Epub 1998/01/24. doi: http://dx.doi.org/10.1006/taap.1997.8261. PubMed PMID: 9439722.
- 290. Burleson GR, Lebrec H, Yang YG, Ibanes JD, Pennington KN, Birnbaum LS. Effect of 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) on influenza virus host resistance in mice. Fundamental and applied toxicology: official journal of the Society of Toxicology. 1996;29(1):40-7. Epub 1996/01/01. doi: http://dx.doi.org/10.1006/faat.1996.0004. PubMed PMID: 8838638.

- 291. van Birgelen AP, Ross DG, DeVito MJ, Birnbaum LS. Interactive effects between 2,3,7,8-tetrachlorodibenzo-p-dioxin and 2,2',4,4',5,5'-hexachlorobiphenyl in female B6C3F1 mice: tissue distribution and tissue-specific enzyme induction. Fundamental and applied toxicology: official journal of the Society of Toxicology. 1996;34(1):118-31. Epub 1996/11/01. doi: http://dx.doi.org/10.1006/faat.1996.0182. PubMed PMID: 8937899.
- 292. Santostefano MJ, Johnson KL, Whisnant NA, Richardson VM, DeVito MJ, Diliberto JJ, Birnbaum LS. Subcellular localization of TCDD differs between the liver, lungs, and kidneys after acute and subchronic exposure: species/dose comparisons and possible mechanism. Fundamental and applied toxicology: official journal of the Society of Toxicology. 1996;34(2):265-75. Epub 1996/12/01. doi: http://dx.doi.org/10.1006/faat.1996.0196. PubMed PMID: 8954756.
- 293. DeVito MJ, Beebe LE, Menache M, Birnbaum LS. Relationship between CYP1A enzyme activities and protein levels in rats treated with 2,3,7,8-tetrachlorodibenzo-p-dioxin. Journal of toxicology and environmental health. 1996;47(4):379-94. Epub 1996/03/01. doi: http://dx.doi.org/10.1080/009841096161717. PubMed PMID: 8600290.
- 294. Diliberto JJ, Jackson JA, Birnbaum LS. Comparison of 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) disposition following pulmonary, oral, dermal, and parenteral exposures to rats. Toxicology and applied pharmacology. 1996;138(1):158-68. Epub 1996/05/01. doi: http://dx.doi.org/10.1006/taap.1996.0109. PubMed PMID: 8658505.
- van Birgelen AP, DeVito MJ, Akins JM, Ross DG, Diliberto JJ, Birnbaum LS. Relative potencies of polychlorinated dibenzo-p-dioxins, dibenzofurans, and biphenyls derived from hepatic porphyrin accumulation in mice. Toxicology and applied pharmacology. 1996;138(1):98-109. Epub 1996/05/01. doi: http://dx.doi.org/10.1006/taap.1996.0103. PubMed PMID: 8658519.
- 296. Abbott BD, Birnbaum LS, Diliberto JJ. Rapid distribution of 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) to embryonic tissues in C57BL/6N mice and correlation with palatal uptake in vitro. Toxicology and applied pharmacology. 1996;141(1):256-63. Epub 1996/11/01. doi: http://dx.doi.org/10.1006/taap.1996.0282. PubMed PMID: 8917698.
- 297. Cummings AM, Metcalf JL, Birnbaum L. Promotion of endometriosis by 2,3,7,8-tetrachlorodibenzo-p-dioxin in rats and mice: Time-dose dependence and species comparison. Toxicology and applied pharmacology. 1996;138(1):131-9. doi: http://dx.doi.org/10.1006/taap.1996.0106. PubMed PMID: 8658502.
- 298. Abbott BD, Birnbaum LS, Perdew GH. Developmental expression of two members of a new class of transcription factors: I. Expression of aryl hydrocarbon receptor in the C57BL/6N mouse embryo. Developmental dynamics: an official publication of the American Association of Anatomists. 1995;204(2):133-43. Epub 1995/10/01. doi: http://dx.doi.org/10.1002/aja.1002040204. PubMed PMID: 8589437.
- 299. Birnbaum LS. Workshop on perinatal exposure to dioxin-like compounds. V. Immunologic effects. Environmental health perspectives. 1995;103 Suppl 2:157-60. Epub 1995/03/01. doi: http://dx.doi.org/10.2307/3432463. PubMed PMID: 7614940; PMCID: PMC1518849.

- 300. DeVito MJ, Birnbaum LS, Farland WH, Gasiewicz TA. Comparisons of estimated human body burdens of dioxinlike chemicals and TCDD body burdens in experimentally exposed animals. Environmental health perspectives. 1995;103(9):820-31. Epub 1995/09/01. doi: http://dx.doi.org/10.2307/3432395. PubMed PMID: 7498094; PMCID: PMC1519223.
- 301. Birnbaum LS. Developmental effects of dioxins. Environmental health perspectives. 1995;103 Suppl 7:89-94. Epub 1995/10/01. doi: http://dx.doi.org/10.2307/3432515. PubMed PMID: 8593882; PMCID: PMC1518885.
- 302. Brouwer A, Ahlborg UG, Van den Berg M, Birnbaum LS, Boersma ER, Bosveld B, Denison MS, Gray LE, Hagmar L, Holene E, et al. Functional aspects of developmental toxicity of polyhalogenated aromatic hydrocarbons in experimental animals and human infants. European journal of pharmacology. 1995;293(1):1-40. Epub 1995/05/26. doi: http://dx.doi.org/10.1016/0926-6917(95)90015-2. PubMed PMID: 7545581.
- 303. DeVito MJ, Birnbaum LS. The importance of pharmacokinetics in determining the relative potency of 2,3,7,8-tetrachlorodibenzo-p-dioxin and 2,3,7,8-tetrachlorodibenzofuran. Fundamental and applied toxicology: official journal of the Society of Toxicology. 1995;24(1):145-8. Epub 1995/01/01. doi: http://dx.doi.org/10.1006/faat.1995.1016. PubMed PMID: 7713338.
- 304. Bull RJ, Birnbaum LS, Cantor KP, Rose JB, Butterworth BE, Pegram R, Tuomisto J. Water chlorination: essential process or cancer hazard? Fundamental and applied toxicology: official journal of the Society of Toxicology. 1995;28(2):155-66. Epub 1995/12/01. doi: http://dx.doi.org/10.1006/faat.1995.1156. PubMed PMID: 8835225.
- 305. De Jongh J, Devito M, Nieboer R, Birnbaum L, Van den Berg M. Induction of Cytochrome P450 Isoenzymes after Toxicokinetic Interactions between 2,3,7,8-Tetrachlorodibenzo-p-dioxin and 2,2',4,4',5,5'-Hexachlorobiphenyl in the Liver of the Mouse. Fundam Appl Toxicol. 1995;25(2):264-70. doi: http://dx.doi.org/10.1006/faat.1995.1062. PubMed PMID: 7665010.
- 306. Diliberto JJ, Akubue PI, Luebke RW, Birnbaum LS. Dose-response relationships of tissue distribution and induction of CYP1A1 and CYP1A2 enzymatic activities following acute exposure to 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) in mice. Toxicology and applied pharmacology. 1995;130(2):197-208. Epub 1995/02/01. doi: http://dx.doi.org/10.1006/taap.1995.1025. PubMed PMID: 7871533.
- 307. Gray LE, Jr., Kelce WR, Monosson E, Ostby JS, Birnbaum LS. Exposure to TCDD during development permanently alters reproductive function in male Long Evans rats and hamsters: reduced ejaculated and epididymal sperm numbers and sex accessory gland weights in offspring with normal androgenic status. Toxicology and applied pharmacology. 1995;131(1):108-18. Epub 1995/03/01. doi: http://dx.doi.org/10.1006/taap.1995.1052. PubMed PMID: 7878665.
- 308. Pegram RA, Diliberto JJ, Moore TC, Gao P, Birnbaum LS. 2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD) distribution and cytochrome P4501A induction in young adult and senescent male mice. Toxicology letters. 1995;76(2):119-26. Epub 1995/03/01. doi: http://dx.doi.org/10.1016/0378-4274(94)03212-P. PubMed PMID: 7725343.

- 309. Birnbaum LS. Developmental effects of dioxins and related endocrine disrupting chemicals. Toxicology letters. 1995;82-83:743-50. Epub 1995/12/01. doi: http://dx.doi.org/10.1016/0378-4274(95)03592-3. PubMed PMID: 8597137.
- 310. DeVito MJ, Birnbaum LS. Dioxins: model chemicals for assessing receptor-mediated toxicity. Toxicology. 1995;102(1-2):115-23. Epub 1995/09/01. doi: http://dx.doi.org/10.1016/0300-483X(95)03040-M. PubMed PMID: 7482546.
- 311. Birnbaum LS, DeVito MJ. Use of toxic equivalency factors for risk assessment for dioxins and related compounds. Toxicology. 1995;105(2-3):391-401. Epub 1995/12/28. doi: http://dx.doi.org/10.1016/0300-483X(95)03237-A. PubMed PMID: 8571375.
- 312. Dejongh J, Devito M, Diliberto J, Vandenberg M, Birnbaum L. The Effects of 2,2',4,4',5,5'-Hexachlorobiphenyl Cotreatment on the Disposition of 2,3,7,8-Tetrachlorodibenzo-p-dioxin in Mice. Toxicology letters. 1995;80(1-3):131-7. doi: http://dx.doi.org/10.1016/0378-4274(95)03387-z. PubMed PMID: 7482580.
- 313. Birnbaum LS. Endocrine effects of prenatal exposure to PCBs, dioxins, and other xenobiotics: implications for policy and future research. Environmental health perspectives. 1994;102(8):676-9. Epub 1994/08/01. doi: http://dx.doi.org/10.2307/3432197. PubMed PMID: 7895708; PMCID: PMC1567315.
- 314. Birnbaum LS. The mechanism of dioxin toxicity: relationship to risk assessment. Environmental health perspectives. 1994;102 Suppl 9:157-67. Epub 1994/11/01. doi: http://dx.doi.org/10.1289/ehp.94102s9157. PubMed PMID: 7698077; PMCID: PMC1566802.
- 315. Narasimhan TR, Craig A, Arellano L, Harper N, Howie L, Menache M, Birnbaum LS, Safe S. Relative sensitivities of 2,3,7,8-tetrachlorodibenzo-p-dioxin-induced Cyp1a-1 and Cyp1a-2 gene expression and immunotoxicity in female B6C3F1 mice. Fundam Appl Toxicol. 1994;23(4):598-607. Epub 1994/11/01. doi: http://dx.doi.org/10.1006/faat.1994.1146. PubMed PMID: 7867912.
- 316. Kedderis LB, Jackson JA, Patterson DG, Jr., Grainger J, Diliberto JJ, Birnbaum LS. Chemical characterization and disposition studies with 1,2,7,8-tetrabromodibenzofuran in the rat. Journal of toxicology and environmental health. 1994;41(1):53-69. Epub 1994/01/01. doi: http://dx.doi.org/10.1080/15287399409531826. PubMed PMID: 8277526.
- 317. Birnbaum LS. Evidence for the role of the Ah receptor in response to dioxin. Progress in clinical and biological research. 1994;387:139-54. Epub 1994/01/01. doi: http://www.ncbi.nlm.nih.gov/pubmed/7972244. PubMed PMID: 7972244.
- 318. Andersen ME, Mills JJ, Fox TR, Goldsworthy TL, Conolly RB, Birnbaum LS. Receptor-mediated toxicity and implications for risk assessment. Progress in clinical and biological research. 1994;387:295-310. Epub 1994/01/01. doi: https://www.ncbi.nlm.nih.gov/pubmed/7972254. PubMed PMID: 7972254.
- 319. DeVito MJ, Ma X, Babish JG, Menache M, Birnbaum LS. Dose-response relationships in mice following subchronic exposure to 2,3,7,8-tetrachlorodibenzo-p-dioxin: CYP1A1, CYP1A2, estrogen receptor, and protein tyrosine phosphorylation. Toxicology and applied pharmacology. 1994;124(1):82-90. Epub 1994/01/01. doi: http://dx.doi.org/10.1006/taap.1994.1011. PubMed PMID: 8291065.

- 320. Luebke RW, Copeland CB, Diliberto JJ, Akubue PI, Andrews DL, Riddle MM, Williams WC, Birnbaum LS. Assessment of host resistance to Trichinella spiralis in mice following preinfection exposure to 2,3,7,8-TCDD. Toxicology and applied pharmacology. 1994;125(1):7-16. Epub 1994/03/01. doi: http://dx.doi.org/10.1006/taap.1994.1043. PubMed PMID: 8128497.
- 321. Abbott BD, Perdew GH, Birnbaum LS. Ah receptor in embryonic mouse palate and effects of TCDD on receptor expression. Toxicology and applied pharmacology. 1994;126(1):16-25. Epub 1994/05/01. doi: http://dx.doi.org/10.1006/taap.1994.1085. PubMed PMID: 8184424.
- 322. Abbott BD, Perdew GH, Buckalew AR, Birnbaum LS. Interactive regulation of Ah and glucocorticoid receptors in the synergistic induction of cleft palate by 2,3,7,8-tetrachlorodibenzo-p-dioxin and hydrocortisone. Toxicology and applied pharmacology. 1994;128(1):138-50. Epub 1994/09/01. doi: http://dx.doi.org/10.1006/taap.1994.1191. PubMed PMID: 8079347.
- 323. Hughes MF, Fisher HL, Birnbaum LS, Hall LL. Effect of age on the in vitro percutaneous absorption of phenols in mice. Toxicology in vitro: an international journal published in association with BIBRA. 1994;8(2):221-7. Epub 1994/04/01. doi: http://dx.doi.org/10.1016/0887-2333(94)90186-4. PubMed PMID: 20692909.
- 324. McMahon TF, Medinsky MA, Birnbaum LS. Age-related changes in benzene disposition in male C57BL/6N mice described by a physiologically based pharmacokinetic model. Toxicology letters. 1994;74(3):241-53. Epub 1994/12/01. doi: http://dx.doi.org/10.1016/0378-4274(94)90083-3. PubMed PMID: 7871548.
- 325. Birnbaum LS. A brief survey of butadiene health effects: a role for metabolic differences. Environmental health perspectives. 1993;101 Suppl 6:161-7. Epub 1993/12/01. doi: http://dx.doi.org/10.1289/ehp.93101s6161. PubMed PMID: 8020440; PMCID: PMCI520015.
- 326. Shyr LJ, Sabourin PJ, Medinsky MA, Birnbaum LS, Henderson RF. Physiologically based modeling of 2-butoxyethanol disposition in rats following different routes of exposure. Environmental research. 1993;63(2):202-18. Epub 1993/11/01. doi: http://dx.doi.org/10.1006/enrs.1993.1141. PubMed PMID: 8243415.
- 327. De Vito MJ, Maier WE, Diliberto JJ, Birnbaum LS. Comparative ability of various PCBs, PCDFs, and TCDD to induce cytochrome P450 1A1 and 1A2 activity following 4 weeks of treatment. Fundamental and applied toxicology: official journal of the Society of Toxicology. 1993;20(1):125-30. Epub 1993/01/01. doi: http://dx.doi.org/10.1006/faat.1993.1015. PubMed PMID: 8432423.
- 328. Jackson JA, Diliberto JJ, Birnbaum LS. Estimation of octanol-water partition coefficients and correlation with dermal absorption for several polyhalogenated aromatic hydrocarbons. Fundamental and applied toxicology: official journal of the Society of Toxicology. 1993;21(3):334-44. Epub 1993/10/01. doi: http://dx.doi.org/10.1006/faat.1993.1106. PubMed PMID: 8258387.
- 329. Kedderis LB, Andersen ME, Birnbaum LS. Effect of dose, time, and pretreatment on the biliary excretion and tissue distribution of 2,3,7,8-tetrachlorodibenzo-p-dioxin in the rat. Fundamental and applied toxicology: official journal of the Society of Toxicology. 1993;21(4):405-11. Epub 1993/11/01. doi: http://dx.doi.org/10.1006/faat.1993.1115. PubMed PMID: 8253293.

- 330. McKinley MK, Kedderis LB, Birnbaum LS. The effect of pretreatment on the biliary excretion of 2,3,7,8-tetrachlorodibenzo-p-dioxin, 2,3,7,8-tetrachlorodibenzofuran, and 3,3',4,4'-tetrachlorobiphenyl in the rat. Fundamental and applied toxicology: official journal of the Society of Toxicology. 1993;21(4):425-32. Epub 1993/11/01. doi: http://dx.doi.org/10.1006/faat.1993.1118. PubMed PMID: 8253296.
- 331. Andersen ME, Mills JJ, Gargas ML, Kedderis L, Birnbaum LS, Neubert D, Greenlee WF. Modeling receptor-mediated processes with dioxin: implications for pharmacokinetics and risk assessment. Risk analysis: an official publication of the Society for Risk Analysis. 1993;13(1):25-36. Epub 1993/02/01. doi: http://dx.doi.org/10.1111/j.1539-6924.1993.tb00726.x. PubMed PMID: 8383868.
- 332. Anderson YB, Jackson JA, Birnbaum LS. Maturational changes in dermal absorption of 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) in Fischer 344 rats. Toxicology and applied pharmacology. 1993;119(2):214-20. Epub 1993/04/01. doi: http://dx.doi.org/10.1006/taap.1993.1062. PubMed PMID: 8480330.
- 333. Diliberto JJ, Kedderis LB, Jackson JA, Birnbaum LS. Effects of dose and routes of exposure on the disposition of 2,3,7,8-[3H]tetrabromodibenzo-p-dioxin (TBDD) in the rat. Toxicology and applied pharmacology. 1993;120(2):315-26. Epub 1993/06/01. doi: http://dx.doi.org/10.1006/taap.1993.1117. PubMed PMID: 8511802.
- 334. Kedderis LB, Mills JJ, Andersen ME, Birnbaum LS. A physiologically based pharmacokinetic model for 2,3,7,8-tetrabromodibenzo-p-dioxin (TBDD) in the rat: tissue distribution and CYP1A induction. Toxicology and applied pharmacology. 1993;121(1):87-98. Epub 1993/07/01. doi: http://dx.doi.org/10.1006/taap.1993.1132. PubMed PMID: 8337704.
- 335. Bechtold WE, Sun JD, Birnbaum LS, Yin SN, Li GL, Kasicki S, Lucier G, Henderson RF. Sphenylcysteine formation in hemoglobin as a biological exposure index to benzene. Archives of toxicology. 1992;66(5):303-9. Epub 1992/01/01. doi: http://dx.doi.org/10.1007/BF01973623. PubMed PMID: 1610291.
- 336. Sabourin PJ, Medinsky MA, Thurmond F, Birnbaum LS, Henderson RF. Effect of dose on the disposition of methoxyethanol, ethoxyethanol, and butoxyethanol administered dermally to male F344/N rats. Fundamental and applied toxicology: official journal of the Society of Toxicology. 1992;19(1):124-32. Epub 1992/07/01. doi: http://dx.doi.org/10.1016/0272-0590(92)90036-H. PubMed PMID: 1397793.
- 337. Henderson RF, Sabourin PJ, Medinsky MA, Birnbaum LS, Lucier GL. Benzene dosimetry in experimental animals: relevance for risk assessment. Progress in clinical and biological research. 1992;374:93-105. Epub 1992/01/01. doi: http://www.ncbi.nlm.nih.gov/pubmed/1620720. PubMed PMID: 1620720.
- 338. Abbott BD, Harris MW, Birnbaum LS. Comparisons of the effects of TCDD and hydrocortisone on growth factor expression provide insight into their interaction in the embryonic mouse palate. Teratology. 1992;45(1):35-53. Epub 1992/01/01. doi: http://dx.doi.org/10.1002/tera.1420450104. PubMed PMID: 1731395.

- 339. Sabourin PJ, Medinsky MA, Birnbaum LS, Griffith WC, Henderson RF. Effect of exposure concentration on the disposition of inhaled butoxyethanol by F344 rats. Toxicology and applied pharmacology. 1992;114(2):232-8. Epub 1992/06/01. doi: http://dx.doi.org/10.1016/0041-008X(92)90073-2. PubMed PMID: 1609415.
- 340. Sabourin PJ, Muggenburg BA, Couch RC, Lefler D, Lucier G, Birnbaum LS, Henderson RF. Metabolism of [14C]benzene by cynomolgus monkeys and chimpanzees. Toxicology and applied pharmacology. 1992;114(2):277-84. Epub 1992/06/01. doi: http://dx.doi.org/10.1016/0041-008X(92)90078-7. PubMed PMID: 1609420.
- 341. Morrissey RE, Harris MW, Diliberto JJ, Birnbaum LS. Limited PCB antagonism of TCDD-induced malformations in mice. Toxicology letters. 1992;60(1):19-25. Epub 1992/01/01. doi: http://dx.doi.org/10.1016/0378-4274(92)90043-J. PubMed PMID: 1539179.
- 342. Bechtold WE, Lucier G, Birnbaum LS, Yin SN, Li GL, Henderson RF. Muconic acid determinations in urine as a biological exposure index for workers occupationally exposed to benzene. American Industrial Hygiene Association journal. 1991;52(11):473-8. Epub 1991/11/01. doi: http://dx.doi.org/10.1080/15298669191365072. PubMed PMID: 1746409.
- 343. Birnbaum LS. Pharmacokinetic basis of age-related changes in sensitivity to toxicants. Annual review of pharmacology and toxicology. 1991;31:101-28. Epub 1991/01/01. doi: http://dx.doi.org/10.1146/annurev.pa.31.040191.000533. PubMed PMID: 2064370.
- 344. McMahon TF, Birnbaum LS. Age-related changes in disposition and metabolism of benzene in male C57BL/6N mice. Drug metabolism and disposition: the biological fate of chemicals. 1991;19(6):1052-7. Epub 1991/11/01. doi: http://www.ncbi.nlm.nih.gov/pubmed/1687010. PubMed PMID: 1687010.
- 345. Lin FH, Clark G, Birnbaum LS, Lucier GW, Goldstein JA. Influence of the Ah locus on the effects of 2,3,7,8-tetrachlorodibenzo-p-dioxin on the hepatic epidermal growth factor receptor. Molecular pharmacology. 1991;39(3):307-13. Epub 1991/03/01. doi: http://www.ncbi.nlm.nih.gov/pubmed/1848654. PubMed PMID: 1848654.
- 346. Barnes D, Alford-Stevens A, Birnbaum LS, Kutz FW, Wood W, Patton D. Toxicity equivalency factors for PCBs? Quality assurance (San Diego, Calif). 1991;1(1):70-81. Epub 1991/10/01. doi: http://www.ncbi.nlm.nih.gov/pubmed/1669971. PubMed PMID: 1669971.
- 347. Abbott BD, Birnbaum LS. TCDD exposure of human embryonic palatal shelves in organ culture alters the differentiation of medial epithelial cells. Teratology. 1991;43(2):119-32. Epub 1991/02/01. doi: http://dx.doi.org/10.1002/tera.1420430205. PubMed PMID: 2014478.
- 348. Birnbaum LS, Morrissey RE, Harris MW. Teratogenic effects of 2,3,7,8-tetrabromodibenzo-p-dioxin and three polybrominated dibenzofurans in C57BL/6N mice. Toxicology and applied pharmacology. 1991;107(1):141-52. Epub 1991/01/01. doi: http://dx.doi.org/10.1016/0041-008X(91)90338-F. PubMed PMID: 1987653.

- 349. Banks YB, Birnbaum LS. Absorption of 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) after low dose dermal exposure. Toxicology and applied pharmacology. 1991;107(2):302-10. Epub 1991/02/01. doi: http://dx.doi.org/10.1016/0041-008X(91)90210-6. PubMed PMID: 1994512.
- 350. Couture-Haws L, Harris MW, Lockhart AC, Birnbaum LS. Evaluation of the persistence of hydronephrosis induced in mice following in utero and/or lactational exposure to 2,3,7,8-tetrachlorodibenzo-p-dioxin. Toxicology and applied pharmacology. 1991;107(3):402-12. Epub 1991/03/01. doi: http://dx.doi.org/10.1016/0041-008X(91)90304-W. PubMed PMID: 2000631.
- 351. Couture-Haws L, Harris MW, McDonald MM, Lockhart AC, Birnbaum LS. Hydronephrosis in mice exposed to TCDD-contaminated breast milk: identification of the peak period of sensitivity and assessment of potential recovery. Toxicology and applied pharmacology. 1991;107(3):413-28. Epub 1991/03/01. doi: http://dx.doi.org/10.1016/0041-008X(91)90305-X. PubMed PMID: 2000632.
- 352. Bond JA, Bechtold WE, Birnbaum LS, Dahl AR, Medinsky MA, Sun JD, Henderson RF. Disposition of inhaled isoprene in B6C3F1 mice. Toxicology and applied pharmacology. 1991;107(3):494-503. Epub 1991/03/01. doi: http://dx.doi.org/10.1016/0041-008X(91)90312-3. PubMed PMID: 2000636.
- 353. Lin FH, Stohs SJ, Birnbaum LS, Clark G, Lucier GW, Goldstein JA. The effects of 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) on the hepatic estrogen and glucocorticoid receptors in congenic strains of Ah responsive and Ah nonresponsive C57BL/6J mice. Toxicology and applied pharmacology. 1991;108(1):129-39. Epub 1991/03/15. doi: http://dx.doi.org/10.1016/0041-008X(91)90276-K. PubMed PMID: 1672475.
- 354. Kedderis LB, Diliberto JJ, Birnbaum LS. Disposition and excretion of intravenous 2,3,7,8-tetrabromodibenzo-p-dioxin (TBDD) in rats. Toxicology and applied pharmacology. 1991;108(3):397-406. Epub 1991/05/01. doi: http://dx.doi.org/10.1016/0041-008X(91)90086-T. PubMed PMID: 2020967.
- 355. Dahl AR, Sun JD, Birnbaum LS, Bond JA, Griffith WC, Jr., Mauderly JL, Muggenburg BA, Sabourin PJ, Henderson RF. Toxicokinetics of inhaled 1,3-butadiene in monkeys: comparison to toxicokinetics in rats and mice. Toxicology and applied pharmacology. 1991;110(1):9-19. Epub 1991/08/11. doi: http://dx.doi.org/10.1016/0041-008X(91)90285-M. PubMed PMID: 1908146.
- 356. Kedderis LB, Diliberto JJ, Linko P, Goldstein JA, Birnbaum LS. Disposition of 2,3,7,8-tetrabromodibenzo-p-dioxin and 2,3,7,8-tetrachlorodibenzo-p-dioxin in the rat: biliary excretion and induction of cytochromes CYP1A1 and CYP1A2. Toxicology and applied pharmacology. 1991;111(1):163-72. Epub 1991/10/01. doi: http://dx.doi.org/10.1016/0041-008X(91)90145-5. PubMed PMID: 1949032.
- 357. Monteiro-Riviere NA, Banks YB, Birnbaum LS. Laser Doppler measurements of cutaneous blood flow in ageing mice and rats. Toxicology letters. 1991;57(3):329-38. Epub 1991/08/01. doi: http://dx.doi.org/10.1016/0378-4274(91)90207-M. PubMed PMID: 1831938.
- 358. McMahon TF, Stefanski SA, Wilson RE, Blair PC, Clark AM, Birnbaum LS. Comparative acute nephrotoxicity of salicylic acid, 2,3-dihydroxybenzoic acid, and 2,5-dihydroxybenzoic acid in young and middle aged Fischer 344 rats. Toxicology. 1991;66(3):297-311. Epub 1991/03/11. doi: http://dx.doi.org/10.1016/0300-483X(91)90201-B. PubMed PMID: 2011854.

- 359. Hebert CD, Cao QL, Birnbaum LS. Role of transforming growth factor beta in the proliferative effect of 2,3,7,8-tetrachlorodibenzo-p-dioxin on human squamous carcinoma cells. Cancer research. 1990;50(22):7190-7. Epub 1990/11/15. doi: http://www.ncbi.nlm.nih.gov/pubmed/2171758. PubMed PMID: 2171758.
- 360. Hebert CD, Cao QL, Birnbaum LS. Inhibition of high-density growth arrest in human squamous carcinoma cells by 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD). Carcinogenesis. 1990;11(8):1335-42. Epub 1990/08/01. doi: http://dx.doi.org/10.1093/carcin/11.8.1335. PubMed PMID: 2387019.
- 361. McMahon TF, Diliberto JJ, Birnbaum LS. Effects of age and dose on disposition and metabolism of salicylic acid in male Fischer 344 rats. Drug metabolism and disposition: the biological fate of chemicals. 1990;18(4):494-503. Epub 1990/07/01. doi: http://www.ncbi.nlm.nih.gov/pubmed/1976074. PubMed PMID: 1976074.
- 362. Diliberto JJ, Srinivas P, Overstreet D, Usha G, Burka LT, Birnbaum LS. Metabolism of citral, an alpha,beta-unsaturated aldehyde, in male F344 rats. Drug metabolism and disposition: the biological fate of chemicals. 1990;18(6):866-75. Epub 1990/11/01. doi: http://www.ncbi.nlm.nih.gov/pubmed/1981530. PubMed PMID: 1981530.
- 363. Dahl AR, Bechtold WE, Bond JA, Henderson RF, Mauderly JL, Muggenburg BA, Sun JD, Birnbaum LS. Species differences in the metabolism and disposition of inhaled 1,3-butadiene and isoprene. Environmental health perspectives. 1990;86:65-9. Epub 1990/06/01. doi: http://dx.doi.org/10.2307/3430933. PubMed PMID: 2401273; PMCID: PMC1567764.
- 364. Couture LA, Harris MW, Birnbaum LS. Characterization of the peak period of sensitivity for the induction of hydronephrosis in C57BL/6N mice following exposure to 2,3,7, 8-tetrachlorodibenzo-p-dioxin. Fundamental and applied toxicology: official journal of the Society of Toxicology. 1990;15(1):142-50. Epub 1990/07/01. doi: http://dx.doi.org/10.1016/0272-0590(90)90171-F. PubMed PMID: 2373295.
- 365. Banks YB, Brewster DW, Birnbaum LS. Age-related changes in dermal absorption of 2,3,7, 8-tetrachlorodibenzo-p-dioxin and 2,3,4,7,8-pentachlorodibenzofuran. Fundamental and applied toxicology: official journal of the Society of Toxicology. 1990;15(1):163-73. Epub 1990/07/01. doi: http://dx.doi.org/10.1016/0272-0590(90)90173-H. PubMed PMID: 2373296.
- 366. Birnbaum LS, McDonald MM, Blair PC, Clark AM, Harris MW. Differential toxicity of 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) in C57BL/6J mice congenic at the Ah Locus. Fundamental and applied toxicology: official journal of the Society of Toxicology. 1990;15(1):186-200. Epub 1990/07/01. doi: http://dx.doi.org/10.1016/0272-0590(90)90175-J. PubMed PMID: 2373298.
- 367. Medinsky MA, Bechtold WE, Birnbaum LS, Bond JA, Burt DG, Cheng YS, Gillett NA, Gulati DK, Hobbs CH, Pickrell JA. Effect of inhaled azodicarbonamide on F344/N rats and B6C3F1 mice with 2-week and 13-week inhalation exposures. Fundamental and applied toxicology: official journal of the Society of Toxicology. 1990;15(2):308-19. Epub 1990/08/01. doi: http://dx.doi.org/10.1016/0272-0590(90)90057-Q. PubMed PMID: 2227158.
- 368. Sun JD, Medinsky MA, Birnbaum LS, Lucier G, Henderson RF. Benzene hemoglobin adducts in mice and rats: characterization of formation and physiological modeling. Fundamental and applied

- toxicology: official journal of the Society of Toxicology. 1990;15(3):468-75. Epub 1990/10/01. doi: http://dx.doi.org/10.1016/0272-0590(90)90033-G. PubMed PMID: 2258011.
- 369. Abbott BD, Birnbaum LS. Effects of TCDD on embryonic ureteric epithelial EGF receptor expression and cell proliferation. Teratology. 1990;41(1):71-84. Epub 1990/01/01. doi: http://dx.doi.org/10.1002/tera.1420410108. PubMed PMID: 2305375.
- 370. Abbott BD, Hill LG, Birnbaum LS. Processes involved in retinoic acid production of small embryonic palatal shelves and limb defects. Teratology. 1990;41(3):299-310. Epub 1990/03/01. doi: http://dx.doi.org/10.1002/tera.1420410307. PubMed PMID: 2326754.
- 371. Abbott BD, Birnbaum LS. Retinoic acid-induced alterations in the expression of growth factors in embryonic mouse palatal shelves. Teratology. 1990;42(6):597-610. Epub 1990/12/01. doi: http://dx.doi.org/10.1002/tera.1420420604. PubMed PMID: 2087681.
- 372. Couture LA, Abbott BD, Birnbaum LS. A critical review of the developmental toxicity and teratogenicity of 2,3,7,8-tetrachlorodibenzo-p-dioxin: recent advances toward understanding the mechanism. Teratology. 1990;42(6):619-27. Epub 1990/12/01. doi: http://dx.doi.org/10.1002/tera.1420420606. PubMed PMID: 2087682.
- 373. Hebert CD, Harris MW, Elwell MR, Birnbaum LS. Relative toxicity and tumor-promoting ability of 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD), 2,3,4,7,8-pentachlorodibenzofuran (PCDF), and 1,2,3,4,7,8-hexachlorodibenzofuran (HCDF) in hairless mice. Toxicology and applied pharmacology. 1990;102(2):362-77. Epub 1990/02/01. doi: http://dx.doi.org/10.1016/0041-008X(90)90033-Q. PubMed PMID: 2300974.
- 374. Medinsky MA, Singh G, Bechtold WE, Bond JA, Sabourin PJ, Birnbaum LS, Henderson RF. Disposition of three glycol ethers administered in drinking water to male F344/N rats. Toxicology and applied pharmacology. 1990;102(3):443-55. Epub 1990/03/01. doi: http://dx.doi.org/10.1016/0041-008X(90)90040-2. PubMed PMID: 2107602.
- 375. Abbott BD, Birnbaum LS. Rat embryonic palatal shelves respond to TCDD in organ culture. Toxicology and applied pharmacology. 1990;103(3):441-51. Epub 1990/05/01. doi: http://dx.doi.org/10.1016/0041-008X(90)90317-N. PubMed PMID: 2339417.
- 376. Sabourin PJ, Sun JD, MacGregor JT, Wehr CM, Birnbaum LS, Lucier G, Henderson RF. Effect of repeated benzene inhalation exposures on benzene metabolism, binding to hemoglobin, and induction of micronuclei. Toxicology and applied pharmacology. 1990;103(3):452-62. Epub 1990/05/01. doi: http://dx.doi.org/10.1016/0041-008X(90)90318-0. PubMed PMID: 2339418.
- 377. McMahon TF, Birnbaum LS. Age-related changes in toxicity and biotransformation of potassium cyanide in male C57BL/6N mice. Toxicology and applied pharmacology. 1990;105(2):305-14. Epub 1990/09/01. doi: http://dx.doi.org/10.1016/0041-008X(90)90191-V. PubMed PMID: 2171158.
- 378. Abbott BD, Birnbaum LS. TCDD-induced altered expression of growth factors may have a role in producing cleft palate and enhancing the incidence of clefts after coadministration of retinoic acid and TCDD. Toxicology and applied pharmacology. 1990;106(3):418-32. Epub 1990/12/01. doi: http://dx.doi.org/10.1016/0041-008X(90)90337-T. PubMed PMID: 2260090.

- 379. Medinsky MA, Bechtold WE, Birnbaum LS, Henderson RF. Measurement of steady-state blood concentrations in B6C3F1 mice exposed by inhalation to vinylidene fluoride. Toxicology. 1990;64(3):255-63. Epub 1990/12/03. doi: http://dx.doi.org/10.1016/0300-483X(90)90118-Z. PubMed PMID: 2267664.
- 380. Stohs SJ, Abbott BD, Lin FH, Birnbaum LS. Induction of ethoxyresorufin-O-deethylase and inhibition of glucocorticoid receptor binding in skin and liver of haired and hairless HRS/J mice by topically applied 2,3,7,8-tetrachlorodibenzo-p-dioxin. Toxicology. 1990;65(1-2):123-36. Epub 1990/12/17. doi: http://dx.doi.org/10.1016/0300-483X(90)90083-S. PubMed PMID: 2274963.
- 381. Hebert CD, Birnbaum LS. Lack of correlation between sensitivity to growth inhibition and receptor number for transforming growth factor beta in human squamous carcinoma cell lines. Cancer research. 1989;49(12):3196-202. Epub 1989/06/15. doi: http://www.ncbi.nlm.nih.gov/pubmed/2541899. PubMed PMID: 2541899.
- 382. Birnbaum LS, Couture LA, Elwell MR. Subchronic Effects of Exposure to Octachlorodibenzodioxin (OCDD). Chemosphere. 1989;18(1-6):389-90. doi: http://dx.doi.org/10.1016/0045-6535(89)90145-8.
- 383. McMahon TF, Diliberto JJ, Birnbaum LS. Age-related changes in the disposition of benzyl acetate. A model compound for glycine conjugation. Drug metabolism and disposition: the biological fate of chemicals. 1989;17(5):506-12. Epub 1989/09/01. doi: http://www.ncbi.nlm.nih.gov/pubmed/2573493. PubMed PMID: 2573493.
- 384. Medinsky MA, Sabourin PJ, Henderson RF, Lucier G, Birnbaum LS. Differences in the pathways for metabolism of benzene in rats and mice simulated by a physiological model. Environmental health perspectives. 1989;82:43-9. Epub 1989/07/01. doi: http://dx.doi.org/10.2307/3430760. PubMed PMID: 2792050; PMCID: PMC1568104.
- 385. Henderson RF, Sabourin PJ, Bechtold WE, Griffith WC, Medinsky MA, Birnbaum LS, Lucier GW. The effect of dose, dose rate, route of administration, and species on tissue and blood levels of benzene metabolites. Environmental health perspectives. 1989;82:9-17. Epub 1989/07/01. doi: http://dx.doi.org/10.2307/3430755. PubMed PMID: 2792053; PMCID: PMC1568113.
- 386. Sun JD, Dahl AR, Bond JA, Birnbaum LS, Henderson RF. Metabolism of inhaled butadiene to monkeys: comparison to rodents. Experimental pathology. 1989;37(1-4):133-5. Epub 1989/01/01. doi: http://dx.doi.org/10.1016/S0232-1513(89)80032-5. PubMed PMID: 2637143.
- 387. Medinsky MA, Sabourin PJ, Lucier G, Birnbaum LS, Henderson RF. A toxikinetic model for simulation of benzene metabolism. Experimental pathology. 1989;37(1-4):150-4. Epub 1989/01/01. doi: http://dx.doi.org/10.1016/S0232-1513(89)80036-2. PubMed PMID: 2637146.
- 388. Sabourin PJ, Sun JD, Birnbaum LS, Lucier G, Henderson RF. Effect of repeated benzene inhalation exposures on subsequent metabolism of benzene. Experimental pathology. 1989;37(1-4):155-7. Epub 1989/01/01. doi: http://dx.doi.org/10.1016/S0232-1513(89)80038-6. PubMed PMID: 2637147.
- 389. Couture LA, Harris MW, Birnbaum LS. Developmental toxicity of 2,3,4,7,8-pentachlorodibenzofuran in the Fischer 344 rat. Fundamental and applied toxicology : official journal of the Society of Toxicology. 1989;12(2):358-66. Epub 1989/02/01. doi: http://dx.doi.org/10.1016/0272-0590(89)90052-3. PubMed PMID: 2714534.

- 390. Harris MW, Birnbaum LS. Developmental toxicity of perfluorodecanoic acid in C57BL/6N mice. Fundamental and applied toxicology: official journal of the Society of Toxicology. 1989;12(3):442-8. Epub 1989/04/01. doi: http://dx.doi.org/10.1016/0272-0590(89)90018-3. PubMed PMID: 2731659.
- 391. George JD, Price CJ, Marr MC, Sadler BM, Schwetz BA, Birnbaum LS, Morrissey RE. Developmental toxicity of 1,1,1-trichloroethane in CD rats. Fundamental and applied toxicology: official journal of the Society of Toxicology. 1989;13(4):641-51. Epub 1989/11/01. doi: http://dx.doi.org/10.1016/0272-0590(89)90322-9. PubMed PMID: 2620788.
- 392. Harris MW, Uraih LC, Birnbaum LS. Acute toxicity of perfluorodecanoic acid in C57BL/6 mice differs from 2,3,7,8-tetrachlorodibenzo-p-dioxin. Fundamental and applied toxicology: official journal of the Society of Toxicology. 1989;13(4):723-36. Epub 1989/11/01. doi: http://dx.doi.org/10.1016/0272-0590(89)90330-8. PubMed PMID: 2620793.
- 393. Gerlach RF, Medinsky MA, Hobbs CH, Bice DE, Bechtold WE, Cheng YS, Gillett NA, Birnbaum LS, Mauderly JL. Effect of four-week repeated inhalation exposure to unconjugated azodicarbonamide on specific and non-specific airway sensitivity of the guinea pig. Journal of applied toxicology: JAT. 1989;9(3):145-53. Epub 1989/06/01. doi: http://dx.doi.org/10.1002/jat.2550090303. PubMed PMID: 2745922.
- 394. Abbott BD, Harris MW, Birnbaum LS. Etiology of retinoic acid-induced cleft palate varies with the embryonic stage. Teratology. 1989;40(6):533-53. Epub 1989/12/01. doi: http://dx.doi.org/10.1002/tera.1420400602. PubMed PMID: 2623642.
- 395. Brewster DW, Banks YB, Clark AM, Birnbaum LS. Comparative dermal absorption of 2,3,7,8-tetrachlorodibenzo-p-dioxin and three polychlorinated dibenzofurans. Toxicology and applied pharmacology. 1989;97(1):156-66. Epub 1989/01/01. doi: http://dx.doi.org/10.1016/0041-008X(89)90064-1. PubMed PMID: 2916232.
- 396. Ryan RP, Sunahara GI, Lucier GW, Birnbaum LS, Nelson KG. Decreased ligand binding to the hepatic glucocorticoid and epidermal growth factor receptors after 2,3,4,7,8-pentachlorodibenzofuran and 1,2,3,4,7,8-hexachlorodibenzofuran treatment of pregnant mice. Toxicology and applied pharmacology. 1989;98(3):454-64. Epub 1989/05/01. doi: http://dx.doi.org/10.1016/0041-008X(89)90174-9. PubMed PMID: 2718174.
- 397. Birnbaum LS, Harris MW, Stocking LM, Clark AM, Morrissey RE. Retinoic acid and 2,3,7,8-tetrachlorodibenzo-p-dioxin selectively enhance teratogenesis in C57BL/6N mice. Toxicology and applied pharmacology. 1989;98(3):487-500. Epub 1989/05/01. doi: http://dx.doi.org/10.1016/0041-008X(89)90177-4. PubMed PMID: 2718176.
- 398. Medinsky MA, Sabourin PJ, Lucier G, Birnbaum LS, Henderson RF. A physiological model for simulation of benzene metabolism by rats and mice. Toxicology and applied pharmacology. 1989;99(2):193-206. Epub 1989/06/15. doi: http://dx.doi.org/10.1016/0041-008X(89)90002-1. PubMed PMID: 2734786.
- 399. Abbott BD, Birnbaum LS. TCDD alters medial epithelial cell differentiation during palatogenesis. Toxicology and applied pharmacology. 1989;99(2):276-86. Epub 1989/06/15. doi: http://dx.doi.org/10.1016/0041-008X(89)90010-0. PubMed PMID: 2734791.

- 400. Abbott BD, Birnbaum LS. Cellular alterations and enhanced induction of cleft palate after coadministration of retinoic acid and TCDD. Toxicology and applied pharmacology. 1989;99(2):287-301. Epub 1989/06/15. doi: http://dx.doi.org/10.1016/0041-008X(89)90011-2. PubMed PMID: 2734792.
- 401. Sabourin PJ, Bechtold WE, Griffith WC, Birnbaum LS, Lucier G, Henderson RF. Effect of exposure concentration, exposure rate, and route of administration on metabolism of benzene by F344 rats and B6C3F1 mice. Toxicology and applied pharmacology. 1989;99(3):421-44. Epub 1989/07/01. doi: http://dx.doi.org/10.1016/0041-008X(89)90151-8. PubMed PMID: 2749731.
- 402. Brewster DW, Birnbaum LS. The biochemical toxicity of perfluorodecanoic acid in the mouse is different from that of 2,3,7,8-tetrachlorodibenzo-p-dioxin. Toxicology and applied pharmacology. 1989;99(3):544-54. Epub 1989/07/01. doi: http://dx.doi.org/10.1016/0041-008X(89)90161-0. PubMed PMID: 2749739.
- 403. Abbott BD, Diliberto JJ, Birnbaum LS. 2,3,7,8-Tetrachlorodibenzo-p-dioxin alters embryonic palatal medial epithelial cell differentiation in vitro. Toxicology and applied pharmacology. 1989;100(1):119-31. Epub 1989/08/01. doi: http://dx.doi.org/10.1016/0041-008X(89)90096-3. PubMed PMID: 2763295.
- 404. Sun JD, Dahl AR, Bond JA, Birnbaum LS, Henderson RF. Characterization of hemoglobin adduct formation in mice and rats after administration of [14C]butadiene or [14C]isoprene. Toxicology and applied pharmacology. 1989;100(1):86-95. Epub 1989/08/01. doi: http://dx.doi.org/10.1016/0041-008X(89)90093-8. PubMed PMID: 2763304.
- 405. Diliberto JJ, Usha G, Birnbaum LS. Disposition of citral in male Fischer rats. Drug metabolism and disposition: the biological fate of chemicals. 1988;16(5):721-7. Epub 1988/09/01. doi: http://www.ncbi.nlm.nih.gov/pubmed/2906597. PubMed PMID: 2906597.
- 406. Rao GN, Birnbaum LS, Collins JJ, Tennant RW, Skow LC. Mouse strains for chemical carcinogenicity studies: overview of a workshop. Fundamental and applied toxicology: official journal of the Society of Toxicology. 1988;10(3):385-94. Epub 1988/04/01. doi: http://dx.doi.org/10.1016/0272-0590(88)90285-0. PubMed PMID: 3286346.
- 407. Brewster DW, Uraih LC, Birnbaum LS. The acute toxicity of 2,3,4,7,8-pentachlorodibenzofuran (4PeCDF) in the male Fischer rat. Fundamental and applied toxicology: official journal of the Society of Toxicology. 1988;11(2):236-49. Epub 1988/08/01. doi: http://dx.doi.org/10.1016/0272-0590(88)90148-0. PubMed PMID: 3220203.
- 408. Medinsky MA, Bechtold WE, Birnbaum LS, Chico DM, Gerlach RF, Henderson RF. Uptake of vinylidene fluoride in rats simulated by a physiological model. Fundamental and applied toxicology: official journal of the Society of Toxicology. 1988;11(2):250-60. Epub 1988/08/01. doi: http://dx.doi.org/10.1016/0272-0590(88)90149-2. PubMed PMID: 3220204.
- 409. Borghoff SJ, Stefanski SA, Birnbaum LS. The effect of age on the glucuronidation and toxicity of 4,4'-thiobis(6-t-butyl-m-cresol). Toxicology and applied pharmacology. 1988;92(3):453-66. Epub 1988/03/15. doi: http://dx.doi.org/10.1016/0041-008X(88)90185-8. PubMed PMID: 3127943.

- 410. Birnbaum LS, Couture LA. Disposition of octachlorodibenzo-p-dioxin (OCDD) in male rats. Toxicology and applied pharmacology. 1988;93(1):22-30. Epub 1988/03/30. doi: http://dx.doi.org/10.1016/0041-008X(88)90022-1. PubMed PMID: 3353999.
- 411. Couture LA, Elwell MR, Birnbaum LS. Dioxin-like effects observed in male rats following exposure to octachlorodibenzo-p-dioxin (OCDD) during a 13-week study. Toxicology and applied pharmacology. 1988;93(1):31-46. Epub 1988/03/30. doi: http://dx.doi.org/10.1016/0041-008X(88)90023-3. PubMed PMID: 3354000.
- 412. Brewster DW, Elwell MR, Birnbaum LS. Toxicity and disposition of 2,3,4,7,8-pentachlorodibenzofuran (4PeCDF) in the rhesus monkey (Macaca mulatta). Toxicology and applied pharmacology. 1988;93(2):231-46. Epub 1988/04/01. doi: http://dx.doi.org/10.1016/0041-008X(88)90123-8. PubMed PMID: 3358261.
- 413. Sabourin PJ, Bechtold WE, Birnbaum LS, Lucier G, Henderson RF. Differences in the metabolism and disposition of inhaled [3H]benzene by F344/N rats and B6C3F1 mice. Toxicology and applied pharmacology. 1988;94(1):128-40. Epub 1988/06/15. doi: http://dx.doi.org/10.1016/0041-008X(88)90343-2. PubMed PMID: 3376110.
- 414. Bond JA, Birnbaum LS, Dahl AR, Medinsky MA, Sabourin PJ, Henderson RF. Disposition of inhaled 1-chloro-2-propanol in F344/N rats. Toxicology and applied pharmacology. 1988;95(3):444-55. Epub 1988/09/30. doi: http://dx.doi.org/10.1016/0041-008X(88)90362-6. PubMed PMID: 3142098.
- 415. Brewster DW, Birnbaum LS. Disposition of 1,2,3,7,8-pentachlorodibenzofuran in the rat. Toxicology and applied pharmacology. 1988;95(3):490-8. Epub 1988/09/30. doi: http://dx.doi.org/10.1016/0041-008X(88)90367-5. PubMed PMID: 3188012.
- 416. Bond JA, Martin OS, Birnbaum LS, Dahl AR, Melnick RL, Henderson RF. Metabolism of 1,3-butadiene by lung and liver microsomes of rats and mice repeatedly exposed by inhalation to 1,3-butadiene. Toxicology letters. 1988;44(1-2):143-51. Epub 1988/11/01. doi: http://dx.doi.org/10.1016/0378-4274(88)90140-3. PubMed PMID: 3188072.
- 417. Shopp GM, Cheng YS, Gillett NA, Bechtold WE, Medinsky MA, Hobbs CH, Birnbaum LS, Mauderly JL. Acute inhalation exposure of azodicarbonamide in the guinea pig. American Industrial Hygiene Association journal. 1987;48(2):127-32. Epub 1987/02/01. doi: http://dx.doi.org/10.1080/15298668791384517. PubMed PMID: 3565267.
- 418. Bond JA, Dahl AR, Henderson RF, Birnbaum LS. Species differences in the distribution of inhaled butadiene in tissues. American Industrial Hygiene Association journal. 1987;48(10):867-72. Epub 1987/10/01. doi: http://dx.doi.org/10.1080/15298668791385723. PubMed PMID: 3687732.
- 419. Eastin WC, Jr., Birnbaum LS. Intestinal absorption of two glucose analogues in rats of different ages. Experimental gerontology. 1987;22(5):351-7. Epub 1987/01/01. doi: http://dx.doi.org/10.1016/0531-5565(87)90033-7. PubMed PMID: 3428412.
- 420. Mewhinney JA, Ayres PH, Bechtold WE, Dutcher JS, Cheng YS, Bond JA, Medinsky MA, Henderson RF, Birnbaum LS. The fate of inhaled azodicarbonamide in rats. Fundamental and applied

toxicology: official journal of the Society of Toxicology. 1987;8(3):372-81. Epub 1987/04/01. doi: http://dx.doi.org/10.1016/0272-0590(87)90086-8. PubMed PMID: 3569707.

- 421. Birnbaum LS. Age-related changes in carcinogen metabolism. Journal of the American Geriatrics Society. 1987;35(1):51-60. Epub 1987/01/01. doi: http://dx.doi.org/10.1111/j.1532-5415.1987.tb01319.x. PubMed PMID: 3540077.
- 422. Abbott BD, Birnbaum LS, Pratt RM. TCDD-induced hyperplasia of the ureteral epithelium produces hydronephrosis in murine fetuses. Teratology. 1987;35(3):329-34. Epub 1987/06/01. doi: http://dx.doi.org/10.1002/tera.1420350307. PubMed PMID: 3629513.
- 423. Abbott BD, Morgan KS, Birnbaum LS, Pratt RM. TCDD alters the extracellular matrix and basal lamina of the fetal mouse kidney. Teratology. 1987;35(3):335-44. Epub 1987/06/01. doi: http://dx.doi.org/10.1002/tera.1420350308. PubMed PMID: 3629514.
- 424. Sabourin PJ, Chen BT, Lucier G, Birnbaum LS, Fisher E, Henderson RF. Effect of dose on the absorption and excretion of [14C]benzene administered orally or by inhalation in rats and mice. Toxicology and applied pharmacology. 1987;87(2):325-36. Epub 1987/02/01. doi: http://dx.doi.org/10.1016/0041-008X(87)90294-8. PubMed PMID: 3824388.
- 425. Dahl AR, Birnbaum LS, Bond JA, Gervasi PG, Henderson RF. The fate of isoprene inhaled by rats: comparison to butadiene. Toxicology and applied pharmacology. 1987;89(2):237-48. Epub 1987/06/30. doi: http://dx.doi.org/10.1016/0041-008X(87)90044-5. PubMed PMID: 3603560.
- 426. Birnbaum LS, Harris MW, Barnhart ER, Morrissey RE. Teratogenicity of three polychlorinated dibenzofurans in C57BL/6N mice. Toxicology and applied pharmacology. 1987;90(2):206-16. Epub 1987/09/15. doi: http://dx.doi.org/10.1016/0041-008X(87)90328-0. PubMed PMID: 3629596.
- 427. Brewster DW, Birnbaum LS. Disposition and excretion of 2,3,4,7,8-pentachlorodibenzofuran in the rat. Toxicology and applied pharmacology. 1987;90(2):243-52. Epub 1987/09/15. doi: http://dx.doi.org/10.1016/0041-008X(87)90332-2. PubMed PMID: 3629600.
- 428. Birnbaum LS, Harris MW, Crawford DD, Morrissey RE. Teratogenic effects of polychlorinated dibenzofurans in combination in C57BL/6N mice. Toxicology and applied pharmacology. 1987;91(2):246-55. Epub 1987/11/01. doi: http://dx.doi.org/10.1016/0041-008X(87)90105-0. PubMed PMID: 3672524.
- 429. Hebert CD, Birnbaum LS. The influence of aging on intestinal absorption of TCDD in rats. Toxicology letters. 1987;37(1):47-55. Epub 1987/06/01. doi: http://dx.doi.org/10.1016/0378-4274(87)90166-4. PubMed PMID: 3109077.
- 430. Birnbaum LS, Heaney SM. Dermal absorption of the antioxidant 4,4'-thiobis(6-tert-butyl-m-cresol) in Sencar mice and Fischer rats. Toxicology letters. 1987;37(1):13-9. Epub 1987/06/01. doi: http://dx.doi.org/10.1016/0378-4274(87)90161-5. PubMed PMID: 3590225.
- 431. Kao LR, Goldstein JA, Birnbaum LS. Effect of o-benzyl-p-chlorophenol on drug-metabolizing enzymes in rats. Biochemical pharmacology. 1986;35(4):613-20. Epub 1986/02/15. doi: http://dx.doi.org/10.1016/0006-2952(86)90356-4. PubMed PMID: 3947391.

- 432. Birnbaum LS. Distribution and excretion of 2,3,7,8-tetrachlorodibenzo-p-dioxin in congenic strains of mice which differ at the Ah locus. Drug metabolism and disposition: the biological fate of chemicals. 1986;14(1):34-40. Epub 1986/01/01. doi: http://www.ncbi.nlm.nih.gov/pubmed/2868862. PubMed PMID: 2868862.
- 433. Borghoff SJ, Birnbaum LS. Age-related changes in the metabolism and excretion of allyl isothiocyanate. A model compound for glutathione conjugation. Drug metabolism and disposition: the biological fate of chemicals. 1986;14(4):417-22. Epub 1986/07/01. doi: http://www.ncbi.nlm.nih.gov/pubmed/2873988. PubMed PMID: 2873988.
- 434. Miller CP, Birnbaum LS. Teratologic evaluation of hexabrominated naphthalenes in C57BL/6N mice. Fundamental and applied toxicology: official journal of the Society of Toxicology. 1986;7(3):398-405. Epub 1986/10/01. doi: http://dx.doi.org/10.1016/0272-0590(86)90089-8. PubMed PMID: 3781129.
- 435. Birnbaum LS, Deskin R, Grumbein SL, Kurtz P, Fowler KL, Peters AC. Prechronic toxicity of obenzyl-p-chlorophenol in rats and mice. Fundamental and applied toxicology: official journal of the Society of Toxicology. 1986;7(4):615-25. Epub 1986/11/01. doi: http://dx.doi.org/10.1016/0272-0590(86)90111-9. PubMed PMID: 3803756.
- 436. Kao LR, Birnbaum LS. Disposition of o-benzyl-p-chlorophenol in male rats. Journal of toxicology and environmental health. 1986;18(3):441-58. Epub 1986/01/01. doi: http://dx.doi.org/10.1080/15287398609530884. PubMed PMID: 3712501.
- 437. Birnbaum LS, Harris MW, Miller CP, Pratt RM, Lamb JC. Synergistic interaction of 2,3,7,8,-tetrachlorodibenzo-p-dioxin and hydrocortisone in the induction of cleft palate in mice. Teratology. 1986;33(1):29-35. Epub 1986/02/01. doi: http://dx.doi.org/10.1002/tera.1420330106. PubMed PMID: 3738807.
- 438. Lamb JC, IV, Harris MW, McKinney JD, Birnbaum LS. Effects of thyroid hormones on the induction of cleft palate by 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) in C57BL/6N mice. Toxicology and applied pharmacology. 1986;84(1):115-24. Epub 1986/06/15. doi: http://dx.doi.org/10.1016/0041-008X(86)90420-5. PubMed PMID: 3715858.
- 439. Bond JA, Dahl AR, Henderson RF, Dutcher JS, Mauderly JL, Birnbaum LS. Species differences in the disposition of inhaled butadiene. Toxicology and applied pharmacology. 1986;84(3):617-27. Epub 1986/07/01. doi: http://dx.doi.org/10.1016/0041-008X(86)90268-1. PubMed PMID: 3726881.
- 440. Weber H, Birnbaum LS. 2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD) and 2,3,7,8-tetrachlorodibenzofuran (TCDF) in pregnant C57BL/6N mice: distribution to the embryo and excretion. Archives of toxicology. 1985;57(3):159-62. Epub 1985/08/01. doi: http://dx.doi.org/10.1007/BF00290880. PubMed PMID: 4062549.
- 441. Birnbaum LS, Johnson L. Disposition of benzo(f)quinoline in male rats. Drug metabolism and disposition: the biological fate of chemicals. 1985;13(1):18-24. Epub 1985/01/01. doi: http://www.ncbi.nlm.nih.gov/pubmed/2858371. PubMed PMID: 2858371.
- 442. Borghoff SJ, Birnbaum LS. Age-related changes in glucuronidation and deglucuronidation in liver, small intestine, lung, and kidney of male Fischer rats. Drug metabolism and disposition: the biological

fate of chemicals. 1985;13(1):62-7. Epub 1985/01/01. doi: http://www.ncbi.nlm.nih.gov/pubmed/2858379. PubMed PMID: 2858379.

- 443. McKinney JD, Chae K, McConnell EE, Birnbaum LS. Structure-induction versus structure-toxicity relationships for polychlorinated biphenyls and related aromatic hydrocarbons. Environmental health perspectives. 1985;60:57-68. Epub 1985/05/01. doi: http://dx.doi.org/10.2307/3429945. PubMed PMID: 2992928; PMCID: PMC1568558.
- 444. Birnbaum LS. The role of structure in the disposition of halogenated aromatic xenobiotics. Environmental health perspectives. 1985;61:11-20. Epub 1985/09/01. doi: http://dx.doi.org/10.2307/3430058. PubMed PMID: 2998745; PMCID: PMC1568747.
- 445. Dutcher JS, Medinsky MA, Bond JA, Cheng YS, Snipes MB, Henderson RF, Birnbaum LS. Effect of vapor concentration on the disposition of inhaled 2,3-dichloropropene in Fischer-344 rats. Fundamental and applied toxicology: official journal of the Society of Toxicology. 1985;5(5):997-1005. Epub 1985/10/01. doi: http://dx.doi.org/10.1016/0272-0590(85)90182-4. PubMed PMID: 4065469.
- 446. Birnbaum LS, McKinney JD. A persistent hexabromonaphthalene isomer is 2,3,4,5,6,7-hexabromonaphthalene. Journal of toxicology and environmental health. 1985;16(2):219-27. Epub 1985/01/01. doi: http://dx.doi.org/10.1080/15287398509530735. PubMed PMID: 4078932.
- 447. Birnbaum LS, Weber H, Harris MW, Lamb JC, IV, McKinney JD. Toxic interaction of specific polychlorinated biphenyls and 2,3,7,8-tetrachlorodibenzo-p-dioxin: increased incidence of cleft palate in mice. Toxicology and applied pharmacology. 1985;77(2):292-302. Epub 1985/02/01. doi: http://dx.doi.org/10.1016/0041-008X(85)90329-1. PubMed PMID: 3919463.
- 448. Bond JA, Medinsky MA, Dutcher JS, Henderson RF, Cheng YS, Mewhinney JA, Birnbaum LS. Disposition and metabolism of 2,3-[14C]dichloropropene in rats after inhalation. Toxicology and applied pharmacology. 1985;78(1):47-54. Epub 1985/03/30. doi: http://dx.doi.org/10.1016/0041-008X(85)90303-5. PubMed PMID: 4035672.
- 449. Medinsky MA, Dutcher JS, Bond JA, Henderson RF, Mauderly JL, Snipes MB, Mewhinney JA, Cheng YS, Birnbaum LS. Uptake and excretion of [14C]methyl bromide as influenced by exposure concentration. Toxicology and applied pharmacology. 1985;78(2):215-25. Epub 1985/04/01. doi: http://dx.doi.org/10.1016/0041-008X(85)90285-6. PubMed PMID: 4035677.
- 450. Bond JA, Dutcher JS, Medinsky MA, Henderson RF, Birnbaum LS. Disposition of [14C]methyl bromide in rats after inhalation. Toxicology and applied pharmacology. 1985;78(2):259-67. Epub 1985/04/01. doi: http://dx.doi.org/10.1016/0041-008X(85)90289-3. PubMed PMID: 4035680.
- 451. Weber H, Harris MW, Haseman JK, Birnbaum LS. Teratogenic potency of TCDD, TCDF and TCDD-TCDF combinations in C57BL/6N mice. Toxicology letters. 1985;26(2-3):159-67. Epub 1985/08/01. doi: http://dx.doi.org/10.1016/0378-4274(85)90161-4. PubMed PMID: 4035709.
- 452. Dieter MP, Wilson R, Birnbaum LS. Age-related changes in glucose metabolizing enzymes in spleen, thymus, and pulmonary lavage cells from F344 rats. Mechanisms of ageing and development. 1984;26(2-3):253-63. Epub 1984/08/01. doi: http://dx.doi.org/10.1016/0047-6374(84)90098-8. PubMed PMID: 6482522.

- 453. Medinsky MA, Bond JA, Dutcher JS, Birnbaum LS. Disposition of [14C]2,3-dichloropropene in Fischer-344 rats after oral or intraperitoneal administration. Toxicology letters. 1984;23(1):119-25. Epub 1984/10/01. doi: http://dx.doi.org/10.1016/0378-4274(84)90017-1. PubMed PMID: 6485012.
- 454. Medinsky MA, Bond JA, Dutcher JS, Birnbaum LS. Disposition of [14C]methyl bromide in Fischer-344 rats after oral or intraperitoneal administration. Toxicology. 1984;32(3):187-96. Epub 1984/09/14. doi: http://dx.doi.org/10.1016/0300-483X(84)90073-8. PubMed PMID: 6433513.
- 455. Birnbaum LS, Eastin WC, Jr., Johnson L, Matthews HB. Disposition of 4,4'-thiobis(6-t-butyl-m-cresol) in rats. Drug metabolism and disposition: the biological fate of chemicals. 1983;11(6):537-43. Epub 1983/11/01. doi: http://www.ncbi.nlm.nih.gov/pubmed/6140136. PubMed PMID: 6140136.
- 456. Birnbaum LS, Darcey DJ, McKinney JD. Hexabromonaphthalene contaminants of polybrominated biphenyls: chemical composition and disposition in the rat. Journal of toxicology and environmental health. 1983;12(4-6):555-73. Epub 1983/10/01. doi: http://dx.doi.org/10.1080/15287398309530449. PubMed PMID: 6321745.
- 457. Ioannou YM, Birnbaum LS, Matthews HB. Toxicity and distribution of 2,3,7,8-tetrachlorodibenzofuran in male guinea pigs. Journal of toxicology and environmental health. 1983;12(4-6):541-53. Epub 1983/10/01. doi: http://dx.doi.org/10.1080/15287398309530448. PubMed PMID: 6668609.
- 458. King FG, Dedrick RL, Collins JM, Matthews HB, Birnbaum LS. Physiological model for the pharmacokinetics of 2,3,7,8-tetrachlorodibenzofuran in several species. Toxicology and applied pharmacology. 1983;67(3):390-400. Epub 1983/03/15. doi: http://dx.doi.org/10.1016/0041-008X(83)90323-X. PubMed PMID: 6405508.
- 459. Birnbaum LS. Distribution and excretion of 2,3,6,2',3',6'- and 2,4,5,2',4',5'-hexachlorobiphenyl in senescent rats. Toxicology and applied pharmacology. 1983;70(2):262-72. Epub 1983/09/15. doi: http://dx.doi.org/10.1016/0041-008X(83)90102-3. PubMed PMID: 6414105.
- 460. Robertson IG, Birnbaum LS. Age-related changes in mutagen activation by rat tissues. Chemicobiological interactions. 1982;38(2):243-52. Epub 1982/01/01. doi: http://dx.doi.org/10.1016/0009-2797(82)90043-6. PubMed PMID: 6799214.
- 461. Armbrecht HJ, Birnbaum LS, Zenser TV, Davis BB. Changes in hepatic microsomal membrane fluidity with age. Experimental gerontology. 1982;17(1):41-8. Epub 1982/01/01. doi: http://dx.doi.org/10.1016/0531-5565(82)90007-9. PubMed PMID: 6284532.
- 462. Decad GM, Birnbaum LS. Noninvasive technique for intravenous injection of guinea pigs. Laboratory animal science. 1981;31(1):85-6. Epub 1981/02/01. doi: http://www.ncbi.nlm.nih.gov/pubmed/7253559. PubMed PMID: 7253559.
- 463. Birnbaum LS, Decad GM, Matthews HB, McConnell EE. Fate of 2,3,7,8-tetrachlorodibenzofuran in the monkey. Toxicology and applied pharmacology. 1981;57(2):189-96. Epub 1981/02/01. doi: http://dx.doi.org/10.1016/0041-008X(81)90279-9. PubMed PMID: 7222035.

- 464. Decad GM, Birnbaum LS, Matthews HB. 2,3,7,8-Tetrachlorodibenzofuran tissue distribution and excretion in guinea pig. Toxicology and applied pharmacology. 1981;57(2):231-40. Epub 1981/02/01. doi: http://dx.doi.org/10.1016/0041-008X(81)90284-2. PubMed PMID: 7222040.
- 465. Decad GM, Birnbaum LS, Matthews HB. Distribution and excretion of 2,3,7,8-tetrachlorodibenzofuran in C57BL/6J and DBA/2J mice. Toxicology and applied pharmacology. 1981;59(3):564-73. Epub 1981/07/01. doi: http://dx.doi.org/10.1016/0041-008X(81)90311-2. PubMed PMID: 7268779.
- 466. Baird MB, Birnbaum LS, Sfeir GT. NADPH-driven lipid peroxidation in rat liver nuclei and nuclear membranes. Archives of biochemistry and biophysics. 1980;200(1):108-15. Epub 1980/03/01. doi: http://dx.doi.org/10.1016/0003-9861(80)90337-9. PubMed PMID: 7362246.
- 467. Birnbaum LS. Altered hepatic drug metabolism in senescent mice. Experimental gerontology. 1980;15(4):259-67. Epub 1980/01/01. doi: http://dx.doi.org/10.1016/0531-5565(80)90030-3. PubMed PMID: 6773794.
- 468. Birnbaum LS, Decad GM, Matthews HB. Disposition and excretion of 2,3,7,8-tetrachlorodibenzofuran in the rat. Toxicology and applied pharmacology. 1980;55(2):342-52. Epub 1980/09/15. doi: http://dx.doi.org/10.1016/0041-008X(80)90096-4. PubMed PMID: 7423523.
- 469. Armbrecht HJ, Birnbaum LS, Zenser TV, Mattammal MB, Davis BB. Renal cytochrome P-450's-electrophoretic and electron paramagnetic resonance studies. Archives of biochemistry and biophysics. 1979;197(1):277-84. Epub 1979/10/01. doi: http://dx.doi.org/10.1016/0003-9861(79)90246-7. PubMed PMID: 232400.
- 470. Baird MB, Birnbaum LS. Increased production of mutagenic metabolites of carcinogens by tissues from senescent rodents. Cancer research. 1979;39(11):4752-5. Epub 1979/11/01. doi: http://www.ncbi.nlm.nih.gov/pubmed/498103. PubMed PMID: 498103.
- 471. Birnbaum LS, Baird MB. Senescent changes in rodent hepatic epoxide metabolism. Chemicobiological interactions. 1979;26(3):245-56. Epub 1979/08/01. doi: http://dx.doi.org/10.1016/0009-2797(79)90028-0. PubMed PMID: 509688.
- 472. Baird MB, Birnbaum LS. Inhibition of 2-fluorenamine-induced mutagenesis in Salmonella typhimurium by vitamin A. Journal of the National Cancer Institute. 1979;63(4):1093-6. Epub 1979/10/01. doi: https://doi.org/10.1093/jnci/63.4.1093. PubMed PMID: 384006.
- 473. Birnbaum LS, Baird MB. Induction of hepatic mixed function oxidases in senescent rodents. Experimental gerontology. 1978;13(5):299-303. Epub 1978/01/01. doi: http://dx.doi.org/10.1016/0531-5565(78)90038-4. PubMed PMID: 104880.
- 474. Birnbaum LS, Baird MB. Induction of hepatic mixed function oxidases in senescent rodents—II. Effect of polychlorinated biphenyls. Experimental gerontology. 1978;13(6):469-77. Epub 1978/01/01. doi: http://dx.doi.org/10.1016/0531-5565(78)90059-1. PubMed PMID: 104883.
- 475. Baird MB, Massie HR, Birnbaum LS. Presence of a high-molecular-weight form of catalse in enzyme purified from mouse liver. The Biochemical journal. 1977;163(3):449-53. Epub 1977/06/01. doi: https://dx.doi.org/10.1042%2Fbj1630449. PubMed PMID: 880214; PMCID: PMC1164724.

- 476. Baird MB, Birnbaum LS, Samis HB, Massie HR, Zimmerman JA. Allylisopropylacetamide preferentially interacts with the phenobarbital-inducible form of rat hepatic microsomal P-450. Biochemical pharmacology. 1976;25(21):2415-7. Epub 1976/11/01. doi: http://dx.doi.org/10.1016/0006-2952(76)90042-3. PubMed PMID: 826256.
- 477. Birnbaum LS, Baird MB, Massie HR. Pregnenolone-16alpha-carbonitrile-inducible cytochrome P450 in rat liver. Research communications in chemical pathology and pharmacology. 1976;15(3):553-62. Epub 1976/11/01. doi: http://www.ncbi.nlm.nih.gov/pubmed/825936. PubMed PMID: 825936.
- 478. Birnbaum LS, Kaplan S. In vitro synthesis of Escherichia coli ribosomal RNA. Journal of molecular biology. 1973;75(1):73-81. Epub 1973/03/25. doi: https://doi.org/10.1016/0022-2836(73)90529-9. PubMed PMID: 4576591.
- 479. Unger M, Birnbaum LS, Kaplan S, Pfister A. Location of the ribosomal RNA cistron of Escherichia coli: a second site. Molecular & general genetics: MGG. 1972;119(4):377-80. Epub 1972/01/01. doi: http://www.ncbi.nlm.nih.gov/pubmed/4567810. PubMed PMID: 4567810.
- 480. Birnbaum LS, Kaplan S. Localization of a portion of the ribosomal RNA genes in Escherichia coli. Proceedings of the National Academy of Sciences of the United States of America. 1971;68(5):925-9. Epub 1971/05/01. doi: http://dx.doi.org/10.1073/pnas.68.5.925. PubMed PMID: 4930242; PMCID: PMC389082.

Reports

- 1. Briss P, Bailey W, Barker L, Beker L, Beltrán-Aguilar E, Bigley M, Birnbaum L, Bucher J, Chattopadhyay A, Donohue J, Doyle E, Garcia I, Gooch B, Goodman J, Gracia J, Griffin S, Grummer-Strawn L, Hirschman J, Hyman F, Iafolla T, Kohn W, Lester A, Makrides N, Manski R, Osorio A, Silverman B, Sinks T. U.S. Public Health Service Recommendation for Fluoride Concentration in Drinking Water for the Prevention of Dental Caries. Public health reports (Washington, DC: 1974). 2015;130(4):318-31. Epub 2015/09/09. doi: https://doi.org/10.1177/003335491513000408. PubMed PMID: 26346489; PMCID: PMC4547570.
- 2. Birnbaum LS. Conclusions and Recommendations. Report on Environmental Health in Israel. 2014:89-92.
- 3. Sekizawa J, Suter II G, Birnbaum LS. Case study information package, III: tributyltin and triphenyltin compounds. Report. Geneva, Switzerland: 2001 09/20/2018.
- 4. Birnbaum LS. Carcinogenesis bioassay of 1,1,1,2-tetrachloroethane. NTP Technical Reports. 1982;NTP TR 237.

Book Reviews

1. Birnbaum LS. Mutation and the environment. Journal of Toxicology and Environmental Health: Part C: Somatic and heritable mutation, adduction, and epidemiology. 1990;32(4):494-6. doi: https://doi.org/10.1080/15287399109531498.

Books and Book Chapters

- 1. Birnbaum LS. Foreword. Environmental Biodynamics: A New Science of How the Environment Interacts with Human Health: Oxford University Press; 2021. p. IX-XII.
- 2. Miller MF, Chandler KJ, Birnbaum LS. Environmental Health. In: Wohl EE, editor. Environmental Science. New York: Oxford University Press; 2020.
- 3. Schug TT, Birnbaum LS. Endocrine-disrupting chemicals. Environmental Toxicants: Wiley; 2020. p. 535-54.
- 4. Birnbaum LS. Persistent Bioaccumulative Toxic Substances (PBTs). In: Etzel RA, American Academy of Pediatrics, editors. Pediatric Environmental Health. 4th edition ed. Elk Grove Village: American Academy of Pediatrics; 2019. p. 641-5.
- 5. Birnbaum LS. A Curious Mind. Breaking In: Women's Accounts of How Choices Shape STEM Careers. Sterling, VA: Stylus Publishing, LLC; 2015. p. 31-43.
- 6. Birnbaum LS. Adipose tissue pollutants and obesity. The ECOG Free Obesity eBook: European Childhood Obesity Group; 2015.
- 7. Birnbaum LS, Schug TT. Human Health Effects of Bisphenol A. In: Snedeker SM, editor. Toxicants in Food Packaging and Household Plastics. London: Springer; 2014. p. 1-29.
- 8. Birnbaum LS, DeVito M. Foreword. In: Fowler BA, editor. Computational Toxicology: Methods and Applications for Risk Assessment. San Diego: Academic Press; 2013. p. IX-XIV.
- 9. Birnbaum LS, DeVito MJ. Foreword. In: Rose M, Fernandes A, editors. Persistent Organic Pollutants and Toxic Metals in Foods. Cambridge: Woodhead Publishing; 2013. p. XXIII-XXIV.
- 10. La Merrill M, Taylor K, Thayer KA, Birnbaum LS. Chemical Obesogens and Obesity. In: Landrigan PJ, Etzel RA, editors. Textbook of Children's Environmental Health. New York: Oxford University Press; 2013. p. 333-43.
- 11. Wikoff D, Fitzgerald L, Birnbaum L. Persistent Organic Pollutants: An Overview. In: Schecter A, editor. Dioxins and Health: Including Other Persistent Organic Pollutants and Endocrine Disruptors. 3rd ed: Wiley & Sons; 2012. p. 1-35.
- 12. Birnbaum LS, White SS, Fenton SE. Adverse Health Outcomes Caused By Dioxin-Activated AHR in Humans. In: Pohjanvirta R, editor. The AH Receptor in Biology and Toxicology: Wiley & Sons, Inc.; 2011. p. 307-16.
- 13. Birnbaum LS, Schecter A, Colacino J. Dioxins: Health Effects. In: Nriagu J, editor. Encyclopedia of Environmental Health. Amsterdam: Elsevier; 2011. p. 93-100.
- 14. Birnbaum LS, Staskal D, Haws L. Application of a Relative Potency Factor Approach in the Assessment of Health Risks Associated with Exposures to Mixtures of Dioxin-Like Compounds. In: Mumtaz M, editor. Principles and Practice of Mixtures Toxicology: Wiley-VCH Verlag GmbH & Co. KGaA; 2010. p. 67-97.

- 15. Birnbaum LS. The third biannual international PCB workshop. In: Hansen L, Robertson L, editors. PCBs: Human and Environmental Disposition and Toxicology. Urbana, Illinois: University of Illinois Press; 2008. p. 1-6.
- 16. Birnbaum LS, Staskal D. Brominated flame retardants. In: Wallace R, editor. Maxcy-Rosenau-Last Public Health and Preventive Medicine. 15th ed. Washington, DC: McGraw-Hill; 2007. p. 685-6.
- 17. Birnbaum LS, Martinez J, M., DeVito M, Walker JN. Toxicology of Dioxins and Dioxinlike Compounds. In: Schecter A, Gasiewicz JA, editors. Dioxins and Health. 2nd ed. New York: Wiley; 2003. p. 137-57.
- 18. Birnbaum LS, Farland W. Health risk characterization of dioxin and related compounds. In: Schecter A, Gasiewicz JA, editors. Dioxins and Health. New York: Wiley; 2003. p. 159-90.
- 19. Birnbaum LS, Youssef J, Roberts L, Swift LL, Morrow JD, Badr M. Brain Oxidative Stress, Senescence and Death Isoprostanes and Neuroprostanes: Novel Markers and New Theories. In: Kanthasamy A, Marwah J, editors. Antioxidants and Free Radicals in Health and Disease. Scottsdale, Arizona: Prominent Press; 2001. p. 1-17.
- 20. Birnbaum LS, Fiedler H, Hutzinger O, Louw L, Needham LL, Patterson Jr DG, Vetter W. Halogenated Environmental Organic Pollutants Dioxin >98 (Special Issue)2000.
- 21. Birnbaum LS, Feeley M, DeVito M. Toxicity equivalence factors (TEFx) for dioxin and related compounds. Health Assessment of 2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD) and Related compounds: US Environmental Protection Agency; 1999.
- 22. Fairbrother A, Ankley GT, Birnbaum LS, Bradbury SP, Francis B, Gray LE, Hinton D, Johnson L, Peterson RE, Van der Kraak G. Reproductive and developmental toxicology of contaminants in oviparous animals. In: DiGiulio RT, Tillitt DE, editors. Reproductive and Developmental Effects of Contaminants in Oviparous Vertebrates: SETAC Press; 1999. p. 283-361.
- 23. Nau H, Staats de Yanes G, Birnbaum LS, Eisenbrand G, Hapke H, Kreienbrock L, Taylor S. WHO Consultation on Current Issues in Risk Assessment of Potentially Toxic Substances. Food of Animal Origin, WHO Collaborating Centre for Research and Training in Veterinary Public Health. Hannover, Germany: World Health Organization; 1998.
- 24. Birnbaum LS, Abbott B. Dioxin and teratogenesis. In: Puga A, Wallace K, editors. Molecular biology of the toxic response. Washington, DC: Taylor & Francis; 1998. p. 439-47.
- 25. Birnbaum LS. Developmental effects of dioxins. In: Korach KS, editor. Reproductive and developmental toxicology. New York: Marcel Dekker; 1998. p. 87-112.
- 26. Birnbaum LS, Abbott BD. Effect of dioxin on growth factor and receptor expression in developing palate. In: Klug S, Thiel R, editors. Methods in Developmental Toxicology and Biology. Oxford: Wiley; 1997. p. 51-63.
- 27. Birnbaum LS. Human health risk assessment. Environ Sci Pollut Res. 1996;3:125-6.

- 28. Birnbaum LS, DeVito MJ. Toxicology of dioxins and related chemicals. In: Schecter A, editor. Dioxins and Health. Boston: Springer; 1994. p. 139-62.
- 29. Birnbaum LS. Advances In Estimating And Predicting Health Effects From Exposure To Environmental Toxicants. In: Andrews JS, Frumkin H, Johnson BL, Mehlman MA, Xintaras C, Bucsela JA, editors. Hazardous Waste and Public Health: International Congress on the Health Effects of Hazardous Waste. Princeton, New Jersey: Princeton Scientific Publishing; 1994.
- 30. Birnbaum LS. Changes in Cytochrome P450 in Senescence. In: Schenkman J.B. GH, editor. Cytochrome P450. Berlin: Springer; 1993. p. 477-89.
- 31. Birnbaum LS, Banks YB. Dermal absorption of TCDD: effect of age. In: Wang R, Knaak J, Maibach H, editors. Health Risk Assessment: Dermal and Inhalation Exposure and Absorption of Toxicants. Boca Raton, Florida: CRC Press; 1993. p. 127-34.
- 32. Birnbaum LS. Basis of altered sensitivity to environmental chemicals. In: Birnbaum LS, Anisimov VN, United Nations Environment Programme, International Labour Organization, World Health Organization, International Program on Chemical Safety, editors. Principles for Evaluating the Effects of Chemicals on the Aged Population. Geneva: World Health Organization; 1993. p. 41-62.
- 33. Henderson RF, Sabourin PJ, Medinsky MA, Birnbaum LS, Lucier GL. Benzene dosimetry in experimental animals: relevance for risk assessment. In: D'Amato R, editor. Relevance of Animal Studies to the Evaluation of Human Cancer Risk. New York: Wiley-Liss; 1992. p. 93-105.
- 34. Birnbaum LS, McMahon TF. Age related changes in the disposition and metabolism of xenobiotics. In: Cooper RG, JM; Harbin, TJ, editor. Aging and environmental toxicology: biological and behavioral perspectives. Baltimore: Johns Hopkins University; 1991. p. 7-30.
- 35. Birnbaum LS. Developmental toxicity of TCDD and related compounds: species sensitivities and differences. In: Gallo MA, Scheuplein, RJ, Van der Heijden, K, editor. Biological basis for risk assessment of dioxins and related compounds. Plainview, NY: Cold Spring Harbor Laboratory Press; 1991. p. 51-67.
- 36. Henry C, Birnbaum LS, DeRosa C, Dutton RJ, Miller FW, Rhomberg L, Gerrity TR. Principles of Route-to-Route Extrapolation for Risk Assessment. New York: Elsevier; 1990. 322 p.
- 37. Goldstein JA, Lin FH, Stohs SJ, Graham M, Clarke G, Birnbaum LS, Lucier G. The Effects of TCDD on Receptors for Epidermal Growth-Factor, Glucocorticoid, and Estrogen in Ah-Responsive and Ah-Nonresponsive Congenic Mice and the Effects of TCDD on Estradiol Metabolism in a Liver-Tumor Promotion Model in Female Rats. In: Stevenson DE, Slaga TJ, Popp JA, Pitot HC, Ward JM, McClain RM, editors. Mouse Liver Carcinogenesis: Mechanisms and Species Comparisons. New York: Wiley-Liss, Inc; 1990. p. 187-202.
- 38. Birnbaum LS. Age related changes in drug disposition In: Zenser TV, Coe RM, editors. Cancer and aging: progress in research and treatment. New York: Springer; 1989. p. 125-38.
- 39. Sohal RS, Birnbaum LS, Cutler RG. Molecular Biology of Aging: Gene Stability and Gene Expression. New York: Raven Press; 1985. 351 p.

- 40. Birnbaum LS, Matthews HB. Factors affecting the disposition and persistence of halogenated furans and dioxins. In: Tucker RG, AP; Young, AL, editor. Human and environmental risks of chlorinated dioxins and related compounds. New York: Plenum; 1983. p. 463-75.
- 41. Decad GM, Birnbaum LS, Matthews HB. Disposition of 2,3,7,8-Tetrachlorodibenzofuran in Guinea Pigs, Rats, and Monkeys. In: Hutzinger O, Frei RW, Merian E, Pocchiari F, editors. Chlorinated Dioxins & Related Compounds. Amsterdam: Pergamon; 1982. p. 307-15.
- 42. Birnbaum LS, editor. Changes in the disposition of two hexachlorobiphenyls in senescent rats. Second Tokyo Symposium on Liver and Aging: Liver and Drugs; 1982 August 18-20, 1982; Tokyo, Japan: Elsevier.

Abstracts (not updated after 2020)

- 1. Birnbaum LS. POPs: A Plethora of Developmental Effects. Birth Defects Research; Jun2020. p. 806.
- 2. Elmore S, Birnbaum LS, Brockenfelt K, Gruebbel M, Harrill A, Joubert B, Seely J, Berridge BR. Leveraging the National Toxicology Program's Experience to Provide Insights into the Etiology of Chronic Kidney Disease of Unknown Origin in Agricultural Workers in Central America and Asia. Annual Symposium of the Society of Toxicologic Pathology June 24, 2019; Raleigh, NC2019.
- 3. Birnbaum LS. The National Institute of Environmental Health Sciences: Protecting Public Health from Ecosystems to Communities. Annual Symposium of the Society of Toxicologic Pathology June 24, 2019; Raleigh, NC2019.
- 4. Birnbaum LS. 1.5° Celsius: Our Climate, Our Environmental Health, Our Future Celsius-Linnaeus Lecturers; February 7, 2019; Uppsala, Sweden 2019.
- 5. Cave MC, Pinkston CM, Rai SN, Pavuk M, Birnbaum LS. Environmental Dioxin and Polychlorinated Biphenyl Exposures Are Associated with Mechanistic Biomarkers of Liver Disease Progression. American Association For The Study Of Liver Diseases; November 9-13, 2018; San Francisco, CA: Hepatology; 2018. p. 433A.
- 6. Cannon RE, Trexler AW, Knudsen GA, Birnbaum LS. Tetrabromobisphenol A (TBBPA) alters efflux transporter activity in rat brain microvessels. Society of Toxicology Annual Meeting; March 11-15, 2018; San Antonio, TX: The Toxicologist; 2018. p. 493.
- 7. Van Etten SL, Bonner MR, Ren X, Birnbaum LS, Olson JR. Telomeres as a potential target for the chronic toxicity of polychlorinated biphenyls (PCBs). Society of Toxicology Annual Meeting; March 11-15, 2018; San Antonio, TX: The Toxicologist; 2018. p. 335.
- 8. Gillera SEA, Filgo A, Kissling G, Shockley K, Birnbaum LS, Fenton SE. Sex-Specific Metabolic and Liver Gene Expression Changes in Wistar Rats following TBBPA Exposure. Society of Toxicology Annual Meeting; March 11-15, 2018; San Antonio, TX: The Toxicologist; 2018. p. 427.

- 9. Samson CM, Gillera SEA, Filgo AJ, Wilson R, Birnbaum LS, Fenton SE. Pre- and Post-Natal TBBPA Exposure Affects Thyroid Hormone Levels of Wistar Han Rats. Society of Toxicology Annual Meeting; March 11-15, 2018; San Antonio, TX: The Toxicologist; 2018. p. 200.
- 10. Kincaid JS, Schecter AJ, Crandall R, Birnbaum LS. Potential health aspects of metals' exposures in female Vietnamese electronic waste recyclers. Society of Toxicology Annual Meeting; March 11-15, 2018; San Antonio, TX: The Toxicologist; 2018. p. 340-1.
- 11. Pittman GS, Wang X, Campbell MR, Coulter SJ, Olson JR, Pavuk M, Birnbaum LS, Bell DA. PCB exposure and altered DNA methylation in the Anniston Community Health Survey. Society of Toxicology Annual Meeting; March 11-15, 2018; San Antonio, TX: The Toxicologist; 2018. p. 220.
- 12. Pavuk M, Yang E, Birnbaum LS, Cave MC. Dioxin-like compounds, cytokines, and hypertension in the Anniston Community Health Survey Follow-up. Society of Toxicology Annual Meeting; March 11-15, 2018; San Antonio, TX: The Toxicologist; 2018. p. 212.
- 13. Richards AC, Knudsen GA, Hughes MF, Birnbaum LS. Dermal uptake of three brominated phenols: Tetrabromobisphenol A (TBBPA), Tetrabromobisphenol A bis(2,3-dibromopropyl ether) (TBBPA-BDBPE), and 2,4,6-tribromophenol (TBP). Society of Toxicology Annual Meeting; March 11-15, 2018; San Antonio, TX: The Toxicologist; 2018. p. 498-9.
- 14. Cave MC, Clair H, Pinkston CM, Rai SN, Yang E, Pavuk M, Birnbaum LS. Association between environmental exposures and steatohepatitis mechanisms in the Anniston Community Health Survey Phase II. Society of Toxicology Annual Meeting; March 11-15, 2018; San Antonio, TX: The Toxicologist; 2018. p. 214.
- 15. Knudsen GA, Richards AC, Trexler AW, Birnbaum LS. 2,4,6-Tribromophenol (TBP) Disposition and Kinetics in Female Sprague-Dawley Rats after Single and Repeated Dosing. Society of Toxicology Annual Meeting; March 11-15, 2018; San Antonio, TX: The Toxicologist; 2018. p. 533.
- 16. Cave MC, Pinkston CM, Pavuk M, Clair H, Hardesty JE, Shi HX, Prough RA, Falkner KC, Rai SN, Birnbaum LS. Total dioxin toxic equivalency is associated with altered serologic biomarkers of hepatic lipid metabolism, inflammation, fibrosis, and function in ACHS-II participants with suspected liver disease. Dioxin Symposium; August 20-25, 2017; Vancouver, Canada: Organohalogen Compounds; 2017. p. 663-6.
- 17. Pavuk M, Yang E, Lewin M, Birnbaum LS. Hypertension and persistent organic pollutants in the Anniston Community Health survey follow up. Dioxin Symposium; August 20-25, 2017; Vancouver, Canada: Organohalogen Compounds; 2017. p. 423-7.
- 18. Birnbaum LS, Yang E, Sjödin A, Jones RS, Lewin MD, Pavuk M. Exposure of polybrominated diphenyl ethers, poly chlorinated biphenyls, and pesticides in the Anniston Community Health Survey Follow Up. Dioxin Symposium; August 20-25, 2017; Vancouver, Canada: Organohalogen Compounds; 2017. p. 428-32.
- 19. Knudsen GA, Hall SM, Richards AC, Birnbaum LS. 2,4,6-Tribromophenol disposition and kinetics in female Sprague Dawley Rats. Dioxin Symposium; August 20-25, 2017; Vancouver, Canada: Organohalogen Compounds; 2017. p. 783-6.

- 20. Petriello MC, Charnigo R, Pavuk M, Birnbaum LS, Morris AJ, Hennig B. Interactions between diet and toxicant exposure lead to increased circulating levels of the cardiometabolic disease biomarker TMAO. Federation of American Societies for Experimental Biology (FASEB) Annual Meeting; April 22-26, 2017; Chicago, IL: Federation proceedings; 2017.
- 21. Knudsen GA, Hall SM, Richards AC, Birnbaum LS. Tetrabromobisphenol A Disposition and Kinetics in Pregnant and Nursing Wistar Han Rats. Society of Toxicology Annual Meeting; March 12-16, 2017; Baltimore, MD: The Toxicologist; 2017. p. 351.
- 22. Callahan CL, Pavuk M, Ren X, Birnbaum LS, Olson JR, Bonner MR. Polychlorinated Biphenyls and Relative Telomere Length in the Anniston Community Health Survey. Society of Toxicology Annual Meeting; March 12-16, 2017; Baltimore, MD: The Toxicologist; 2017. p. 348.
- 23. Gillera SEA, Filgo A, Kissling G, Birnbaum LS, Fenton SE. Low-Dose Developmental Tetrabromobisphenol-A Exposure and Metabolic Changes In Rats. Society of Toxicology Annual Meeting; March 12-16, 2017; Baltimore, MD: The Toxicologist; 2017. p. 47.
- 24. Cave MC, Clair HB, Pinkston CM, Falkner KC, Birnbaum LS, Pavuk M. Initial Analysis of Liver Disease in the Anniston Community Health Survey-II. Society of Toxicology Annual Meeting; March 12-16, 2017; Baltimore, MD: The Toxicologist; 2017. p. 71.
- 25. Hall SM, Coulter SF, Knudsen GA, Birnbaum LS. Identifying Responders to Tetrabromobisphenol A (TBBPA) Using Marker Genes following Repeat Oral Administration in Wistar Han Rats. Society of Toxicology Annual Meeting; March 12-16, 2017; Baltimore, MD: The Toxicologist; 2017. p. 345.
- 26. Yang E, Birnbaum LS, Pavuk M. Hypertension in Relation to Dioxins, Polychlorinated Biphenyls, and Pesticides from the Anniston Community Health Survey Follow-Up. Society of Toxicology Annual Meeting; March 12-16, 2017; Baltimore, MD: The Toxicologist; 2017. p. 71.
- 27. Schecter AJ, Kincaid JS, Clair H, Cave MC, Bhatnagar A, Riggs D, Birnbaum LS. Hepatic, Cardiovascular, and Other Biomarkers Associated with Organics and Metals Exposure in Female Vietnamese Electronic Waste Workers and Comparisons. Society of Toxicology Annual Meeting; March 12-16, 2017; Baltimore, MD: The Toxicologist; 2017. p. 214.
- 28. Pinkston CM, Middleton FA, Rosenbaum PF, Clair HB, Falkner KC, Pavuk M, Birnbaum LS, Cave MC. Associations between PCB and dioxin exposures with serum cytokines in the Anniston Community Health Survey-II. Society of Toxicology Annual Meeting; March 12-16, 2017; Baltimore, MD: The Toxicologist; 2017. p. 71.
- 29. Schecter A, Kincaid J, Birnbaum LS. Agent Orange and newer chemicals of concern in Vietnam. American Public Health Association (APHA) Annual Meeting; October 28- November 2; Denver, CO 2016.
- 30. Knudsen GA, Hughes MF, Hall SM, Sanders JA, Birnbaum LS. Using the parallelogram approach to estimate human percutaneous bioavailability for novel & legacy brominated flame retardants. Dioxin Symposium; August 28 September 2, 2016; Florence, Italy: Organohalogen Compounds; 2016. p. 274-7.
- 31. Birnbaum LS, Miller MF, Rooney AR. Systematic Evaluation of Health Effects for Persistent Organic Pollutants: A Case Study of Perfluorooctanoic Acid (PFOA) and Perfluorooctane Sulfonate

- (PFOS). Dioxin Symposium; August 28 September 2, 2016; Florence, Italy: Organohalogen Compounds; 2016. p. 49-52.
- 32. Clair H, Pinkston CM, Brock G, Pavuk M, Falkner K, Prough RA, Cave MC, Birnbaum LS. Sensitive and specific liver injury biomarkers: elevated liver disease in organochlorine toxicant exposed residents of Anniston, AL. Dioxin Symposium; August 28 September 2, 2016; Florence, Italy: Organohalogen Compounds; 2016. p. 59-62.
- 33. Pavuk M, Yang E, Lewin M, Birnbaum LS. Polycholorinated biphenyls, dioxins, and diabetes in the Anniston cohort. Dioxin Symposium; August 28 September 2, 2016; Florence, Italy: Organohalogen Compounds; 2016. p. 68-71.
- 34. Chandramouli B, Cosgrove JR, Butler H, Patterson Jr DG, Birnbaum LS, Pavuk M. Linking PCB congener concentrations and metabolomics profiles in Anniston residents: a pilot study. Dioxin Symposium; August 28 September 2, 2016; Florence, Italy: Organohalogen Compounds; 2016. p. 56-8.
- 35. Petriello MC, Perkins JT, Morris AJ, Sunkara M, Soman S, Stromberg A, Pavuk M, Birnbaum LS, Hennig B. Interactions between environmental pollution and nutrition-based biomarkers of metabolic disease risk in residents of Anniston, Alabama. Dioxin Symposium; August 28 September 2, 2016; Florence, Italy: Organohalogen Compounds; 2016. p. 72-5.
- 36. Schecter A, Kincaid J, Quynh HT, Clair H, Cave MC, Gagnier M, Ahmed M, Crandall R, Jawad K, Rashid S, Birnbaum LS. Health, social and economic issues of electronic waste recycling workers. Dioxin Symposium; August 28 September 2, 2016; Florence, Italy: Organohalogen Compounds; 2016. p. 1209-13.
- 37. Birnbaum LS, Pavuk M, Sjödin A, Jones RS, Lewin M, Yang E. Exposure to dioxins and dioxin-like compounds in a follow-up study of the Anniston Community Health Survey (ACHS II). Dioxin Symposium; August 28 September 2, 2016; Florence, Italy: Organohalogen Compounds; 2016. p. 63-7.
- 38. Schecter A, Kincaid J, Quynh HT, Ahmed M, Rashid S, Jawad K, Crandall R, Gagnier M, Birnbaum LS. Electronics and electrical waste recycling: organics and metals in Vietnamese Women. Dioxin Symposium; August 28 September 2, 2016; Florence, Italy: Organohalogen Compounds; 2016. p. 461-5.
- 39. Birnbaum LS. Long-term impacts of early life exposures. International Congress of Toxicology; October 2-6, 2016; Merida, Yucatan, Mexico: Toxicology Letters; 2016. p. S1.
- 40. Birnbaum LS. Early life contributions to breast cancer risk. International Congress of Toxicology; October 2-6, 2016; Merida, Yucatan, Mexico: Toxicology Letters; 2016. p. S59.
- 41. Pavuk M, Dutton ND, Sjödin A, Jones RS, Lewin MD, Birnbaum LS. Serum Concentrations of Non-Ortho Polychlorinated Biphenyls (PCBs) in a Residential Cohort from Anniston, Alabama. Society of Toxicology Annual Meeting; March 13-17, 2016; New Orleans, LA: The Toxicologist; 2016. p. 568.
- 42. Schecter AJ, Quynh HT, Shropshire W, Lanceta J, Kincaid J, Birnbaum LS. Metals and organics biomonitoring in female Vietnamese electronic waste recyclers, general population, and US NHANES. Society of Toxicology Annual Meeting; March 13-17, 2016; New Orleans, LA: The Toxicologist; 2016. p. 33.

- 43. Birnbaum LS. Gulf Oil Spill Response: Health Research, Community-Academic Partnerships, Lessons Learned, and Future Preparedness. Society of Toxicology Annual Meeting; March 13-17, 2016; New Orleans, LA: The Toxicologist; 2016. p. 12.
- 44. Hall SM, Coulter SJ, Knudsen GA, Sanders JM, Birnbaum LS. Gene Expression Changes Following Repeat Oral Administration of Tetrabromobisphenol A (TBBPA) in Female Wistar Han Rats. Society of Toxicology Annual Meeting; March 13-17, 2016; New Orleans, LA: The Toxicologist; 2016. p. 246.
- 45. Knudsen GA, Hughes MF, Sanders JM, Birnbaum LS. Estimation of human percutaneous uptake for two novel brominated flame retardants 2-ethylhexyl tetrabromobenzoate (TBB) and bis(2-ethylhexyl) tetrabromophthalate (TBPH) using the parallelogram method. Society of Toxicology Annual Meeting; March 13-17, 2016; New Orleans, LA: The Toxicologist; 2016. p. 564.
- 46. Chandler KJ, Milliman E, Birnbaum LS, Newton SA. A Computational Approach to Evaluate NIEHS-Funded Scientific Literature in the Context of the 2012–2017 NIEHS Strategic Plan. Society of Toxicology Annual Meeting; March 13-17, 2016; New Orleans, LA: The Toxicologist; 2016. p. 468.
- 47. Falkner KC, Birnbaum LS, Schecter AJ, Clair H, Cave MC. Adipocykine and Liver Injury Biomarker Assessment in Electronic Waste Recyclers. Society of Toxicology Annual Meeting; March 13-17, 2016; New Orleans, LA: The Toxicologist; 2016. p. 407.
- 48. Pavuk M, Dutton ND, Sjödin A, Lewin M, Birnbaum LS. Temporal changes of serum concentrations of Polychlorinated biphenyls and organochlorine pesticides in a residential cohort. Dioxin Symposium; August 23-28, 2015; Sao Paulo, Brazil: Organohalogen Compounds; 2015. p. 472-5.
- 49. Schecter A, Sjödin A, Quynh HT, Caldwell K, Shropshire W, Jones R, Wong LY, Cheng PY, Hynan LS, Birnbaum LS. Halogenated organics and metals in Vietnamese female electronic waste recyclers and a non-exposed cohort. Dioxin Symposium; August 23-28, 2015; Sao Paulo, Brazil: Organohalogen Compounds; 2015. p. 582-5.
- 50. Mitro SD, Birnbaum LS, Needham BL, Zota AR. Cross-sectional associations between exposure to persistent organic pollutants and leukocyte telomere length among US adults: National Health and Nutrition Examination Survey, 2001-2002. International Society for Environmental Epidemiology (ISEE) Conference; August 30-September 3; Sao Paulo, Brazil: Environmental Health Perspectives; 2015.
- 51. Hull EP, Knudsen GA, Sanders JM, Birnbaum LS. The US Tox21 Collaboration: Advances Made and Lessons Learned. Society of Toxicology Annual Meeting; March 22-26, 2015; San Diego, CA: The Toxicologist; 2015. p. 8.
- 52. Sanders JM, Knudsen GA, Birnbaum LS. The Disposition of 2-Ethylhexyl Tetrabromobenzoate (TBB) in Female Sprague-Dawley Rats after Administration of Single or Repeated Doses by Gavage. Society of Toxicology Annual Meeting; March 22-26, 2015; San Diego, CA: The Toxicologist; 2015. p. 451.
- 53. Knudsen GA, McIntosh KL, Sanders JM, Hughes MF, Birnbaum LS. Dermal Uptake of Tetrabromobisphenol A (TBBPA) by Female Wistar Han Rat or Human Skin. Society of Toxicology Annual Meeting; March 22-26, 2015; San Diego, CA: The Toxicologist; 2015. p. 271.

- Nadadur SS, Birnbaum LS. Comprehensive Analysis of Nano Silver Toxicity Profiles: Known, Unknown and Surprises! Society of Toxicology Annual Meeting; March 22-26, 2015; San Diego, CA: The Toxicologist; 2015. p. 521.
- 55. Hull EP, Knudsen GA, Sanders JM, Birnbaum LS. Biological fate of the emerging brominated flame retardant, decabromodiphenyl ethane, in female Sprague Dawley rats. Society of Toxicology Annual Meeting; March 22-26, 2015; San Diego, CA: The Toxicologist; 2015. p. 450.
- 56. Schecter A, Lorber M, Paepke O, Shropshire W, Christensen K, Gill J, Birnbaum LS. Exposure to bisphenol a (BPA) from fresh, frozen and canned food from Dallas, Texas, U.S.A. Dioxin Symposium; August 31 September 5, 2014; Madrid, Spain: Organohalogen Compounds; 2014. p. 1232-5.
- 57. Miller MF, Birnbaum LS. Environmental exposures, endocrine disrupting chemicals, and new approaches to the science of risk assessment. Dioxin Symposium; August 31 September 5, 2014; Madrid, Spain: Organohalogen Compounds; 2014. p. 1161-3.
- 58. Schecter A, Shropshire W, Quynh HT, Oduor H, Hynan LS, Gill J, Birnbaum LS. Biomonitoring of Selected Halogenated Organics and Metals in Vietnamese Women Electronic Waste Incinerator Workers. Dioxin Symposium; August 31 September 5, 2014; Madrid, Spain: Organohalogen Compounds; 2014. p. 1218-21.
- 59. Knudsen GA, Sanders JA, Birnbaum LS. Biological fate of the emerging brominated flame retardants, 2-ethylhexyl tetrabromobenzoate (TBB) and bis(2-ethylhexyl)tetrabromophthalate (TBPH), in female Sprague Dawley rats. Dioxin Symposium; August 31 September 5, 2014; Madrid, Spain: Organohalogen Compounds; 2014. p. 1364-7.
- 60. Knudsen GA, Coulter SJ, Sanders JM, Birnbaum LS. Biological effects of tetrabromobisphenol a (TBBPA) in female Wistar-Han rats. Dioxin Symposium; August 31 September 5, 2014; Madrid, Spain: Organohalogen Compounds; 2014. p. 1360-3.
- Birnbaum LS, Schecter AJ, Cherry D, Liao C, Yun SH, Kannan K, Moye J, Thiex N, Shropshire WC. Serial Measurements of BPA and BPS in Texas Mother-Infant Pairs from the 3rd Trimester of Pregnancy through the 4th Month of Lactation. Society of Toxicology Annual Meeting; March 23-27, 2014; Phoenix, AZ: The Toxicologist; 2014. p. 398.
- 62. Birnbaum LS, Mahadevan B, Rao P, Swanson HI, Aardema M, Burns Naas L. Leadership In Science: Skills and Styles. Society of Toxicology Annual Meeting; March 23-27, 2014; Phoenix, AZ: The Toxicologist; 2014. p. 554.
- 63. Birnbaum LS, Knudsen GA, Sanders JM. Fates of Two Emerging Brominated Flame Retardants, 2-Ethylhexyl Tetrabromobenzoate and Bis(2-ethylhexyl Tetrabromophthalate, in Female Sprague-Dawley Rats. Society of Toxicology Annual Meeting; March 23-27, 2014; Phoenix, AZ: The Toxicologist; 2014. p. 232-3.
- 64. Birnbaum LS, Sanders JM, Knudsen GA, Coulter SJ, Dunnick JK. The Effects of Five Days of Tetrabromobisphenol A (TBBPA) Treatment in Female Rats. Society of Toxicology Annual Meeting; March 23-27, 2014; Phoenix, AZ: The Toxicologist; 2014. p. 239.

- 65. Schecter A, Cherry D, Thiex NW, Kannan K, Yun SH, Liao C, Wang L, Hynan LS, Cheng D, Kassarjian K, Waqar M, Moye J, Birnbaum LS. PBDE, BPA and BPS in mothers and children from a U.S. National Children's Study formative project. Dioxin Symposium; August 25-30, 2013; Daegu, Korea: Organohalogen Compounds; 2013. p. 1212-6.
- 66. Schecter A, Quynh HT, Cheng D, Tuyet-Hanh TT, Kassarjian K, Birnbaum LS. Biomonitoring of Vietnamese rural home-based women electronic waste recycling workers. Dioxin Symposium; August 25-30, 2013; Daegu, Korea: Organohalogen Compounds; 2013. p. 1146-9.
- 67. Balshaw D, Birnbaum LS, Collman GW. The exposome: an approach for untargeted discovery in environmental health. International Society for Environmental Epidemiology (ISEE) Conference; August 19-23; Basel, Switzerland: Environmental Health Perspectives; 2013.
- 68. Szabo DT, Birnbaum LS. Multiple organ-omic integration for HBCD developmental neurotoxicity hazard identification. Society of Toxicology Annual Meeting; March 10-14, 2013; San Antonio, TX: The Toxicologist; 2013. p. 349.
- 69. Schecter AJ, Cherry D, Hynan LS, Cheng D, Imran N, Hommel M, Kannan K, Wang L, Yun SH, Thiex N, Specter B, Moye J, Birnbaum LS. Maternal and child polybrominated diphenyl ether (PBDE) levels in U.S. National Children's Study (NCS) formative research. Society of Toxicology Annual Meeting; March 10-14, 2013; San Antonio, TX: The Toxicologist; 2013. p. 388.
- 70. Birnbaum LS. Low-dose and non-monotonic dose response curves for endocrine disruptors. Society of Toxicology Annual Meeting; March 10-14, 2013; San Antonio, TX: The Toxicologist; 2013. p. 342.
- 71. Orme-Zavaleta J, Birnbaum LS. Exposure science in the 21st century: perspectives from the NAS and what it means for toxicology. Society of Toxicology Annual Meeting; March 10-14, 2013; San Antonio, TX: The Toxicologist; 2013. p. 525.
- 72. Knudsen GA, Sanders JM, Sadik AM, Birnbaum LS. Disposition and kinetics of tetrabromobishpenol A (TBBPA) in female Wistar-Han rats. Society of Toxicology Annual Meeting; March 10-14, 2013; San Antonio, TX: The Toxicologist; 2013. p. 104.
- 73. Haws LC, Hixon G, DeVito MJ, Walker JN, Kuriakose L, Harris M, Birnbaum LS, Wikoff D. Development of weighted distributions of relative potency estimates for dioxin-like compounds. Society of Toxicology Annual Meeting; March 10-14, 2013; San Antonio, TX: The Toxicologist; 2013. p. 426.
- 74. Sanders JM, Knudsen GA, Sadik AM, Birnbaum LS. Characterization of the fate of β -hexabromocyclododecane (HBCD) in mice. Society of Toxicology Annual Meeting; March 10-14, 2013; San Antonio, TX: The Toxicologist; 2013. p. 105.
- 75. Frawley R, Smith M, White Jr K, Walker JN, Birnbaum LS, Maynor T, DeVito MJ, Germolec DR. Alterations in xenobiotic metabolizing enzyme and immune relevant genes following administration of brominated and chlorinated dioxins and furans in female B6C3F1 mice. Society of Toxicology Annual Meeting; March 10-14, 2013; San Antonio, TX: The Toxicologist; 2013. p. 424.

- 76. Blum A, Babrauskas V, Birnbaum LS. Replacements for pentaBDE flame retardant: is there an improvement in fire safety or health impacts? Dioxin Symposium; August 26-31, 2012; Cairns, Australia: Organohalogen Compounds; 2012. p. 1513-6.
- 77. Schecter A, Lorber M, Guo Y, Wu Q, Yun SH, Kannan K, Miller J, Hommel M, Imran N, Hynan LS, Cheng D, Colacino J, Birnbaum LS. Phthalates and dietary exposure in U.S. food. Dioxin Symposium; August 26-31, 2012; Cairns, Australia: Organohalogen Compounds; 2012. p. 743-7.
- 78. Birnbaum LS, Jung P. Environmental health research at NIEHS: Current priorities and plans for the future. Dioxin Symposium; August 26-31, 2012; Cairns, Australia: Organohalogen Compounds; 2012. p. 1449-51.
- 79. Birnbaum LS. Endocrine disruptors: where do we go from here? Dioxin Symposium; August 26-31, 2012; Cairns, Australia: Organohalogen Compounds; 2012. p. 1393-4.
- 80. Sanders JM, Knudsen GA, Birnbaum LS. The disposition of betahexabromocyclododecane (HBCD) in mice. Dioxin Symposium; August 26-31, 2012; Cairns, Australia: Organohalogen Compounds; 2012. p. 1047-50.
- 81. Scott LL, Mortimer D, Birnbaum LS. Brominated flame retardants (BFRs) in food and food products and impact of dietary intake on body burden: Policy implications for regulating BFRs in the U.S. Dioxin Symposium; August 26-31, 2012; Cairns, Australia: Organohalogen Compounds; 2012. p. 1109-13.
- 82. Szabo DT, Shah RR, Birnbaum LS. A transcriptomics approach using HBCD to prioritize chemicals and mixtures for developmental neurotoxicity risk assessment. Society of Toxicology Annual Meeting; March 11-15, 2012; San Francisco, CA: The Toxicologist; 2012. p. 103.
- 83. Birnbaum LS, Skoglund RS, Juberg DR, Andersen ME, Bradbury SP, Stephens ML, Hartung TA. Scientific, regulatory, and public perspectives on the credibility and use of alternative toxicological test methods in a legislative framework. Society of Toxicology Annual Meeting; March 11-15, 2012; San Francisco, CA: The Toxicologist; 2012. p. 471.
- 84. Blum A, Babrauskas V, Fuoco R, Birnbaum LS. Risk-benefit assessment of flame retardant chemicals. Society of Toxicology Annual Meeting; March 11-15, 2012; San Francisco, CA: The Toxicologist; 2012. p. 21.
- 85. Schecter AJ, Bass N, Calafat AM, Kato K, Colacino J, Harris TR, Hynan LS, Gent TL, Malla S, Birnbaum LS. Polyfluoroalkyl compounds (PFCs) in Texas children from birth through 12 years of age. Society of Toxicology Annual Meeting; March 11-15, 2012; San Francisco, CA: The Toxicologist; 2012. p. 456.
- 86. Frawley R, White Jr K, Smith M, Walker JN, Birnbaum LS, DeVito MJ, Germolec D. Immunological evaluation of the relative potency of a single oral administration of brominated and chlorinated dioxins and furans in female B6C3F1 mice. Society of Toxicology Annual Meeting; March 11-15, 2012; San Francisco, CA: The Toxicologist; 2012. p. 541.
- 87. Birnbaum LS, Schecter AJ, Szabo DT, Colacino JA, Gent TL, Bass N, Paepke O, Hynan LS, Harris TR, Malla S. Hexabromocyclododecane (HBCD) stereoisomers in U.S. food and adult daily dietary intake.

Society of Toxicology Annual Meeting; March 11-15, 2012; San Francisco, CA: The Toxicologist; 2012. p. 237.

- 88. Birnbaum LS. Early-life exposures to endocrine-active chemicals promotes breast cancer risk later in life. Society of Toxicology Annual Meeting; March 11-15, 2012; San Francisco, CA: The Toxicologist; 2012. p. 173.
- 89. Emond C, DeVito MJ, Warner M, Eskenazi B, Mocarelli P, Birnbaum LS. An assessment of dioxin exposure across multiple gestational and lactational stages using a PBPK model and new data points from Seveso. Society of Toxicology Annual Meeting; March 11-15, 2012; San Francisco, CA: The Toxicologist; 2012. p. 94-5.
- 90. Wikoff DS, DeVito MJ, Walker JN, Hixon JG, Harris MA, Tachovsky JA, Birnbaum LS, Haws LC. Application of machine learning in the development of a weighting framework for evaluating estimates of relative potency for dioxin-like compounds. Society of Toxicology Annual Meeting; March 11-15, 2012; San Francisco, CA: The Toxicologist; 2012. p. 372.
- 91. La Merrill M, Birnbaum LS. The Potential Role of Developmental Chemical Exposures in Contributing to the Obesity Epidemic. Dioxin Symposium; August 21-25, 2011; Brussels, Belgium: Organohalogen Compounds; 2011. p. 1499-501.
- 92. Schecter A, Malik-Bass N, Calafat AM, Kayoko K, Basden B, Dunbar C, Jia T, Colacino J, Harris TR, Malla S, Birnbaum LS. Polyfluoroalkyl Compounds (PFCs) in Texas Children from Birth Through 12 Years of Age. Dioxin Symposium; August 21-25, 2011; Brussels, Belgium: Organohalogen Compounds; 2011. p. 932-4.
- 93. Schecter A, Malik-Bass N, Harris TR, Malla S, Paepke O, Birnbaum LS. Hexabromocyclododecane (HBCD) Stereoisomers in U.S. Food. Dioxin Symposium; August 21-25, 2011; Brussels, Belgium: Organohalogen Compounds; 2011. p. 346-7.
- 94. Shaw SD, Blum A, Weber R, Kannan K, Rich D, Lucas D, Koshland CP, Dobraca D, Hanson S, Birnbaum LS. Halogenated Flame Retardants: Do the Fire Safety Benefits Justify the Risks? Dioxin Symposium; August 21-25, 2011; Brussels, Belgium: Organohalogen Compounds; 2011. p. 2036-9.
- 95. Emond C, DeVito MJ, Warner M, Eskenazi B, Mocarelli P, Birnbaum LS. Physiologically based pharmacokinetic modeling (PBPK) as a tool to predict 2, 3, 7, 8-tetrachlorodibenzo-p-dioxin (TCDD) pharmacokinetics (PK) during gestation and lactation. Society of Toxicology Annual Meeting; March 6-11, 2011; Washington, DC: The Toxicologist; 2011. p. 153.
- 96. Szabo DT, Pathmasiri W, Diliberto JJ, Sumner S, Birnbaum LS. Metabolic analysis of serum after treatment with the emerging POP flame retardant hexabromocyclododecane (HBCD): commercial mixture, alpha and gamma stereoisomers elicit differential effects in infantile mice. Society of Toxicology Annual Meeting; March 6-11, 2011; Washington, DC: The Toxicologist; 2011. p. 482.
- 97. Schecter AJ, Malik N, Paepke O, Birnbaum LS. Bisphenol A (BPA) and hexabromocyclododecane (HBCD) stereoisomers in U.S. food. Society of Toxicology Annual Meeting; March 6-11, 2011; Washington, DC: The Toxicologist; 2011. p. 268.

- 98. Emond C, DeVito MJ, Warner M, Patterson Jr DG, Needham L, Mocarelli P, Eskenazi B, Birnbaum LS. Physiologically based pharmacokinetic modeling (PBPK) as a tool for predicting PCDD blood concentration in women living near Seveso. Dioxin Symposium; September 12-17, 2010; San Antonio, TX: Organohalogen Compounds; 2010. p. 1707-10.
- 99. Blum A, Shaw SD, Birnbaum LS. PBDEs and their replacements: does the benefit justify the harm? Dioxin Symposium; September 12-17, 2010; San Antonio, TX: Organohalogen Compounds; 2010. p. 1296-301.
- 100. Hakk H, Huwe J, Szabo DT, Diliberto JJ, Birnbaum LS. Metabolism of a- and γ-hexabromocyclododecane and enantioselective fractions of a-, β-, γ-isomers in mice. Dioxin Symposium; September 12-17, 2010; San Antonio, TX: Organohalogen Compounds; 2010. p. 1154-7.
- 101. Daley RE, Shaw SD, Birnbaum LS, Blum A. It's all about penta: informing decision-makers about the properties of penta-BDE and its replacements. Dioxin Symposium; September 12-17, 2010; San Antonio, TX: Organohalogen Compounds; 2010. p. 1673-6.
- 102. Szabo DT, Hakk H, Diliberto JJ, Huwe J, Birnbaum LS. In vivo stereoisomerization of HBCD gamma and alpha is tissue and stereoisomer specific. Dioxin Symposium; September 12-17, 2010; San Antonio, TX: Organohalogen Compounds; 2010. p. 558-61.
- 103. Emond C, DeVito MJ, Birnbaum LS. Design and application of a physiologically-based pharmacokinetic (PBPK) model for TCDD dose-response modeling as a tool for human risk assessment. Dioxin Symposium; September 12-17, 2010; San Antonio, TX: Organohalogen Compounds; 2010. p. 1481-4.
- 104. Schecter A, Smith AH, Colacino J, Malik N, Patel K, Peterson M, Paepke O, Birnbaum LS. Contamination of U.S. food with BPA. Dioxin Symposium; September 12-17, 2010; San Antonio, TX: Organohalogen Compounds; 2010. p. 20-3.
- 105. Diliberto JJ, Sirinek L, Becker J, Jude D, Patterson Jr DG, Turner WE, Burkhalter B, Haws L, Tachovsky A, Landy RB, Birnbaum LS. Cohort of women living in a highly industrialized area of Kanawha River Valley in West Virginia: endometriosis and blood levels of dioxin and dioxin-like chemicals. Dioxin Symposium; September 12-17, 2010; San Antonio, TX: Organohalogen Compounds; 2010. p. 1181-3.
- 106. Szabo DT, Diliberto JJ, Hakk H, Huwe JK, Birnbaum LS. Toxicokinetic differences between two major HBCD stereoisomers: effect of dose, time, repeated exposure, and route. Society of Toxicology Annual Meeting; March 7-11, 2010; Salt Lake City, UT: The Toxicologist; 2010. p. 334.
- 107. Tice RR, Kavlock RJ, Smith C, Xia M, Judson RS, Birnbaum LS. The Tox21st community and the future of toxicology testing. Society of Toxicology Annual Meeting; March 7-11, 2010; Salt Lake City, UT: The Toxicologist; 2010. p. 367.
- 108. Schecter AJ, Birnbaum LS. POPs: What's new and why should we care? Society of Toxicology Annual Meeting; March 7-11, 2010; Salt Lake City, UT: The Toxicologist; 2010. p. 136.
- 109. Schecter AJ, Colacino J, Harris TR, Opel M, Paepke O, Kannan K, Birnbaum LS. POPs in the U.S. population and in U.S. food. Society of Toxicology Annual Meeting; March 7-11, 2010; Salt Lake City, UT: The Toxicologist; 2010. p. 137.

- 110. Birnbaum LS. Legacy and enduring POPs. Society of Toxicology Annual Meeting; March 7-11, 2010; Salt Lake City, UT: The Toxicologist; 2010. p. 136.
- 111. Diliberto JJ, Szabo DT, Huwe J, Birnbaum LS. Disposition of the brominated flame retardant HBCD alpha and gamma in developing mice over time. Society of Toxicology Annual Meeting; March 7-11, 2010; Salt Lake City, UT: The Toxicologist; 2010. p. 334.
- 112. Schecter A, Colacino J, Kurunthachalam K, Yun SH, Harris TR, Paepke O, Birnbaum LS. Trends in polybrominated diphenyl ether levels in breast milk, blood and food from the United States. Brominated Flame Retardants (BFR) Annual Workshop; May 19-20, 2009; Ottawa, Canada 2009.
- 113. Birnbaum L. Effects of brominated flame retardants: health and regulations. Brominated Flame Retardants (BFR) Annual Workshop; May 19-20, 2009; Ottawa, Canada 2009. p. 13.
- 114. Szabo DT, Diliberto J, Huwe J, Birnbaum L. Toxicokinetics of the sterioisomer specific flame retardant hexabromocyclododecane (HBCD) gamma: effect of dose, time, repeated, intravenous, and developmental exposure. Brominated Flame Retardants (BFR) Annual Workshop; May 19-20, 2009; Ottawa, Canada 2009. p. 36.
- 115. Staskal DF, Harris MA, Haws LC, Birnbaum LS, Tachovsky JA. Probabilistic evaluation of cancer and non-cancer risk associated with exposure to BDE 209 in automobiles. Dioxin Symposium; August 23-28, 2009; Beijing, China: Organohalogen Compounds; 2009. p. 2117-22.
- 116. Schecter A, Colacino J, Haffner D, Opel M, Paepke O, Birnbaum LS. Polybrominated diphenyl ethers, organochlorine pesticides, polychlorinated biphenyls and perfluorinated compounds in composite samples of United States food. Dioxin Symposium; August 23-28, 2009; Beijing, China: Organohalogen Compounds; 2009. p. 959-64.
- 117. Schecter AJ, Colacino JA, Kannan K, Yun SH, Harris TR, Paepke O, Birnbaum LS. Polybrominated diphenyl ethers in food from the USA: trends by time and location. Dioxin Symposium; August 23-28, 2009; Beijing, China: Organohalogen Compounds; 2009. p. 857-62.
- 118. Birnbaum LS, Szabo DT, Diliberto JJ, Huwe J. Integrating toxicology and epidemiology for risk assessment toxicokinetics of the diastereomer specific flame retardant hexabromocyclododecane: effect of dose, time, and repeated exposure. Dioxin Symposium; August 23-28, 2009; Beijing, China: Organohalogen Compounds; 2009. p. 2328-31.
- 119. Haws LC, DeVito MJ, Walker NJ, Birnbaum LS, Farland WH, Harris MA, Tachovsky JA, Unice KM, Scott PK, Staskal DF. Development of distributions of relative potency estimates to quantitatively assess uncertainty inherent in the TEFs for dioxin-like compounds: a proposed consensus-based weighting framework. Dioxin Symposium; August 23-28, 2009; Beijing, China: Organohalogen Compounds; 2009. p. 2230-5.
- 120. Shields LE, Staskal D, Ray R, Birnbaum LS, Scheibe RR. Evaluation of risk trade-offs in passenger compartment fire retardant usage a case study. Society of Automotive Engineers (SAE) International World Congress; April 20-23, 2009; Detroit, MI2009. p. 51-68.
- 121. Szabo DT, Diliberto JJ, Huwe J, Birnbaum LS. Toxicokinetics of the stereoisomer specific flame retardant hexabromocyclododecane (HBCD) gamma: effect on dose, time, and repeated exposure.

Society of Toxicology Annual Meeting; March 15-19, 2009; Baltimore, MD: The Toxicologist; 2009. p. 263264.

- 122. Diliberto JJ, Becker J, Jude D, Sirinek L, Patterson Jr DG, Turner WE, Landy RB, Hughes TJ, Staats de Yanes G, Birnbaum LS. Serum levels of dioxin-like compounds in women living in a highly industrialized area of West Virginia. Society of Toxicology Annual Meeting; March 15-19, 2009; Baltimore, MD: The Toxicologist; 2009. p. 417.
- 123. Staskal D, Birnbaum LS. Screening-level assessment of risk associated with exposure to PBDEs in vehicles. Society of Toxicology Annual Meeting; March 15-19, 2009; Baltimore, MD: The Toxicologist; 2009. p. 419-20.
- 124. Schecter AJ, Colacino JA, Kurunthachalam K, Yun SH, Paepke O, Birnbaum LS. Results of a new survey show increasing levels of PBDEs in U.S. food. Society of Toxicology Annual Meeting; March 15-19, 2009; Baltimore, MD: The Toxicologist; 2009. p. 420.
- 125. Emond C, Pelekis M, Birnbaum LS. Physiologically based pharmacokinetic modeling as a tool for predicting lifetime exposure of PBDE in humans: From infants to elderly. Dioxin Symposium; August 17-22, 2008; Birmingham, UK: Organohalogen Compounds; 2008. p. 1993-6.
- 126. Birnbaum LS. Human health impacts of exposure to POPs: unanswered questions. Dioxin Symposium; August 17-22, 2008; Birmingham, UK: Organohalogen Compounds; 2008. p. 275-7.
- 127. Szabo DT, Diliberto JJ, Birnbaum LS. Hexabromocyclododecane gamma (HBCD-y): tissue disposition and elimination kinetics in mice. Dioxin Symposium; August 17-22, 2008; Birmingham, UK: Organohalogen Compounds; 2008. p. 1220-3.
- 128. Diliberto JJ, Becker J, Jude D, Sirinek L, Patterson Jr DG, Turner WE, Landy RB, Hughes TJ, Staats DA, Birnbaum LS. Cohort study of women in West Virginia: Serum levels of dioxin and dioxin-like compounds. Dioxin Symposium; August 17-22, 2008; Birmingham, UK: Organohalogen Compounds; 2008. p. 654-7.
- 129. Haws L, Unice KM, Tachovsky A, Harris M, DeVito MJ, Walker NJ, Birnbaum LS, Farland WH, Nguyen LM, Staskal D. Assessment of the impact of using weighted distributions of REPs to develop exposure estimates for dioxin-like compounds. Dioxin Symposium; August 17-22, 2008; Birmingham, UK: Organohalogen Compounds; 2008. p. 414-7.
- 130. Huwe JK, Hakk H, Stapleton HM, Birnbaum LS. Tissue Distribution of Polybrominated Diphenyl Ethers in Rats Following Oral Exposure and the Relationship to Body Burdens. International Society for Environmental Epidemiology (ISEE) Conference; October 12-16, 2008; Pasadena, CA: Epidemiology; 2008. p. S76.
- 131. La Merrill M, Harper R, Birnbaum LS, Cardiff RD, Threadgill DW. Obesity and perinatal TCDD exposure increases mammary tumor incidence in FVB mice. Keystone Symposium; February 19-24, 2008; Taos, NM2008.
- 132. Kodavanti PR, Rao S, Birnbaum LS. Overview of current TEFs as it relates to current PCB exposures: What is needed? . PCB Workshop; May 18-22, 2008; Iowa City, IA2008.

- 133. Mitchell KA, Radio N, Birnbaum LS, Burns Naas L. Putting your best foot forward: job interviewing workshop for early-career scientists. Society of Toxicology Annual Meeting; March 16-20, 2008; Seattle, WA: The Toxicologist; 2008. p. 129.
- 134. La Merrill M, Birnbaum LS, Cardiff RD, Threadgill DW. Obesity and perinatal TCDD exposure increases mammary tumors in FVB mice. Society of Toxicology Annual Meeting; March 16-20, 2008; Seattle, WA: The Toxicologist; 2008. p. 140.
- 135. Szabo DT, Diliberto JJ, Richardson VM, Ross DG, Kodavanti PR, Birnbaum LS. Effects on hepatic deiodenase 1 and thyroid hormone levels in perinatally exposed rats to a PBDE commercial mixture. Society of Toxicology Annual Meeting; March 16-20, 2008; Seattle, WA: The Toxicologist; 2008. p. 20.
- 136. Haws LC, DeVito MJ, Walker JN, Birnbaum LS, Unice KM, Scott PK, Harris MA, Tachovsky JA, Farland WH, Finley B, Staskal DF. Development of weighted distribution of reps for dioxin-like compounds: Implications for risk assessment. Society of Toxicology Annual Meeting; March 16-20, 2008; Seattle, WA: The Toxicologist; 2008. p. 242.
- 137. Dye JA, Venier M, Ward CR, Hites RA, Birnbaum LS. Brominated-flame retardants (BFRS) in cats Possible linkage to feline hyperthyroidism? American College of Veterinary Internal Medicine (ACVIM) Forum; June 6-9, 2007; Seattle, WA: Journal of Veterinary Internal Medicine; 2007. p. 595.
- 138. Dye JA, Venier M, Ward CR, Hites RA, Birnbaum LS. Brominated-flame retardants (BFRs) in cats possible linkage to feline hyperthyroidism? American College of Veterinary Internal Medicine Annual Meeting; June 6-9, 2007; Seattle, WA: Journal of Veterinary Internal Medicine; 2007. p. 595.
- 139. Staskal DF, Scott LL, Williams ES, Luksemburg WJ, Haws LC, Birnbaum LS, Nguyen LM, Paustenbach DJ, Harris MA. Daily intake estimates of PBDEs associated with consumption of catfish in the U.S. Brominated Flame Retardants (BFR) Annual Workshop; April 24-27, 2007; Amsterdam, Netherlands 2007.
- 140. Huwe JK, Hakk H, Diliberto JJ, Stapleton HM, Birnbaum LS. Comparative oral bioavailability of PBDEs from dust and oil in male rats. Brominated Flame Retardants (BFR) Annual Workshop; April 24-27, 2007; Amsterdam, Netherlands2007.
- 141. Emond C, Staskal DF, Birnbaum LS. Mechanistic description of dose-dependent urinary elimination of PBDE-47 in adult mice using a physiological based pharmacokinetic model. Dioxin Symposium; September 2-7, 2007; Tokyo, Japan: Organohalogen Compounds; 2007. p. 2651-4.
- 142. Birnbaum LS. Health effects of brominated flame retardants (BFRs) Dioxin Symposium; September 2-7, 2007; Tokyo, Japan: Organohalogen Compounds; 2007. p. 670-3.
- 143. Birnbaum LS. Health consequences of dioxin exposure. Dioxin Symposium; September 2-7, 2007; Tokyo, Japan: Organohalogen Compounds; 2007. p. 896-7.
- 144. Dye JA, Venier M, Zhu Y, Ward CR, Hites RA, Birnbaum LS. Comparison of PBDEs in cat serum to levels in cat food evidence of deca debromination. Dioxin Symposium; September 2-7, 2007; Tokyo, Japan: Organohalogen Compounds; 2007. p. 2666-9.

- 145. Richardson VM, Hakk H, Huwe JK, Diliberto JJ, Stapleton HM, Birnbaum LS. Bioavailability and biological response of PBDEs administered to rats in household dust. Dioxin Symposium; September 2-7, 2007; Tokyo, Japan: Organohalogen Compounds; 2007. p. 690-3.
- 146. Szabo DT, Diliberto JJ, Richardson V, Kodavanti PR, Birnbaum LS. Perinatal exposure to DE-71, a PBDE commercial mixture, alters the expression of genes involved in thyroid hormone homeostasis in male rates. International Congress of Toxicology (ICT); July 15-19, 2007; Montreal, Canada2007.
- 147. Emond C, Staskal D, Birnbaum LS. Prediction of saturable elimination of 2,2',4,4'-tetrabromophenyl ether (BDE-47) using a physiologically based pharmacokinetic model in mice. International Congress of Toxicology (ICT); July 15-19, 2007; Montreal, Canada2007.
- 148. Raymer JH, Studabaker WB, Michael LC, Murtha A, Emond C, Birnbaum LS. Potential media for monitoring in utero exposure to 2,2',4,4'-tetrabromodiphenyl ether. International Society of Exposure Science (ISES) Annual Conference; October 14-18, 2007; Research Triangle Park, NC: International Society of Exposure Science (ISES) 2007. p. 185.
- 149. Huwe J, Hakk H, Diliberto JJ, Richardson VM, Stapleton HM, Birnbaum LS. Are polybrominated diphenyl ethers from household dust bioavailable and biologically active? International Society of Exposure Science (ISES) Annual Conference; October 14-18, 2007; Research Triangle Park, NC: International Society of Exposure Science (ISES) 2007. p. 581.
- 150. Birnbaum LS. Human health impacts of exposure to POPs. Network Conference on Persistent Organic Pollutants April 17-18, 2007; Birmingham, UK: Organohalogen Compounds; 2007. p. 275-7.
- 151. Birnbaum LS. A toxicological view of issues and approaches. Society for Risk Analysis Annual Meeting; December 9-12, 2007; San Antonio, TX: Society For Risk Analysis; 2007.
- 152. Emond C, Raymer JH, Garner E, Diliberto JJ, Staskal D, Birnbaum LS. A physiologically based pharmacokinetic model for developmental exposure to PBDE-47 in rodents. Society of Toxicology Annual Meeting; March 25-29, 2007; Charlotte, NC: The Toxicologist; 2007. p. 348.
- 153. Dye JA, Venier M, Ward CR, Hites RA, Birnbaum LS. Pet cats in the U.S. have high polybrominated diphenyl ether (PBDE) serum levels. Society of Toxicology Annual Meeting; March 25-29, 2007; Charlotte, NC: The Toxicologist; 2007. p. 176.
- 154. Szabo DT, Diliberto JJ, Richardson VM, Kodavanti PS, Birnbaum LS. Perinatal exposure to DE-71 alters expression of hepatic genes involved in thyroid hormone disruption in male rats. Society of Toxicology Annual Meeting; March 25-29, 2007; Charlotte, NC: The Toxicologist; 2007. p. 175.
- 155. Richardson VM, Hakk H, Diliberto JJ, Birnbaum LS. Effects on hepatic gene expression in male rats administered PBDEs in household dust. Society of Toxicology Annual Meeting; March 25-29, 2007; Charlotte, NC: The Toxicologist; 2007. p. 176.
- 156. Diliberto JJ, Staskal DF, Hakk H, Birnbaum LS. Differential urinary protein binding of PBDEs in mice. Society of Toxicology Annual Meeting; March 25-29, 2007; Charlotte, NC: The Toxicologist; 2007. p. 415.

- 157. Nguyen LM, Staskal D, Williams ES, Luksemburg WJ, Haws L, Birnbaum LS, Paustenbach DJ, Harris M. Dietary intake of PBDEs based on consumption of catfish in Southern Mississippi. Society of Toxicology Annual Meeting; March 25-29, 2007; Charlotte, NC: The Toxicologist; 2007. p. 147.
- 158. Haws L, Walker N, DeVito MJ, Birnbaum LS, Unice KM, Scott PK, Harris M, Farland WH, Finley B, Staskal D. Development of weighted distributions of reps for dioxin-like compounds (DLCs). Society of Toxicology Annual Meeting; March 25-29, 2007; Charlotte, NC: The Toxicologist; 2007. p. 323.
- 159. Hakk H, Huwe JK, Diliberto JJ, Stapleton HM, Birnbaum LS. Bioavailability of PBDEs in male rats from orally administered household dust. Society of Toxicology Annual Meeting; March 25-29, 2007; Charlotte, NC: The Toxicologist; 2007. p. 421.
- 160. La Merrill M, Birnbaum LS, Threadgill DW. Assessing TCDD wasting syndrome in an in vivo obesity model. Society of Toxicology Annual Meeting; March 25-29, 2007; Charlotte, NC: The Toxicologist; 2007. p. 149.
- 161. Birnbaum L. Health effects of brominated flame retardants (BFRs). American Chemical Society (ACS) National Meeting; September 10-14, 2006; San Francisco, CA: Abstracts of Papers of the American Chemical Society; 2006. p. ENVR 256.
- 162. Birnbaum L. Health aspects of brominated flame retardants (BFRs). Brominated Flame Retardants (BFR) Annual Workshop; June 24-27, 2006; Toronto, Canada2006.
- 163. Birnbaum L. Brominated flame retardants: What we know and what we don't. Brominated Flame Retardants (BFR) Annual Workshop; June 24-27, 2006; Toronto, Canada2006.
- 164. Diliberto JJ, Staskal DF, Hakk H, Bauer D, Birnbaum LS. Role of protein binding in the urinary excretion of PBDEs in mice. Dioxin Symposium; August 21-25, 2006; Oslo, Norway: Organohalogen Compounds; 2006. p. 1975-8.
- 165. Staskal DF, Ferriby LL, Williams ES, Luksemburg WJ, Haws LC, Birnbaum LS. Polybrominated diphenyl ethers in southern Mississippi catfish. Dioxin Symposium; August 21-25, 2006; Oslo, Norway: Organohalogen Compounds; 2006. p. 1839-42.
- 166. Van den Berg M, Birnbaum LS, Denison M, DeVito MJ, Farland WH, Feeley M, Fiedler H, Hakansson H, Hanberg A, Haws L, Rose M, Safe S, Schrenk D, Tohyama C, Tritscher A, Tuomisto J, Tysklind M, Walker N, Peterson RE. Human and mammalian toxic equivalency factors for dioxins and dioxinlike compounds: the WHO 2005 re-evaluation. Dioxin Symposium; August 21-25, 2006; Oslo, Norway: Organohalogen Compounds; 2006. p. 834-5.
- 167. Richardson VM, Staskal DF, Diliberto JJ, Birnbaum LS, DeVito MJ. Effects of 2,2'4,4'Tetrabromodiphenyl ether on nuclear receptor regulated genes? implications for thyroid hormone
 disruption. Dioxin Symposium; August 21-25, 2006; Oslo, Norway: Organohalogen Compounds; 2006.
 p. 403-6.
- 168. Ferriby LL, Williams ES, Luksemburg WJ, Paustenbach DJ, Birnbaum LS, Haws LC, Harris MA. Comparing polychlorinated biphenyls in farm-raised and wild-caught catfish from Southern Mississippi. Dioxin Symposium; August 21-25, 2006; Oslo, Norway: Organohalogen Compounds; 2006. p. 2527-30.

- 169. Ferriby LL, Williams ES, Luksemburg WJ, Paustenbach DJ, Birnbaum LS, Haws L, Harris M. Comparing PCDDs, PCDFs, and dioxin-like PCBs in farm-raised and wild-caught Catfish from Southern Mississippi. Dioxin Symposium; August 21-25, 2006; Oslo, Norway: Organohalogen Compounds; 2006. p. 612-5.
- 170. Staskal DF, Scott PK, Haws LC, Birnbaum LS, Walker NJ, DeVito MJ, Harris MA, Farland WH, Finley BL, Unice KM. An alternative method for establishing TEFs for dioxin-like compounds. Part 3. development of weighted distributions of reps for PCB 126 and 2,3,r,7,8-PeCDF. Dioxin Symposium; August 21-25, 2006; Oslo, Norway: Organohalogen Compounds; 2006. p. 836-9.
- 171. Scott PK, Haws LC, Staskal DF, Birnbaum LS, Walker NJ, DeVito MJ, Harris MA, Farland WH, Finley BL, Unice KM. An alternative method for establishing TEFs for dioxin-like compounds. Part 2. Development of an approach to quantitatively weight the underlying potency data. Dioxin Symposium; August 21-25, 2006; Oslo, Norway: Organohalogen Compounds; 2006. p. 2523-6.
- 172. Scott PK, Haws LC, Staskal DF, Birnbaum LS, Walker NJ, DeVito MJ, Harris MA, Farland WH, Finley BL, Unice KM. An alternative method for establishing TEFs for dioxin-like compounds. Part 1. Evaluation of decision analysis methods for use in weighting relative potency data. Dioxin Symposium; August 21-25, 2006; Oslo, Norway: Organohalogen Compounds; 2006. p. 2519-22.
- 173. Birnbaum LS. Risk characterizations of dioxins. International Congress on Occupational Health (ICOH); June 11-16, 2006; Milan, Italy Environmental Protection Agency; 2006.
- 174. Richardson VM, Staskal D, Birnbaum LS, DeVito MJ. Effects of BDE-47 on nuclear receptor regulated genes and implications for thyroid hormone disruption. Society of Toxicology Annual Meeting; March 5-9, 2006; San Diego, CA: The Toxicologist; 2006. p. 238.
- 175. Staskal D, Diliberto JJ, Birnbaum LS. Effect of age on tissue disposition of BDE 47 in mice. Society of Toxicology Annual Meeting; March 5-9, 2006; San Diego, CA: The Toxicologist; 2006. p. 122-3.
- 176. Diliberto JJ, Staskal DF, Birnbaum LS. Developmental age effects on tissue disposition of BDE 47 in Mice. Society of Toxicology Annual Meeting; March 5-9, 2006; San Diego, CA: The Toxicologist; 2006. p. 115.
- 177. Staskal D, Bauer D, Birnbaum L. Congener-dependent distribution and excretion: A comparison of BDEs 47, 99, 100, and 153 toxicokinetics. Brominated Flame Retardants (BFR) Annual Workshop; June 3-6, 2005; Baltimore, MD2005.
- 178. Birnbaum LS. Introduction to brominated flame retardants. EPA Region 2 Science Day October 25, 2005; New York, NY: Environmental Protection Agency (EPA); 2005.
- 179. Birnbaum LS. Risk characterization of dioxins. Eurotox; September 11-14, 2005; Krakow, Poland: Toxicology Letters; 2005. p. S10.
- 180. Okino MS, Chiu WA, Evans MV, Power FW, Lipscomb JC, Tornero-Velez R, Dary CC, Blancato JN, Chen CY, Birnbaum LS. Suitability of using in vitro and computationally estimated parameters in simplified pharmacokinetic models. International Society for the Study of Xenobiotics (ISSX) Annual Meeting; October 23-27, 2005; Maui, HI: International Society for the Study of Xenobiotics (ISSX); 2005.

- 181. Birnbaum LS. PBDEs: toxicology update. National Forum on Contaminants in Fish; September 18-21, 2005; Baltimore, MD: Environmental Protection Agency (EPA); 2005. p. II-62-3; Birnbaum 1-3.
- 182. Farland WH, DeVito MJ, Birnbaum LS. The use of TEFs in assessing mixtures of dioxins, furans and dioxin-like PCBs. Society of Toxicology Annual Meeting; March 6-10, 2005; New Orleans, LA: The Toxicologist; 2005. p. 7.
- 183. Staskal D, Diliberto JJ, DeVito MJ, Birnbaum LS. Toxicokinetics of BDE 47 in mice. Society of Toxicology Annual Meeting; March 6-10, 2005; New Orleans, LA: The Toxicologist; 2005. p. 64.
- 184. Schecter AJ, Paepke O, Ryan J, Birnbaum LS, Staskal D, Tung KC. PBDEs in U.S. humans, food, and environmental samples. Society of Toxicology Annual Meeting; March 6-10, 2005; New Orleans, LA: The Toxicologist; 2005. p. 64.
- 185. Diliberto JJ, DeVito MJ, Ross DG, Richardson VM, Birnbaum LS. Disposition of TCDD in a mouse model of obesity and type II diabetes. Society of Toxicology Annual Meeting; March 6-10, 2005; New Orleans, LA: The Toxicologist; 2005. p. 251.
- 186. Bauer D, Staskal DF, Diliberto JJ, Birnbaum LS. Disposition of BDE 99 and BDE 153 in Female Mice. Society of Toxicology Annual Meeting; March 6-10, 2005; New Orleans, LA: The Toxicologist; 2005. p. 257.
- 187. Evans MV, Tornero-Velez R, DeVito MJ, Okino MS, Geller AM, Blancato JN, Birnbaum LS. Development of a physiologically based pharmacokinetic (PBPK) model to compare differences in disposition of trichloroethylene (TCE), and metabolites in adult versus elderly rats. Society of Toxicology Annual Meeting; March 6-10, 2005; New Orleans, LA: The Toxicologist; 2005. p. 175.
- 188. Burgin DE, Diliberto JJ, Birnbaum LS. Comparing environmentally relevant PCBs to TCDD in CYP1A2 null and wildtype mice. Society of Toxicology Annual Meeting; March 6-10, 2005; New Orleans, LA: The Toxicologist; 2005. p. 80.
- 189. Birnbaum LS, Schecter A. Brominated flame retardants: new findings. Society of Toxicology Annual Meeting; March 6-10, 2005; New Orleans, LA: The Toxicologist; 2005. p. 63.
- 190. Schecter A, Paepke O, Staskal D, Tung KC, Rosen R, Birnbaum LS. PBDE Contamination of U.S. food and human milk, and PBDE, PCDD/F, PCB, and levels in U.S. human blood. Brominated Flame Retardants (BFR) Annual Workshop; June 6-9, 2004; Toronto, Canada2004.
- 191. Schecter AJ, Paepke O, Ryan JJ, Olson J, Malisch R, Birnbaum LS, Pavuk M. PBDEs in U.S. nursing mothers milk, food, and electronics: levels and estimated intake by various routes. Society of Toxicology Annual Meeting; March 21-25, 2004; Baltimore, MD: The Toxicologist; 2004. p. 392.
- 192. Emond C, DeVito MJ, Birnbaum LS, Michalek J. The influence of variable elimination rate and body fat mass in a PBPK model for TCDD in predicting the serum TCDD concentrations from veterans of Operation Ranch Hand. Society of Toxicology Annual Meeting; March 21-25, 2004; Baltimore, MD: The Toxicologist; 2004. p. 18.

- 193. Staskal D, Diliberto JJ, DeVito MJ, Birnbaum LS. Disposition of 2, 2', 4, 4'-tetrabromodiphenyl either (BDE 47) in female mice. Society of Toxicology Annual Meeting; March 21-25, 2004; Baltimore, MD: The Toxicologist; 2004. p. 393.
- 194. Birnbaum LS, Emond C, DeVito MJ. Application of a PBPK model to aid in understanding the relative potencies (REPS) of dioxin-like chemicals. Society of Toxicology Annual Meeting; March 21-25, 2004; Baltimore, MD: The Toxicologist; 2004. p. 362.
- 195. Emond C, Birnbaum LS, DeVito MJ. Utilization of physiologically based pharmacokinetic model (PBPK) to study the influence of body fat mass and induction of CYP1A2 on the pharmacokinetics of TCDD. Dioxin Symposium; August 24-29, 2003; Boston, MA: Organohalogen Compounds; 2003. p. 203-6.
- 196. Emond C, Birnbaum LS, DeVito MJ. Utilization of a PBPK model to predict the distribution of 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) in humans during critical windows of development. Dioxin Symposium; August 24-29, 2003; Boston, MA: Organohalogen Compounds; 2003. p. 234-7.
- 197. Farland WH, Birnbaum LS. The need for continued research on dioxin and related compounds. Dioxin Symposium; August 24-29, 2003; Boston, MA: Organohalogen Compounds; 2003. p. 337-9.
- 198. DeVito MJ, Walker N, Birnbaum LS. The influence of chemical impurity on estimating relative potency factors for PCBs. Dioxin Symposium; August 24-29, 2003; Boston, MA: Organohalogen Compounds; 2003. p. 288-91.
- 199. Staskal DF, DeVito MJ, Ross DG, Birnbaum LS. Caffeine, Acetanilide, and Methoxyresorufin Metabolism by Rat and Human CYP1A2 SUPERSOMES and their Inhibition by 2,3,7,8,- Tetrachlorodibenzo-p-dioxin (TCDD). Dioxin Symposium; August 24-29, 2003; Boston, MA: Organohalogen Compounds; 2003. p. 324-7.
- 200. Emond C, Birnbaum LS, DeVito MJ. Application of a physiologically based pharmacokinetic (PBPK) model to aid in understanding relative potency factors for dioxin-like chemicals. Dioxin Symposium; August 24-29, 2003; Boston, MA: Organohalogen Compounds; 2003. p. 39-42.
- 201. Birnbaum L. Agent Orange in Vietnam and human effects: what should we look for? What might we expect? Dioxin Symposium; August 24-29, 2003; Boston, MA: Organohalogen Compounds; 2003. p. 251-4.
- 202. DeVito MJ, Diliberto JJ, Ross DG, Emond C, Richardson VM, Birnbaum LS. Influence of type II diabetes and obesity on the dispostion and elimination of TCDD in mice. Society of Toxicology Annual Meeting; March 9-13, 2003; Salt Lake City, UT: The Toxicologist; 2003. p. 364.
- 203. Godin SJ, Richardson VM, Diliberto JJ, Birnbaum LS, DeVito MJ. Influence of diabetes, obesity and 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) exposure on the expression of hepatic CYP1A2 in a murine model of type II diabetes. Society of Toxicology Annual Meeting; March 9-13, 2003; Salt Lake City, UT: The Toxicologist; 2003. p. 364.
- 204. Smialowicz R, Burgin DE, Williams WC, Diliberto JJ, Birnbaum LS. CYP1A2 is not required for 2,3,7,8-tetrachlorodibenzo-p-dioxin-induced immunosuppression. Society of Toxicology Annual Meeting; March 9-13, 2003; Salt Lake City, UT: The Toxicologist; 2003. p. 403.

- 205. Staskal D, Ross DG, Birnbaum LS, DeVito MJ. A comparison of the metabolism of methoxyresorufin, acetanilide and caffiene in rat and human CYP1A2 supersomes and their inhibition by 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD). Society of Toxicology Annual Meeting; March 9-13, 2003; Salt Lake City, UT: The Toxicologist; 2003. p. 363.
- 206. Burgin DE, Diliberto JJ, Birnbaum LS. Comparing environmentally relevant PCBs to TCDD. Society of Toxicology Annual Meeting; March 9-13, 2003; Salt Lake City, UT: The Toxicologist; 2003. p. 364.
- 207. Diliberto JJ, DeVito MJ, Birnbaum LS. Using tissue dose of 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) as a predictive response for reversible biochemical changes. Dioxin Symposium; August 11-16, 2002; Barcelona, Spain: Organohalogen Compounds; 2002. p. 171-3.
- 208. Birnbaum LS, Fenton SE. Role of developmental exposure to endocrine disruptors in cancer. Dioxin Symposium; August 11-16, 2002; Barcelona, Spain: Organohalogen Compounds; 2002. p. 65-7.
- 209. Emond C, DeVito MJ, Birnbaum LS. Physiologically based pharmacokinetic modeling as a tool for predicting dose response relationships for TCDD during development. Dioxin Symposium; August 11-16, 2002; Barcelona, Spain: Organohalogen Compounds; 2002. p. 119-22.
- 210. Staskal DF, DeVito MJ, Birnbaum LS. Dioxin and dioxin-like chemicals inhibit CYP1 activity. Dioxin Symposium; August 11-16, 2002; Barcelona, Spain: Organohalogen Compounds; 2002. p. 465-8.
- 211. Burgin DE, Diliberto JJ, Birnbaum LS. Comparing mixtures of dioxin-like and non dioxin-like PCBs to TCDD. Dioxin Symposium; August 11-16, 2002; Barcelona, Spain: Organohalogen Compounds; 2002. p. 375-8.
- 212. Diliberto JJ, DeVito MJ, Birnbaum LS. Relationship of tissue dose of 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) to reversible biological responses. Society of Toxicology Annual Meeting; March 17-21, 2002; Nashville, TN: The Toxicologist; 2002. p. 170.
- 213. Staskal DF, Birnbaum LS, DeVito MJ. Inhibition of human and rat CYP1A2 by TCDD and dioxin-like chemicals. Society of Toxicology Annual Meeting; March 17-21, 2002; Nashville, TN: The Toxicologist; 2002. p. 171.
- 214. Burgin DE, Diliberto JJ, Birnbaum LS. Comparing mixtures of dioxin-like and non dioxin-like PCBs to TCDD. Society of Toxicology Annual Meeting; March 17-21, 2002; Nashville, TN: The Toxicologist; 2002. p. 171.
- 215. Birnbaum LS. Health effects of polybrominated dioxins and furans. Brominated Flame Retardants (BFR) Annual Workshop; May 14-16, 2001; Stockholm, Sweden2001. p. 135-7.
- 216. Farland WH, Birnbaum LS, Winters D, Tuxen L. Dioxin after EPA's Reassessment: Science and Policy. Dioxin Symposium; September 9-14, 2001; Gyeongju, Korea: Organohalogen Compounds; 2001. p. 5-9.
- 217. Youssef JA, Ammann P, Ghanayem BI, Birnbaum LS, Badr MZ. Discordant induction of peroxisome proliferator-activated receptor alpha mRNA and dependent genes by peroxisome proliferators in livers of senescent rats. Federation of American Societies for Experimental Biology

- (FASEB) Annual Meeting; March 31 April 4, 2001; Orlando, FL: Federation proceedings; 2001. p. A562-A.
- 218. Youssef JA, Ammann P, Ghanayem BL, Birnbaum LS, Badr MZ. Mechanisms Involved in the Enhanced Susceptibility of Senescent Rats to the Hepatocarcinogenic Effect of Peroxisome Proliferators: Role of Peroxisome Proliferator-Activated Receptor alpha (PPAR), Cell Proliferation and Oxidative Stress. Miami Nature Biotechnology Winter Symposium (MNBWS); February 3-7, 2001; Miami, FL: The Scientific World Journal; 2001. p. 85.
- 219. Richardson VM, Hamm JT, Birnbaum LS. Time-dependent effects on gene expression in rat seminal vesicle developmentally altered by in utero exposure to TCDD. Society of Toxicology Annual Meeting; March 25-29, 2001; San Francisco, CA: The Toxicologist; 2001. p. 273.
- 220. Birnbaum LS. Regulation of AHR expression during development, daily, and following ligand exposure. Society of Toxicology Annual Meeting; March 25-29, 2001; San Francisco, CA: The Toxicologist; 2001. p. 134.
- 221. Diliberto JJ, McQuaid F, Hamm JT, Birnbaum LS. Postnatal disposition of TCDD in Long Evans rats following gestational exposure. Society of Toxicology Annual Meeting; March 25-29, 2001; San Francisco, CA: The Toxicologist; 2001. p. 290-1.
- 222. Burgin DE, Diliberto JJ, Birnbaum LS. 2,3,7,8-Tetrachlorodibenzo-p-dioxin (TDCC) mediated oxidative stress in female CYP1A-2 knockout (CYP1A2-/-) mice. Society of Toxicology Annual Meeting; March 25-29, 2001; San Francisco, CA: The Toxicologist; 2001. p. 442.
- 223. Farland WH, Schaum J, Winters D, Lorber M, Cleverly D, Rodan B, Tuxen L, DeVito MJ, Birnbaum LS. USEPA's risk characterization of dioxin and related compounds. Dioxin Symposium; August 13-17; Monterey, CA: Organohalogen Compounds; 2000. p. 248-51.
- 224. Diliberto JJ, Abbott BD, Birnbaum LS. Use of AHR Knockout (AHR-/-) mice to investigate the role of the AH receptor on disposition of TCDD. Dioxin Symposium; August 13-17; Monterey, CA: Organohalogen Compounds; 2000. p. 120-3.
- 225. Richardson VM, Santostefano MJ, Birnbaum LS. Time-dependent expression of AhR and Arnt mRNAs in multiple mouse tissues. Dioxin Symposium; August 13-17; Monterey, CA: Organohalogen Compounds; 2000. p. 314-7.
- 226. Chen CY, Hamm JT, Hass JR, Birnbaum LS. Time-course transfer of PCDD/FS and non-ortho PCBS to fetal and neonatal Long Evans rats. Dioxin Symposium; August 13-17 Monterey, CA: Organohalogen Compounds; 2000. p. 334-7.
- 227. Hamm JT, Diliberto JJ, McQuaid F, Birnbaum LS. Postnatal disposition of 2,3,7,8,-tetrachlorobidenzo-p- dioxin in the Long Evans rat following gestational exposure. Dioxin Symposium; August 13-17 Monterey, CA: Organohalogen Compounds; 2000. p. 104-7.
- 228. Chen CY, Hamm JT, Hass JR, Albro PW, Birnbaum LS. A Mixture of Polychlorinated Dibenzo-p-Dioxins (PCDDs), Dibenzofurans (PCDFs), and Non-Ortho Polychlorinated Biphenyls (PCBs) Changed the Lipid Content of Pregnant Long Evans Rats. Dioxin Symposium; August 13-17; Monterey, CA: Organohalogen Compounds; 2000. p. 225-8.

- 229. DeVito MJ, Farland WH, Birnbaum LS. Margin of exposure estimates for TCDD for cancer and non-cancer effects in laboratory animals. Dioxin Symposium; August 13-17 Monterey, CA: Organohalogen Compounds; 2000. p. 292-5.
- 230. Birnbaum LS. Health Effects of Dioxins: people are animals, and vice-versa! Dioxin Symposium; August 13-17; Monterey, CA: Organohalogen Compounds; 2000. p. 101-3.
- 231. Burgin DE, Diliberto JJ, Birnbaum LS. Effects of two lots of Arolor 1254 on hepatic retinoid concentration in rats. Dioxin Symposium; August 13-17 Monterey, CA: Organohalogen Compounds; 2000. p. 221-4.
- 232. Kodavanti PR, Kannan N, Yamashita N, Derr-Yellin EC, Ward TR, Burgin DE, Tilson HA, Birnbaum LS. Differential effects of two lots of Aroclor 1254R: congener analysis and neurochemical endpoints. Dioxin Symposium; August 13-17 Monterey, CA: Organohalogen Compounds; 2000. p. 303-6.
- 233. Fenton SE, Hamm JT, Birnbaum LS, Youngblood GL. Adverse effects of TCDD on mammary gland development in Long Evans rats: a two generational study. Dioxin Symposium; August 13-17; Monterey, CA: Organohalogen Compounds; 2000. p. 157-60.
- 234. Burgin DE, Diliberto JJ, Kodavanti PR, Birnbaum LS. Use of two Aroclorx lots to evaluate TEQ and oxidative stress predictors. Society of Toxicology Annual Meeting; March 19-23, 2000; Philadelphia, PA: The Toxicologist; 2000. p. 181.
- 235. Abbott BD, Birnbaum LS, Hurst CH. TCDD changes growth factor and matrix protein expression in fetal rat vaginal tract. Society of Toxicology Annual Meeting; March 19-23, 2000; Philadelphia, PA: The Toxicologist; 2000. p. 287.
- 236. Diliberto JJ, Abbott BD, Birnbaum LS. Role of Ah receptor of hepatic sequestration and disposition of dioxin studies using the Ah receptor-knockout mice. Society of Toxicology Annual Meeting; March 19-23, 2000; Philadelphia, PA: The Toxicologist; 2000. p. 58-9.
- 237. Wang X, DeVito MJ, Bischoff KB, Birnbaum LS. Physiological pharmacokinetic model reduction applied to human risk assessment. Society of Toxicology Annual Meeting; March 19-23, 2000; Philadelphia, PA: The Toxicologist; 2000. p. 93.
- 238. Youngblood GL, Hamm JT, Birnbaum LS, Fenton SE. Gestational exposure of long evans rats to 2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD) leads to stunted mammary epithelial development in female offspring. Society of Toxicology Annual Meeting; March 19-23, 2000; Philadelphia, PA: The Toxicologist; 2000. p. 135.
- 239. Hurst CH, Abbott BD, Birnbaum LS. Early morphogenetic events are altered in the formation of the lower reproductive tract in female rat fetuses gestationally exposed to 2,3,7,8, tetrachlorodibenzo-p-dioxin (TCDD). Society of Toxicology Annual Meeting; March 19-23, 2000; Philadelphia, PA: The Toxicologist; 2000. p. 288.
- 240. Hamm JT, Birnbaum LS. Developmental reproductive effects of a mixture of dioxins, furans, and co-planar PCBS on Long Evans rats. Society of Toxicology Annual Meeting; March 19-23, 2000; Philadelphia, PA: The Toxicologist; 2000. p. 367.

- 241. Santostefano MJ, Richardson VM, Walker NJ, Blanton J, Lindros KO, Lucier GW, Alcasey SK, Birnbaum LS. TCDD localization in centrilobular and periportal hepatocytes. Dioxin Symposium; September 12-17, 1999; Venice, Italy: Organohalogen Compounds; 1999. p. 469-73.
- 242. Diliberto JJ, Birnbaum LS. Role of CYP1A2 on toxicokinetic behavior of PHAHS in knockout (CYP!A2-/-) versus parental (CYP1A2+/+) strains of mice. Dioxin Symposium; September 12-17, 1999; Venice, Italy: Organohalogen Compounds; 1999. p. 165-8.
- 243. Slezak BP, Diliberto JJ, Birnbaum LS. The Role of CYP1A2 on oxidative stress following exposure to 2,3,7,8-tetrachlorodibenzo-p-dioxin in knockout (CYP1A2-/-) versus parental (CYP1A2+/+) strains of mice. Dioxin Symposium; September 12-17, 1999; Venice, Italy: Organohalogen Compounds; 1999.
- 244. Hamm JT, Chen CY, Hass JR, Birnbaum LS. Do toxic equivalency factors predict adverse reproductive effects of a mixture of dioxin and dioxin-like compounds. Dioxin Symposium; September 12-17, 1999; Venice, Italy: Organohalogen Compounds; 1999. p. 253-7.
- 245. Schecter AJ, Birnbaum LS, Sheu SU. Do recent changes in TEF values have a major impact on TEQ of biological samples? Dioxin Symposium; September 12-17, 1999; Venice, Italy: Organohalogen Compounds; 1999. p. 371-5.
- 246. Burgin DE, Diliberto JJ, Prasad H, Kodavanti PR, Birnbaum LS. Differential toxicities of two lots of aroclor 1254. Dioxin Symposium; September 12-17, 1999; Venice, Italy: Organohalogen Compounds; 1999. p. 301-4.
- 247. Chen CY, Hamm JT, Hass JR, Birnbaum LS. Deposition of PCDD/Fs and Non-ortho PCBs in Long Evans Rats. Dioxin Symposium; September 12-17, 1999; Venice, Italy: Organohalogen Compounds; 1999. p. 151-4.
- 248. Schecter AJ, Sheu SU, Birnbaum LS, DeVito MJ, Denison MS, Paepke O. A comparison and discussion of two differing methods of measuring dioxin-like compounds: gas chromatography-mass spectrometry and the CALLUX bioassay implications of health studies. Dioxin Symposium; September 12-17, 1999; Venice, Italy: Organohalogen Compounds; 1999. p. 247-50.
- 249. DeVito MJ, Diliberto JJ, Birnbaum LS. The comparative toxicokinetics of dioxin-like chemicals and the role of CYP1A2 in their disposition. Dioxin Symposium; September 12-17, 1999; Venice, Italy: Organohalogen Compounds; 1999.
- 250. Hurst CH, Abbott BD, Birnbaum LS. 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) disrupts early morphogenetic events that form the lower reproductive tract in female rat fetuses. Dioxin Symposium; September 12-17, 1999; Venice, Italy: Organohalogen Compounds; 1999. p. 273-6.
- 251. Hamm JT, Sparrow BR, Wolf D, Birnbaum LS. 2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD) alters epithelial development of the seminal vesicles. Dioxin Symposium; September 12-17, 1999; Venice, Italy: Organohalogen Compounds; 1999. p. 321-4.
- 252. Burgin DE, Kodavanti PS, Diliberto JJ, Birnbaum LS. Differential toxicities of two lots of aroclor 1254. Federation of American Societies for Experimental Biology (FASEB) Annual Meeting; April 17-21, 1999; Washington, DC: Federation proceedings; 1999. p. A154-A.

- 253. Birnbaum LS, Richardson VM, Alcasey SK, Blanton J, Walker NJ, Lucier GW, Lindros KO, Santostefano MJ. Localization of TCDD and effects on gene expression in isolated hepatocytes. Federation of American Societies for Experimental Biology (FASEB) Annual Meeting; April 17-21, 1999; Washington, DC: Federation proceedings; 1999. p. A154-A.
- 254. Slezak BP, Crissman K, Slade R, Hatch GE, Devito M, Diliberto JJ, Birnbaum LS. TCDD mediated oxidative stress in female B6C3F1 mouse liver and brain following acute and subchronic exposure. Federation of American Societies for Experimental Biology (FASEB) Annual Meeting; April 17-21, 1999; Washington, DC: Federation proceedings; 1999. p. A154-A.
- 255. Slezak BP, Hatch GE, DeVito M, Diliberto JJ, Slade R, Crissman K, Birnbaum LS. Oxidative stress in female B6C3F1 mouse liver and brain following acute and subchronic exposure to 2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD). Society of Toxicology Annual Meeting; March 14-18, 1999; New Orleans, LA: The Toxicologist; 1999. p. 61.
- 256. Richardson VM, Santostefano MJ, Walker NJ, Lucier GW, Birnbaum LS. Examination of gene expression in centrilobular and periportal cells after TCDD exposure by quantitative RT-PCR. Society of Toxicology Annual Meeting; March 14-18, 1999; New Orleans, LA: The Toxicologist; 1999. p. 220.
- 257. Menache MG, Graham RC, DeVito MJ, Birnbaum LS. An empirical approach to predicting biological responses following exposures to mixtures. Society of Toxicology Annual Meeting; March 14-18, 1999; New Orleans, LA: The Toxicologist; 1999. p. 23.
- 258. Blackwell LT, Birnbaum LS, DeVito MJ. The effects of 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) on insulin in a murine model of type II diabetes. Society of Toxicology Annual Meeting; March 14-18, 1999; New Orleans, LA: The Toxicologist; 1999. p. 216-7.
- 259. Diliberto JJ, DeVito MJ, Ross DG, Birnbaum LS. Dose-response relationship of subchronic dosing with [3H]TCDD on dosimetry and CYP1A activities. Society of Toxicology Annual Meeting; March 14-18, 1999; New Orleans, LA: The Toxicologist; 1999. p. 220.
- 260. Kodavanti PR, Kannan N, Yamashita N, Ward TR, Birnbaum LS, Tilson HA. Differential effects of aroclor 1254 mixtures with two lot numbers: intracellular calcium buffering and protein kinase C translocation in rat brain. Society of Toxicology Annual Meeting; March 14-18, 1999; New Orleans, LA: The Toxicologist; 1999. p. 277.
- Burgin DE, Diliberto JJ, Derr-Yellin EC, Birnbaum LS, Kodavanti PR. Differential effects of Aroclor 1254 mixtures with two lot numbers: Hepatic enzyme induction and circulating thyroid hormone levels. Society of Toxicology Annual Meeting; March 14-18, 1999; New Orleans, LA: The Toxicologist; 1999. p. 277-8.
- 262. Santostefano MJ, Blanton J, Richardson VM, Alcasey SK, Lindros KO, Birnbaum LS. Differences in localization of TCDD in centrilobular and periportal hepatocytes give insight into the mechanism of gene expression. Society of Toxicology Annual Meeting; March 14-18, 1999; New Orleans, LA: The Toxicologist; 1999. p. 305.
- 263. Ostby JS, Price M, Huey O, Hurst CH, Birnbaum LS, Gray LE. Developmental and reproductive effects of low-dose, steady-state maternal 2,3,7,8tetrachlorodibenzo-p-dioxin (TCDD) administration.

- Society of Toxicology Annual Meeting; March 14-18, 1999; New Orleans, LA: The Toxicologist; 1999. p. 147.
- 264. Hamm JT, Birnbaum LS. Altered cellular proliferation in the seminal vesicles of rats gestationally exposed to TCDD. Society of Toxicology Annual Meeting; March 14-18, 1999; New Orleans, LA: The Toxicologist; 1999. p. 21.
- 265. Hurst CH, DeVito MJ, Abbott BD, Ostby JS, Gray LE, Birnbaum LS. Acute and subchronic administration of TCDD in Long Evans rats: comparison of fetal tissue levels and adverse developmental effects. Society of Toxicology Annual Meeting; March 14-18, 1999; New Orleans, LA: The Toxicologist; 1999. p. 22.
- 266. Birnbaum LS. Health effects of dioxins. American Public Health Association (APHA) Annual Meeting; November 15-19; Washington, DC: American Public Health Association (APHA) 1998. p. 75.
- 267. Diliberto JJ, DeVito MJ, Ross DG, Birnbaum LS. Time-course and dose-response relationships of subchronic dosing with [3H] 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) on dosimetry and CYP1A1 and CYP1A2 activities in mice. Dioxin Symposium; August 17-21, 1998; Stockholm, Sweden: Organohalogen Compounds; 1998. p. 381-4.
- 268. Birnbaum LS. Sensitive non-carcinogenic effects of TCDD in animals. Dioxin Symposium; August 17-21, 1998; Stockholm, Sweden: Organohalogen Compounds; 1998. p. 291-4.
- 269. Blackwell L, Birnbaum LS, DeVito MJ. The effects of TCDD in a murine model of type II diabetes. Dioxin Symposium; August 17-21, 1998; Stockholm, Sweden: Organohalogen Compounds; 1998. p. 281-4.
- 270. Hurst CH, Abbott B, DeVito MJ, Ostby JS, Gray E, Birnbaum LS. Acute administration of 2,3,7,8-tetracgkirdubebzi-p-dioxin (TCDD) in Long Evans rats: comparison of fetal tissue levels and adverse developmental effects. Dioxin Symposium; August 17-21, 1998; Stockholm, Sweden: Organohalogen Compounds; 1998. p. 359-62.
- 271. Hurst CH, DeVito MJ, Birnbaum LS. Tissue disposition of 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) in maternal and developing Long Evans rats following subchronic exposures. Society of Toxicology Annual Meeting; March 1-5, 1998; Seattle, WA: The Toxicologist; 1998. p. 258.
- 272. Richardson VM, Santostefano MJ, Blanton JL, Birnbaum LS. Time-dependent expression of Ah receptor and ARNT proteins in multiple tissues of female Sprague-Dawley rats. Society of Toxicology Annual Meeting; March 1-5, 1998; Seattle, WA: The Toxicologist; 1998. p. 249.
- 273. Ross DG, Van Birgelen APJM, DeVito MJ, Birnbaum LS. Relative potency factors are predictive for alterations in hepatic retinoid concentrations after subchronic exposure to mixtures of PCDDs, PCDFs, and PCBs. Society of Toxicology Annual Meeting; March 1-5, 1998; Seattle, WA: The Toxicologist; 1998. p. 383.
- 274. Hamm JT, Ross DG, Richardson VM, Diliberto JJ, Birnbaum LS. MROD: An inappropriate marker for cytochrome P450 1A2 activity in the mouse. Society of Toxicology Annual Meeting; March 1-5, 1998; Seattle, WA: The Toxicologist; 1998. p. 20.

- 275. Birnbaum LS, Visser TJ, Kaptein E, Kodavanti PR, Derr-Yellin EC, Klasson-Wehler E, DeVito MJ, Van Birgelen APJM. Involvement of multiple mechanisms in thyroid hormone metabolism by a mixture of dioxin-like compounds in female Sprague Dawley Rats. Society of Toxicology Annual Meeting; March 1-5, 1998; Seattle, WA: The Toxicologist; 1998. p. 166.
- 276. Menache MG, Graham RC, DeVito MJ, Birnbaum LS. Estimating the relative potency of a mixture of dioxin-like compounds. Society of Toxicology Annual Meeting; March 1-5, 1998; Seattle, WA: The Toxicologist; 1998. p. 46.
- 277. Diliberto JJ, Birnbaum LS. Effects of the deficient CYP1A2 gene on disposition of 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD); comparison of transgenic CYP1A2 Knock-Out Mice to the parental strains (C57B1/6N and 129/SV). Society of Toxicology Annual Meeting; March 1-5, 1998; Seattle, WA: The Toxicologist; 1998. p. 385.
- 278. DeVito MJ, Birnbaum LS, Blackwell L. The effects of TCDD in a murine model of type II diabetes. Society of Toxicology Annual Meeting; March 1-5, 1998; Seattle, WA: The Toxicologist; 1998. p. 385-6.
- 279. Wang X, Santostefano MJ, DeVito MJ, Birnbaum LS. Effect of exposure and species in previous PBPK model to TCDD. Society of Toxicology Annual Meeting; March 1-5, 1998; Seattle, WA: The Toxicologist; 1998. p. 140.
- 280. Santostefano MJ, Wang X, DeVito MJ, Evans MV, Diliberto JJ, Birnbaum LS. Development, validation and extrapolation of physiologically based pharmacokinetic and biologically based pharmacodynamic models of dioxin. Society of Toxicology Annual Meeting; March 1-5, 1998; Seattle, WA: The Toxicologist; 1998. p. 142.
- 281. Van Birgelen APJM, Visser TJ, Kaptein E, Kodavanti PR, Derr-Yellin EC, DeVito MJ, Birnbaum LS. Synergists effects on thyroid hormone metabolism in female Sprague Dawley rats after subchronic exposure to mixtures of PCDDs, PCDFs, and PCBs. Dioxin Symposium; August 25-29, 1997; Indianapolis, IN: Organohalogen Compounds; 1997. p. 370-5.
- 282. Van Birgelen APJM, Birnbaum LS. Synergistic effects of mixtures of dioxin-like and non-dioxin-like compounds in rodents. Dioxin Symposium; August 25-29, 1997; Indianapolis, IN: Organohalogen Compounds; 1997. p. 203-8.
- 283. Ross DG, Van Birgelen APJM, DeVito MJ, Birnbaum LS. Relative potency factors derived from CYP1A induction in mice are predictive for alterations in retinoid concentrations after subchronic exposure to mixtures of PCDDs, PCDFs, and PCBs in female Sprague Dawley rats. Dioxin Symposium; August 25-29, 1997; Indianapolis, IN: Organohalogen Compounds; 1997. p. 281-6.
- 284. Santostefano MJ, Wang X, DeVito MJ, Richardson VM, Ross DG, Birnbaum LS. Multiple tissue pharmacodynamic analysis of TCDD-induced biochemical responses. Dioxin Symposium; August 25-29, 1997; Indianapolis, IN: Organohalogen Compounds; 1997. p. 19-24.
- 285. Wang X, Santostefano MJ, DeVito MJ, Birnbaum LS. Extrapolation of a previous PBPK model for TCDD across routes of exposure, gender, and from rats to mice. Dioxin Symposium; August 25-29, 1997; Indianapolis, IN: Organohalogen Compounds; 1997. p. 38-42.

- 286. DeVito MJ, Ross DG, Van Birgelen APJM, Birnbaum LS. The effects of mixtures of PCDDs, PCDFs, and PCBs on hepatic retinyl palmitate concentrations in mice. Dioxin Symposium; August 25-29, 1997; Indianapolis, IN: Organohalogen Compounds; 1997. p. 49-54.
- 287. Van Birgelen APJM, DeVito MJ, Orzech D, Walker N, Birnbaum LS, Bucher JR, Lucier G. Design of 2-year bioassays with dioxin-like compounds in female Sprague Dawley rats. Dioxin Symposium; August 25-29, 1997; Indianapolis, IN: Organohalogen Compounds; 1997. p. 154-9.
- 288. Diliberto JJ, Burgin D, Birnbaum LS. CYP1A2: The Inducible Binding Protein for TCDD Sequestration. Dioxin Symposium; August 25-29, 1997; Indianapolis, IN: Organohalogen Compounds; 1997. p. 376-9.
- 289. Santostefano MJ, Birnbaum LS, Diliberto JJ. CYP1A2 Knockout Mice: Decreased hepatic microsomal localization of TCDD. Dioxin Symposium; August 25-29, 1997; Indianapolis, IN: Organohalogen Compounds; 1997. p. 380-5.
- 290. Birnbaum LS. Beyond TEFs: Mixtures of Dioxins and Non-Dioxins. Dioxin Symposium; August 25-29, 1997; Indianapolis, IN: Organohalogen Compounds; 1997. p. 199-202.
- 291. van Birgelen APJM, Diliberto JJ, Smialowicz RJ, Birnbaum LS. Toxic and biochemical responses in tissue reflect 2,3,7,8-TCDD concentration in corresponding tissue and 2,3,7,8-TCDD body burden. Society of Toxicology Annual Meeting; March 9-13, 1997; Cincinnati, OH: The Toxicologist; 1997. p. 216.
- 292. Birnbaum LS, DeVito MJ, Van Birgelen APJM. Relative potency factors derived from cytochrome P450 induction in mice predict cytochrome P450 induction in rats after exposure to a mixture of dioxin-like compounds. Society of Toxicology Annual Meeting; March 9-13, 1997; Cincinnati, OH: The Toxicologist; 1997. p. 216.
- 293. DeVito MJ, Jackson JA, Van Birgelen APJM, Birnbaum LS. Reductions in hepatic retinoid levels after subchronic exposure to dioxinlike compounds in female mice and rats. Society of Toxicology Annual Meeting; March 9-13, 1997; Cincinnati, OH: The Toxicologist; 1997. p. 214.
- 294. Wang X, Santostefano MJ, Birnbaum LS. Extrapolation of a previous PBPK model for TCDD across doses, routes of exposure and genders in Sprague-Dawley Rats. Society of Toxicology Annual Meeting; March 9-13, 1997; Cincinnati, OH: The Toxicologist; 1997. p. 31-2.
- 295. Hurst CH, DeVito MJ, Abbott BD, Birnbaum LS. Dose-response of 2,3,7,8-tetrachloro-dibenzo-p-dioxin (TCDD) distribution in pregnant long Evans rats. Society of Toxicology Annual Meeting; March 9-13, 1997; Cincinnati, OH: The Toxicologist; 1997. p. 257-8.
- 296. Richardson VM, Santostefano MJ, Birnbaum LS. Dose-dependent effects of TCDD on Ah receptor and ARNT expression in liver and adrenals of female Sprague-Dawley rats. Society of Toxicology Annual Meeting; March 9-13, 1997; Cincinnati, OH: The Toxicologist; 1997. p. 127.
- 297. Santostefano MJ, Ross DG, Savas U, Jefcoate CR, Birnbaum LS. Differential hepatic regulation of CYP1B1, CYP1A1 and CYP1A2 proteins by TCDD. Society of Toxicology Annual Meeting; March 9-13, 1997; Cincinnati, OH: The Toxicologist; 1997. p. 216.

- 298. Smialowicz R, DeVito M, Riddle MM, Williams W, Birnbaum LS. Comparative immunotoxic potency of mixtures containing polychlorinated dibenzo-p-dioxins (PCDDs), dibenzofurans (PCDFs) and biphenyls (PCBs). Society of Toxicology Annual Meeting; March 9-13, 1997; Cincinnati, OH: The Toxicologist; 1997. p. 266.
- 299. Menache MG, DeVito MJ, Graham RC, Birnbaum LS. An alternative approach for estimating relative potencies in the TEF methodology. Society of Toxicology Annual Meeting; March 9-13, 1997; Cincinnati, OH: The Toxicologist; 1997. p. 169.
- 300. Pollenz RS, Santostefano MJ, Birnbaum LS. The AH-receptor is rapidly depleted in the spleen, lung and thymus of rats following a single oral dose of TCDD. Society of Toxicology Annual Meeting; March 9-13, 1997; Cincinnati, OH: The Toxicologist; 1997. p. 242.
- 301. Birnbaum LS. Health effects of disinfection byproducts (DBPS). American Chemical Society (ACS) National Meeting; March 24-28, 1996; New Orleans, LA: Abstracts of Papers of the American Chemical Society (ACS); 1996. p. 6-CHAS.
- 302. DeVito MJ, Birnbaum LS. The use of body burdens vs daily dose in comparisons of endo- and exodioxins and in assessing human health risks. Dioxin Symposium; August 12-16, 1996; Amsterdam, Netherlands: Organohalogen Compounds; 1996. p. 424-9.
- 303. Van Birgelen APJM, DeVito MJ, Birnbaum LS. Toxic equivalency factors derived from cytochrome P450 induction in mice are predictive for cytochrome P450 induction after subchronic exposure to mixtures of PCDDs, PCDFs, and PCBs in female B6C3F1 mice and Sprague Dawley rats. Dioxin Symposium; August 12-16, 1996; Amsterdam, Netherlands: Organohalogen Compounds; 1996. p. 251-6.
- 304. Van Birgelen APJM, Diliberto JJ, DeVito MJ, Birnbaum LS. Tissue CYP1A1 activity reflects tissue 1,2,7,8-tetrachlorodibenzo-p-dioxin concentration. Dioxin Symposium; August 12-16, 1996; Amsterdam, Netherlands: Organohalogen Compounds; 1996. p. 439-42.
- 305. Van Birgelen APJM, Nix-Stevenson D, DeVito MJ, Diliberto JJ, Birnbaum LS. Synergistic effects on porphyrin metabolism in female B6C3F1 mice after subchronic exposure to mixtures of PCDDs, PCDFs, and PCBs. Dioxin Symposium; August 12-16, 1996; Amsterdam, Netherlands: Organohalogen Compounds; 1996. p. 300-5.
- 306. Wang X, Santostefano MJ, Evans MV, Richardson VM, Diliberto JJ, Birnbaum LS. Receptor incorporated physiologically-based pharmacokinetic model for TCDD distribution in rat. Dioxin Symposium; August 12-16, 1996; Amsterdam, Netherlands: Organohalogen Compounds; 1996. p. 389-93.
- 307. Hurst CH, DeVito MJ, Abbott BD, Birnbaum LS. Maternal and fetal disposition of TCDD in Long Evans rats. Dioxin Symposium; August 12-16, 1996; Amsterdam, Netherlands: Organohalogen Compounds; 1996. p. 339-42.
- 308. Santostefano MJ, Richardson VM, Birnbaum LS. In vivo regulation of the hepatic cytosolic Ah receptor (AhR) protein by TCDD. Dioxin Symposium; August 12-16, 1996; Amsterdam, Netherlands: Organohalogen Compounds; 1996. p. 430-3.

- 309. Birnbaum LS, Farland WH. Health risk assessment for dioxin and related chemicals: the U.S. EPA Approach. Dioxin Symposium; August 12-16, 1996; Amsterdam, Netherlands: Organohalogen Compounds; 1996. p. 279-81.
- 310. Johnson KL, Cummings AM, Birnbaum LS. Assessing the structure activity relationship of polyhalogenated aromatic hydrocarbons using endometriosis as an endpoint. Dioxin Symposium; August 12-16, 1996; Amsterdam, Netherlands: Organohalogen Compounds; 1996. p. 268-71.
- 311. Van Birgelen APJM, DeVito MJ, Birnbaum LS. Minimal interactive effects on induction of cytochrome P450 isozymes after co-administration of 2,3,7,8-tetrachlorodibenzo-p-dioxin and 2,2',4,4',5,5'-hexachlorobiphenyl in multiple tissue of female B6C3F1 mice. Federation of American Societies for Experimental Biology (FASEB) Annual Meeting; April 14-17, 1996; Washington, DC: Federation proceedings; 1996. p. 1028.
- 312. Jackson JA, Diliberto JJ, Birnbaum LS. Biliary elimination of 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) in rats involves sex-specific cytochrome P-450 metabolism and excretion of unchanged TCDD. Federation of American Societies for Experimental Biology (FASEB) Annual Meeting; April 14-17, 1996; Washington, DC: Federation proceedings; 1996. p. 1026.
- 313. Richardson VM, Santostefano MJ, Pollenz RS, Perdew GH, Birnbaum LS. Multiple tissue expression of AHR and ARNT proteins in rats exposed to TCDD. Federation of American Societies for Experimental Biology (FASEB) Annual Meeting; April 14-17, 1996; Washington, DC: Federation proceedings; 1996. p. 1027.
- 314. Santostefano MJ, Richardson VM, Birnbaum LS. In vivo regulation of the Ah receptor by TCDD. Society of Environmental Toxicology and Chemistry (SETAC) Annual Meeting; November 17-21, 1996; Washington, DC 1996. p. 294.
- 315. Van Birgelen A, Nix-Stevenson D, DeVito MJ, Diliberto JJ, Birnbaum LS. Synergism on porphyrin metabolism after mixture exposure to PCDD, PCDFs, and PCBs. Society of Environmental Toxicology and Chemistry (SETAC) Annual Meeting; November 17-21; Washington, DC Organohalogen Compounds; 1996. p. 300-5.
- 316. Wang X, Santostefano MJ, Evans MV, Birnbaum LS. Time-course of TCDD tissue distribution analyzed by a PBPK/PD model. Society of Environmental Toxicology and Chemistry (SETAC) Annual Meeting; November 17-21; Washington, DC1996. p. 16.
- 317. Whisnant NA, Santostefano MJ, Richardson V, Birnbaum LS. Tissue distribution of [3H]2,3,7,8-tetrachlorodibeno-p-dioxin (TCDD) in female Sprague-Dawley rats after acute exposure: Subcellular TCDD levels in hepatic and pulmonary tissues. Society of Toxicology Annual Meeting; March 10-14, 1996; Anaheim, CA: The Toxicologist; 1996. p. 156.
- 318. Van Birgelen APJM, Nix-Stevenson D, DeVito MJ, Birnbaum LS. Synergistic hepatic porphyrin accumulation and urinary porphyrin excretion after subchronic exposure to mixtures of PCDDs, PCDFs, and PCBs in mice. Society of Toxicology Annual Meeting; March 10-14, 1996; Anaheim, CA: The Toxicologist; 1996. p. 180.

- 319. Santostefano MJ, Whisnant NA, Richardson V, Perdew GH, Pollenz RS, Birnbaum LS. Subcellular disposition of [3H]2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) in the liver and kidneys of female Sprague-Dawley rats after acute exposure: role of CYP1A2. Society of Toxicology Annual Meeting; March 10-14, 1996; Anaheim, CA: The Toxicologist; 1996. p. 181.
- 320. Smialowicz RJ, DeVito MJ, Riddle MM, Williams WC, Birnbaum LS. Opposite effects of 2,2',4,4',5,5'-hexachlorobiphenyl (PCB153) and 2,3,7,8-TCDD on the antibody response to sheep red blood cells (SRBC) in mice. Society of Toxicology Annual Meeting; March 10-14, 1996; Anaheim, CA: The Toxicologist; 1996. p. 60.
- 321. DeVito MJ, Ross DG, Birnbaum LS. Disposition of PCBs in B6C3F1 mice following 13 weeks of exposure. Society of Toxicology Annual Meeting; March 10-14, 1996; Anaheim, CA: The Toxicologist; 1996. p. 180.
- 322. Hurst CH, DeVito MJ, Abbott BD, Birnbaum LS. 2,3,7,8-tetrachloro-dibenzo-p-dioxin (TCDD) in pregnant rats: distribution to maternal and fetal tissues. Society of Toxicology Annual Meeting; March 10-14, 1996; Anaheim, CA: The Toxicologist; 1996. p. 198.
- 323. Birnbaum LS. Update: The US EPA's Reassessment of Dioxin and Related Compounds. Dioxin Symposium; August 21-25, 1995; Edmonton, Canada: Organohalogen Compounds; 1995. p. 21-4.
- 324. Farland WH, Birnbaum LS, DeVito MJ. The United States Environmental Protection Agency (U.S.EPA) Approach to Evaluating Dioxin Health Risks: Critical Issues. Dioxin Symposium; August 21-25, 1995; Edmonton, Canada: Organohalogen Compounds; 1995. p. 475-8.
- 325. Santostefano MJ, Little KM, DeVito MJ, Diliberto JJ, Birnbaum LS. The role of CYP1A2 in localization of TCDD in subcellular fractions of rat and mouse tissues. Dioxin Symposium; August 21-25, 1995; Edmonton, Canada: Organohalogen Compounds; 1995. p. 203-6.
- 326. Van Birgelen APJM, DeVito MJ, Ross DG, Richardson VM, Birnbaum LS. Relative potencies derived from hepatic porphyrin accumulation following subchronic exposure of polychlorinated dibenzop-dioxins, dibenzofurans, or biphenyls in female B6C3F1 mice. Dioxin Symposium; August 21-25, 1995; Edmonton, Canada: Organohalogen Compounds; 1995. p. 1-6.
- 327. Smialowicz RJ, DeVito MJ, Riddle MM, Williams WC, Birnbaum LS. Opposite Effects of 2,2',4,4',5,5'-hexachlorobiphenyl and 2,3,7,8-tetrachlorodibenzo-p-dioxin on the splenic plaque-forming cell response to sheep red blood cells in female B6C3F1 mice. Dioxin Symposium; August 21-25, 1995; Edmonton, Canada: Organohalogen Compounds; 1995. p. 299-302.
- 328. Gray LE, Ostby JS, Wolf C, Miller DB, Kelce WR, Gordon CJ, Birnbaum LS. Functional developmental toxicity of low doses of 2,3,7,8-tetrachlorodibenzo-p-dioxin and a dioxin-like PCB (169) in Long Evans rats and Syrian hamsters: reproductive, behavioral and thermoregulatory alterations. Dioxin Symposium; August 21-25, 1995; Edmonton, Canada: Organohalogen Compounds; 1995. p. 33-8.
- 329. Cummings AM, Metcalf JL, Birnbaum LS. Effects of TCDD on the growth of endometriotic sites compared between rats and mice. Dioxin Symposium; August 21-25, 1995; Edmonton, Canada: Organohalogen Compounds; 1995. p. 225-9.

- 330. Abbott BD, Diliberto JJ, Birnbaum LS. Disposition of TCDD in pregnant C57BL/6N mice from 0.5 to 24 hours post-exposure. Dioxin Symposium; August 21-25, 1995; Edmonton, Canada: Organohalogen Compounds; 1995. p. 279-82.
- 331. DeVito MJ, Ross DR, Birnbaum LS. Disposition of PCDD/PCDF in mice. Dioxin Symposium; August 21-25, 1995; Edmonton, Canada: Organohalogen Compounds; 1995. p. 11-5.
- 332. Stahl BU, Viluksela M, Birnbaum LS, Rozman KK. Subchronic toxicity of a mixture of four chlorinated dibenzo-p-dioxins (CDDs) in Sprague-Dawley rats. Part II: Biochemical observations. Society of Toxicology Annual Meeting; March 5-9, 1995; Baltimore, MD: The Toxicologist; 1995. p. 67.
- 333. Viluksela M, Stahl BU, Birnbaum LS, Rozman KK. Subchronic toxicity of a mixture of four chlorinated dibenzo-p-dioxins (CDDs) in Sprague-Dawley rats. Part I: Study design and general observations. Society of Toxicology Annual Meeting; March 5-9, 1995; Baltimore, MD: The Toxicologist; 1995. p. 68.
- 334. Diliberto JJ, DeVito MJ, Ross DG, Little KM, Jackson JA, Birnbaum LS. Subchronic disposition of 2,3,7,8-tetrachloro-dibenzo-p-dioxin (TCDD) in mice. Society of Toxicology Annual Meeting; March 5-9, 1995; Baltimore, MD: The Toxicologist; 1995. p. 68.
- 335. Little KM, Diliberto JJ, DeVito MJ, Ross DG, Birnbaum LS. Subcellular distribution of 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) in mice. Society of Toxicology Annual Meeting; March 5-9, 1995; Baltimore, MD: The Toxicologist; 1995. p. 68.
- 336. Batra R, DeVito MJ, Andersen ME, Birnbaum LS. A physiologically-based pharmacokinetic (PB-PK) Model for TCDD in C57BL/6J mice. Society of Toxicology Annual Meeting; March 5-9, 1995; Baltimore, MD: The Toxicologist; 1995. p. 272.
- 337. Andersen ME, Eklund CR, Mills JJ, Birnbaum LS. A pharmacokinetic/ pharmacodynamic model for the regional induction of hepatic cytochrome P450 isoforms by TCDD. Society of Toxicology Annual Meeting; March 5-9, 1995; Baltimore, MD: The Toxicologist; 1995. p. 271.
- 338. Jackson JA, Diliberto JJ, DeVito MJ, Ross DG, Little KM, Birnbaum LS. Elimination profiles in a subchronic study of 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) in mice. Society of Toxicology Annual Meeting; March 5-9, 1995; Baltimore, MD: The Toxicologist; 1995. p. 68.
- 339. DeVito MJ, Gasiewicz TA, Farland W, Birnbaum LS. Comparisons of body burdens in humans and experimental animals exposed to dioxins. Society of Toxicology Annual Meeting; March 5-9, 1995; Baltimore, MD: The Toxicologist; 1995. p. 142.
- 340. Ross DG, DeVito MJ, Diliberto JJ, Birnbaum LS. Comparison of relative potency of tissue dose vs. administered dose of PCBs in the mouse. Society of Toxicology Annual Meeting; March 5-9, 1995; Baltimore, MD: The Toxicologist; 1995. p. 142.
- 341. Bull RJ, Birnbaum LS. Chlorination: essential process or cancer hazard? Introduction. . Society of Toxicology Annual Meeting; March 5-9, 1995; Baltimore, MD: The Toxicologist; 1995. p. 213.

- 342. Hurst CH, DeVito MJ, Ross DG, Diliberto JJ, Birnbaum LS. Additive interactions of mixtures containing polychlorinated dibenzo-p-dioxins (PCDD), dibenzo furans (PCDF) and biphenyls (PCB). Society of Toxicology Annual Meeting; March 5-9, 1995; Baltimore, MD: The Toxicologist; 1995. p. 63.
- 343. Stahl BU, Viluksela M, Diliberto JJ, Birnbaum LS, Rozman KK. Subchronic (13 week) toxicity of a mixture of four chlorinated dibenzo-p-dioxins in Sprague-Dawley rats. Dioxin Symposium; November 21-25, 1994; Kyoto, Japan: Organohalogen Compounds; 1994. p. 341-4.
- 344. Stahl BU, Viluksela M, Diliberto JJ, Birnbaum LS, Rozman KK. Status of Dioxin-Related Activities at the United States Environmental Protection Agency (U.S. EPA). Dioxin Symposium; November 21-25, 1994; Kyoto, Japan: Organohalogen Compounds; 1994. p. 559-62.
- 345. Diliberto JJ, DeVito MJ, Ross DG, Little K, Birnbaum LS. Relationship of steady-state exposure and pharmacokinetics of [3H]2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) in the female mouse. Dioxin Symposium; November 21-25, 1994; Kyoto, Japan: Organohalogen Compounds; 1994. p. 235-8.
- 346. Batra R, Andersen ME, Birnbaum LS. Physiologically-based pharmacokinetic model for TCDD in in C57BL/6J mice. Dioxin Symposium; November 21-25, 1994; Kyoto, Japan: Organohalogen Compounds; 1994. p. 399-403.
- 347. Birnbaum LS. Re-evaluation of dioxin. Great Lakes Water Quality Board Meeting; July 15, 1993; Chicago, IL: International Joint Commission (IJC) Digital Archive; 1994. p. 1-19.
- 348. Diliberto JJ, DeVito MJ, Ross DG, Little KM, Birnbaum LS. Subchronic pharmacokinetic study of [3H]2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) in the mouse. International Society for the Study of Xenobiotics (ISSX) Annual Conference; October 23-27; Raleigh, NC International Society for the Study of Xenobiotics (ISSX) Proceedings; 1994.
- 349. DeVito MJ, Beebe LE, Birnbaum LS. Sex differences in induction of CYP1A1 and CYP1A2 Activity by TCDD in Fisher 344 Rats. Society of Toxicology Annual Meeting; March 13-17, 1994; Dallas, TX: The Toxicologist; 1994. p. 383.
- 350. Batra R, DeVito MJ, Birnbaum LS. Role of Ah receptor in the induction of cytochrome P450 1A1 and 1A2 enzymes in response to TCDD exposure. Society of Toxicology Annual Meeting; March 13-17, 1994; Dallas, TX: The Toxicologist; 1994. p. 408.
- 351. Ross DG, DeVito MJ, Birnbaum LS. Relative induction potency of polychlorinated biphenyls (PCBs) and TCDD in mouse liver, lung and skin. Society of Toxicology Annual Meeting; March 13-17, 1994; Dallas, TX: The Toxicologist; 1994. p. 278.
- 352. Jackson JA, Diliberto JJ, Birnbaum LS. Modulation of cytochrome P-450 isozymes in male F344 rats does not alter the biliary excretion of 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD). Society of Toxicology Annual Meeting; March 13-17, 1994; Dallas, TX: The Toxicologist; 1994. p. 273.
- 353. Reed BM, Diliberto JJ, Pegram R, Moore TC, Jackson JA, Birnbaum LS. Effect of age and dose on TCDD disposition in mice. Society of Toxicology Annual Meeting; March 13-17, 1994; Dallas, TX: The Toxicologist; 1994. p. 273.

- 354. Abbott BD, Perdew GH, Birnbaum LS. Ah receptor expression in embryonic C57BL/6N mouse from gestation day 10 to 16. Society of Toxicology Annual Meeting; March 13-17, 1994; Dallas, TX: The Toxicologist; 1994. p. 269.
- 355. Gray LE, Ostby JS, Marshall R, Kelce WR, Monosson E, Miller DB, Birnbaum LS. 2,3,7,8-TCDD alters sex differentiation in female and male Syrian hamsters (H) and LE hooded rats [®]. Society of Toxicology Annual Meeting; March 13-17, 1994; Dallas, TX: The Toxicologist; 1994. p. 382.
- 356. Birnbaum LS. Mechanisms of dioxin toxicity: Implications for risk assessment. American Association for the Advancement of Science (AAAS) Annual Meeting; February 11-16, 1993; Boston, MA American Association for the Advancement of Science (AAAS); 1993. p. 132-3.
- 357. Birnbaum LS, Cook PM, Farland W, Preuss PW, Schaum JC. The U.S. EPA's scientific reassessment of the risks of exposure to dioxin. Dioxin Symposium; September 20-24, 1993; Vienna, Austria: Organohalogen Compounds; 1993. p. 1-4.
- 358. Andersen ME, Birnbaum LS, Conolly RB, Mills JJ. Tumor promotion, growth factors and dioxin risk assessments. Dioxin Symposium; September 20-24, 1993; Vienna, Austria: Organohalogen Compounds; 1993. p. 31-4.
- 359. Gray LE, Ostby JS, Kelce WR, Marshall R, Diliberto JJ, Birnbaum LS. Perinatal TCDD exposure alters sex differentiation in both female and male LE hooded rats. Dioxin Symposium; September 20-24, 1993; Vienna, Austria: Organohalogen Compounds; 1993. p. 337-40.
- 360. Rozman KK, Stahl BU, Viluksela M, Birnbaum LS. Multiple Dose (Subchronic) Toxicity of Heptachlorodibenzo-p-dioxin. Dioxin Symposium; September 20-24, 1993; Vienna, Austria: Organohalogen Compounds; 1993. p. 133-6.
- 361. Diliberto JJ, Akubue PI, Luebke RW, Birnbaum LS. Dose-and time-dependent tissue distribution and induction of CYP1A1 and CYP1A2 in female B6C3F1 mice following acute exposure to [3H]TCDD. Dioxin Symposium; September 20-24, 1993; Vienna, Austria: Organohalogen Compounds; 1993. p. 233-6.
- 362. Birnbaum LS, Ross DG, DeVito MJ. Dose response relationships for EROD induction in liver, lung and skin for dioxin and dibenzofurans. Dioxin Symposium; September 20-24, 1993; Vienna, Austria: Organohalogen Compounds; 1993. p. 237-40.
- 363. Abbott BD, Perdew GH, Diliberto JJ, Birnbaum LS. Ah receptor expression in embryonic palate exposed to TCDD. Dioxin Symposium; September 20-24, 1993; Vienna, Austria: Organohalogen Compounds; 1993. p. 333-6.
- 364. Abbott B, Diliberto JJ, Birnbaum LS. TCDD alters expression of glucocorticoid receptor in embryonic mouse palate. Society of Toxicology Annual Meeting; March 14-18, 1993; New Orleans, LA: The Toxicologist; 1993. p. 103.
- 365. Andersen ME, Mills JJ, Birnbaum LS, Conolly RB. Stochastic dose-response modeling of hepatic promotion by dioxin. Society of Toxicology Annual Meeting; March 14-18, 1993; New Orleans, LA: The Toxicologist; 1993. p. 196.

- 366. Hebert CD, DeVito MJ, Birnbaum LS. Relative toxicity and enzyme-inducing potency of 2-chlorinated axo(xy)benzene compounds and TCDD. Society of Toxicology Annual Meeting; March 14-18, 1993; New Orleans, LA: The Toxicologist; 1993. p. 193.
- 367. Luebke RW, Copeland CB, Andrews DL, Diliberto JJ, Akubue PI, Birnbaum LS. Effects of TCDD exposure on resistance to T. Spiralis infection in mice. Society of Toxicology Annual Meeting; March 14-18, 1993; New Orleans, LA: The Toxicologist; 1993. p. 100.
- 368. Connor K, Narasimhan TR, Fernandes P, Safe L, Birnbaum LS, Menache M, Safe S. Dose-response induction of CYP1A1 gene expression by 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) in the Fischer 344 rat. Society of Toxicology Annual Meeting; March 14-18, 1993; New Orleans, LA: The Toxicologist; 1993. p. 192.
- 369. Diliberto JJ, Akubue PI, Jackson JA, Luebke RW, Copeland CB, Birnbaum LS. Dose-dependent tissue distribution of 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) in mice. Society of Toxicology Annual Meeting; March 14-18, 1993; New Orleans, LA: The Toxicologist; 1993. p. 195.
- 370. Jackson JA, Diliberto JJ, Birnbaum LS. Dermal absorption and disposition of 3,4,3',4'-tetrachlorobiphenyl (TCB) in male F344 rats. Society of Toxicology Annual Meeting; March 14-18, 1993; New Orleans, LA: The Toxicologist; 1993. p. 362.
- 371. Birnbaum LS, DeVito MJ. Comparative induction of EROD activity by TCDD and TCDF following 4 or 13 weeks of treatment. Society of Toxicology Annual Meeting; March 14-18, 1993; New Orleans, LA: The Toxicologist; 1993. p. 274.
- 372. DeVito MJ, Diliberto JJ, Ma X, Babish JG, Birnbaum LS. Comparative ability to induce CYP1A1 and 1A2 activity and protein tyrosine phosphorylation. Society of Toxicology Annual Meeting; March 14-18, 1993; New Orleans, LA: The Toxicologist; 1993. p. 192.
- 373. Ross DG, DeVito MJ, Diliberto JJ, Birnbaum LS. Comparative ability of 1.2.3.7,8-pentachlorodibenzo-p-dioxin to induce EROD activity in liver, lung and skin. Society of Toxicology Annual Meeting; March 14-18, 1993; New Orleans, LA: The Toxicologist; 1993. p. 192.
- 374. Abbott BD, Diliberto JJ, Birnbaum LS. Glucocorticoid receptor involvement in embryonic mouse palatal response to TCDD and hydrocortisone. American Society for Cell Biology (ASCB) Annual Meeting; November 15-19, 1992; Denver, CO: Molecular Biology of the Cell; 1992. p. A143-A.
- 375. Mills JJ, Kedderis LB, Birnbaum LS, Andersen ME. Toxicokinetics of 2,3,7,8-TCDD (dioxin) and related compounds. Dioxin Symposium; August 24-28, 1992; Tampere, Finland: Organohalogen Compounds; 1992. p. 153-6.
- 376. Kedderis LB, Mills JJ, Anderson ME, Birnbaum LS. A physiologically based pharmacokinetic model for 2,3,7,8-tetrabromodibenzo-p-dioxin (TBDD) in the rat. Dioxin Symposium; August 24-28, 1992; Tampere, Finland: Organohalogen Compounds; 1992. p. 113-6.
- 377. Birnbaum LS. EPA's reassessment of dioxin risk: directed health research. Dioxin Symposium; August 24-28, 1992; Tampere, Finland: Organohalogen Compounds; 1992. p. 287-90.

- 378. Diliberto JJ, Jackson JA, Birnbaum LS. Effects of exposure route on absorption, distribution, and elimination of 3HTCDD in rats. Dioxin Symposium; August 24-28, 1992; Tampere, Finland: Organohalogen Compounds; 1992. p. 45-8.
- 379. DeVito MJ, Diliberto JJ, Birnbaum LS. Comparative ability of TCDD to induced hepatic and skin cytochrome P450 1A1 activity following 13 weeks of treatment. Dioxin Symposium; August 24-28, 1992; Tampere, Finland: Organohalogen Compounds; 1992. p. 41-4.
- 380. Birnbaum LS. The mechanism of dioxin toxicity: relationship to risk assessment. International Society for the Study of Xenobiotics (ISSX); July 3-6, 1992; Bologna, Italy1992. p. 157-67.
- 381. Birnbaum L. Role of toxicokinetics in the design and interpretation of risk assessment studies. International Society for the Study of Xenobiotics (ISSX) Annual Meeting; July 3-6, 1992; Bologna, Italy: International Society for the Study of xenobiotics; 1992. p. 123.
- 382. Abbott BD, Diliberto JJ, Birnbaum LS. Mechanisms of TCDD-induction of cleft palate: insights from invivo and invitro approaches. International Symposium on Chlorinated Dioxins and Related Compounds; September 23-27, 1991; Research Triangle Park, NC: Chemosphere; 1992. p. 75-8.
- 383. Henderson RF, Sabourin PJ, Muggenburg BA, Couch RC, Birnbaum LS, Lucier GW. Metabolism of benzene by nonhuman primates. Society of Toxicology Annual Meeting; February 23-27, 1992; Seattle, WA: The Toxicologist; 1992. p. 219.
- 384. Hughes MF, Fisher HL, Birnbaum LS, Hall LL. In vitro dermal absorption of p-substituted phenols in mice: effect of age. Society of Toxicology Annual Meeting; February 23-27, 1992; Seattle, WA: The Toxicologist; 1992. p. 113.
- 385. Jackson JA, Diliberto JJ, Birnbaum LS. Estimation of octanol-water partition coefficients and correlation with dermal absorption for several polyhalogenated dibenzo-p-dioxins and dibenzofurans. Society of Toxicology Annual Meeting; February 23-27, 1992; Seattle, WA: The Toxicologist; 1992. p. 116.
- 386. Diliberto JJ, Jackson JA, Birnbaum LS. Disposition and absorption of intratracheal, oral, and intravenous 3HTCDD in male Fischer rats. Society of Toxicology Annual Meeting; February 23-27, 1992; Seattle, WA: The Toxicologist; 1992. p. 79.
- 387. Pegram RA, Diliberto JJ, Leavans TL, Gao P, Birnbaum LS. Comparative induction of cytochrome P4501A1 by 2,3,7,8-tetrachlorodibenzo-p-dioxins (TCDD) and tissue distribution of TCDD in young and senescent C57BL/6N mice. Society of Toxicology Annual Meeting; February 23-27, 1992; Seattle, WA: The Toxicologist; 1992. p. 78.
- 388. Kedderis L, Birnbaum LS. Biliary excretion and hepatic disposition of TCDD in rats. Society of Toxicology Annual Meeting; February 23-27, 1992; Seattle, WA: The Toxicologist; 1992. p. 78.
- 389. McKinley MK, Kedderis LB, Birnbaum LS. 2,3,7,8-tetrachlorodibenzo dioxin (TCDD) pretreatment of male fischer rats alters the hepatic metabolism of 3,3'4,4'-tetrachlorobiphenyl (TCB). Society of Toxicology Annual Meeting; February 23-27, 1992; Seattle, WA: The Toxicologist; 1992. p. 65.

- 390. Kedderis LB, Diliberto JJ, Jackson JA, Linko P, Goldstein JA, Birnbaum LS. Effects of dose and route of exposure on dioxin disposition. International Symposium on Chlorinated Dioxins and Related Compounds; September 23-27, 1991; Research Triangle Park, NC: Chemosphere; 1991. p. 7-10.
- 391. Badr MZ, Birnbaum LS. Selective induction of peroxisomal enzyme activities by perfluorooctanoic acid (PFOA) in aged rats. Society of Toxicology Annual Meeting; February 12-16, 1990; Miami Beach, FL: The Toxicologist; 1991. p. 187.
- 392. Banks YB, Birnbaum LS. Kinetics of 2,3,7,8-Tetrachlorodibenzofuran (TCDF) after low dose dermal exposure. Society of Toxicology Annual Meeting; February 12-16, 1990; Miami Beach, FL: The Toxicologist; 1991. p. 270.
- 393. Shyr LJ, Sabourin PJ, Medinsky MA, Birnbaum LS, Henderson RF. The development of a physiologically based pharmacokinetic model for 2-butoxyethanol metabolism rats following different routes of exposure. Society of Toxicology Annual Meeting; February 12-16, 1990; Miami Beach, FL: The Toxicologist; 1991. p. 35.
- 394. Jackson JA, Diliberto JJ, Kedderis LB, Birnbaum LS. Dermal absorption and disposition of 2,3,7,8-tetrabromodibenzo-p-dioxin (TBDD) in rats. Society of Toxicology Annual Meeting; February 12-16, 1990; Miami Beach, FL: The Toxicologist; 1991. p. 270.
- 395. Kedderis LB, Diliberto JJ, Birnbaum LS. Biliary excretion of 2,3,7,8-tetrabromodibenzo-p-dioxin (TBDD) and 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) metabolites in rats. Society of Toxicology Annual Meeting; February 12-16, 1990; Miami Beach, FL: The Toxicologist; 1991. p. 272.
- 396. McMahon TF, Birnbaum LS. Age-related changes in disposition and metabolism in benzene in male C57BL/CN mice. Society of Toxicology Annual Meeting; February 12-16, 1990; Miami Beach, FL: The Toxicologist; 1991. p. 92.
- 397. Medinsky MA, McMahon TF, Birnbaum LS. Age-related changes in benzene metabolism in C57BL/6N mice described by a physiologically based pharmacokinetic model. Society of Toxicology Annual Meeting; February 12-16, 1990; Miami Beach, FL: The Toxicologist; 1991. p. 181.
- 398. Diliberto JJ, Jackson JA, Birnbaum LS. Acute pulmonary absorption of 2,3,7,8-tetrabromodibenzo-p-dioxin (TBDD) in rats. Society of Toxicology Annual Meeting; February 12-16, 1990; Miami Beach, FL: The Toxicologist; 1991. p. 272.
- 399. Abbott B, Birnbaum LS. TGF-β1 & EGF expression increases in palatal epithelia exposed to hydrocortisone (HC) and HC + TCDD. American Society for Cell Biology Annual Meeting; December 9-13, 1990; San Diego, CA: Journal of Cell Biology; 1990. p. 348a.
- 400. Abbott BD, Birnbaum LS. Interspecies sensitivity to TCDD examined with embryonic palatal organ culture. Dioxin Symposium; September 10-14, 1990; Bayreuth, Germany: Organohalogen Compounds; 1990. p. 165-7.
- 401. Diliberto JJ, Kedderis LB, Birnbaum LS. Acute oral exposure to 2,3,7,8-tetrabromodibenzo-p-dioxin (TBDD). Dioxin Symposium; September 10-14, 1990; Bayreuth, Germany: Organohalogen Compounds; 1990. p. 309-11.

- 402. Hebert CD, Birnbaum LS. Role of transforming growth factor-β in TCDD changes in growth of epithelial cells. Society of Toxicology Annual Meeting; February 12-16, 1990; Miami Beach, FL: The Toxicologist; 1990. p. 312.
- 403. Couture LA, Harris MW, Clark AM, Birnbaum LS. Persistence of hydronephrosis in mice following in utero and/or lactational exposure to 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD). Society of Toxicology Annual Meeting; February 12-16, 1990; Miami Beach, FL: The Toxicologist; 1990. p. 313.
- 404. Freeman GB, Trejo R, Hejtmancik MR, Peters AC, Kurtz P, Birnbaum LS. Neurobehavioral evaluation of exposure to 4,4'-thiobis-(6-t-butyl-m-cresol) in Fischer 344 rats. Society of Toxicology Annual Meeting; February 12-16, 1990; Miami Beach, FL: The Toxicologist; 1990. p. 304.
- 405. Jackson JA, Banks YB, Birnbaum LS. Maximum dermal absorption of TCDD occurs in weanling rats. Society of Toxicology Annual Meeting; February 12-16, 1990; Miami Beach, FL: The Toxicologist; 1990. p. 309.
- 406. Monteiro-Riviere NA, Banks YB, Birnbaum LS. Laser doppler measurements of cutaneous blood flow in aging mice and rats. Society of Toxicology Annual Meeting; February 12-16, 1990; Miami Beach, FL: The Toxicologist; 1990. p. 151.
- 407. Abbott BD, Birnbaum LS. Interspecies sensitivity to TCDD examined using embryonic palatal organ culture. Society of Toxicology Annual Meeting; February 12-16, 1990; Miami Beach, FL: The Toxicologist; 1990. p. 314.
- 408. Banks YB, Birnbaum LS. Finite dermal absorption after low dose TCDD exposure. Society of Toxicology Annual Meeting; February 12-16, 1990; Miami Beach, FL: The Toxicologist; 1990. p. 309.
- 409. Stefanski SA, McMahon TF, Wilson RE, Blair PC, Clark AM, Birnbaum LS. Enzymuria as an indicator of toxicity after administration of salicylic acid (SAL), 2,3-dihydroxybenzoic acid (2,3-DiOH) and 2,5-dihydroxybenzoic acid. Society of Toxicology Annual Meeting; February 12-16, 1990; Miami Beach, FL: The Toxicologist; 1990. p. 268.
- 410. Kedderis LB, Diliberto JJ, Birnbaum LS. Disposition of intravenous 2,3,7,8-tetrabromodibenzodioxin (TBDD) in rats. Society of Toxicology Annual Meeting; February 12-16, 1990; Miami Beach, FL: The Toxicologist; 1990. p. 310.
- 411. Henderson RF, Bond JA, Bechtold WE, Sun JD, Birnbaum LS, Dahl AR, Medinsky MA. Disposition of inhaled isoprene in B6C3Fl mice. Society of Toxicology Annual Meeting; February 12-16, 1990; Miami Beach, FL: The Toxicologist; 1990. p. 216.
- 412. Harris MW, Allen JD, Haskins EA, Morrissey RM, Birnbaum LS. Developmental toxicity of brominated dibenzodioxin and furans in mice. Society of Toxicology Annual Meeting; February 12-16, 1990; Miami Beach, FL: The Toxicologist; 1990. p. 313.
- 413. Bechtold WE, Lucier GW, Birnbaum LS, Yin SN, Li GL, Henderson RF. Determination of muconic acid in the urine of workers occupationally exposed to benzene as a biological exposure index. Society of Toxicology Annual Meeting; February 12-16, 1990; Miami Beach, FL: The Toxicologist; 1990. p. 280.

- 414. Sabourin PJ, Medinsky MA, Birnbaum LS, Thurmond F, Henderson RF. Dermal absorption and disposition of methoxy- (ME), ethoxy- (EE), and butoxy[U-14C] ethanol (BE). Society of Toxicology Annual Meeting; February 12-16, 1990; Miami Beach, FL: The Toxicologist; 1990. p. 236.
- 415. Lin FH, Clark G, Stohs S, Birnbaum LS, Lucier G, Goldstein JA. The Ah locus mediates the effects of 2,3,7,8- tetrachlorodibenzo-p-dioxin (TCDD) on epidermal growth factor receptor (EGFR) binding through a mechanism which does not involve EGFR in RNA. Society of Toxicology Annual Meeting; February 12-16, 1990; Miami Beach, FL: The Toxicologist; 1990. p. 31.
- 416. Birnbaum LS, McMahon TF, Diliberto JJ. Age-related changes in metabolism and disposition of salicylic acid (SAL) in male Fischer 344 rats. Society of Toxicology Annual Meeting; February 12-16, 1990; Miami Beach, FL: The Toxicologist; 1990. p. 238.
- 417. McMahon TF, Birnbaum LS. Age-related changes in biotransformation and toxicity of potassium cyanide (KCN) in male C57BL/6N mice. Society of Toxicology Annual Meeting; February 12-16, 1990; Miami Beach, FL: The Toxicologist; 1990. p. 326.
- 418. Diliberto JJ, Kedderis LB, Birnbaum LS. Absorption of 2,3,7,8-tetrabromodibenzodioxin (TBDD) in male rats. Society of Toxicology Annual Meeting; February 12-16, 1990; Miami Beach, FL: The Toxicologist; 1990. p. 54.
- 419. Birnbaum LS. Metabolism of xenobiotics in aging & carcinogenesis. World Cancer Congress; August 16-22, 1990; Hamburg, Germany: Union for International Cancer Control (UICC) 1990. p. 1055.
- 420. McMahon TF, Diliberto JJ, Birnbaum LS. Age related changes in metabolism and disposition of salicylic acid (SAL) in male Fischer 344 rats. American Aging Association (AGE) Annual Meeting; October 4-7, 1989; Washington, DC: GeroScience; 1989. p. 147.
- 421. Abbott BD, Birnbaum LS. Effects of retinoic acid on $TGF\alpha$ and $TGF\beta$ in embryonic palatal cells varies with developmental stage. American Society for Cell Biology Annual Meeting; November 5-9, 1989; Houston, TX: Journal of Cell Biology; 1989. p. 245s.
- 422. Sabourin PJ, Sun JD, Birnbaum LS, Lucier G, Henderson RF. Effect of repeated benzene inhalation exposures on subsequent metabolism of benzene. Experimental pathology1989. p. 155-7.
- 423. Harris MW, Stocking LM, Morrissey RE, Clark AM, Birnbaum LS. TCDD and Retinoic Acid (RA) interact synergistically in Cleft Palate (CP) induction in mice. Society of Toxicology Annual Meeting; February 27-March 3, 1989; Atlanta, GA: The Toxicologist; 1989. p. 116.
- 424. Abbott BD, Diliberto JJ, Birnbaum LS. TCDD alters embryonic palatal cell differentiation in vitro. Society of Toxicology Annual Meeting; February 27-March 3, 1989; Atlanta, GA: The Toxicologist; 1989. p. 33.
- 425. Lin FH, Stohs S, Birnbaum LS, Clark G, Lucier GW, Goldstein JA. Role of the Ah locus in the regulation of the effects of 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) on epidermal growth factor (EGFR), glucocorticoid (GCR), and estrogen (ER) receptors in mouse liver. Society of Toxicology Annual Meeting; February 27-March 3, 1989; Atlanta, GA: The Toxicologist; 1989. p. 116.

- 426. Sun JD, Dahl AR, Bond JA, Birnbaum LS, Henderson RF. Metabolism of inhaled butadiene in monkeys: comparison to rodents. Society of Toxicology Annual Meeting; February 27-March 3, 1989; Atlanta, GA: The Toxicologist; 1989. p. 284.
- 427. Diliberto JJ, Srinivas P, Burka LT, Birnbaum LS. In vivo metabolism of Cis and Trans 3,7-dimethyl-2,6-octadienal (Citral) in rats. Society of Toxicology Annual Meeting; February 27-March 3, 1989; Atlanta, GA: The Toxicologist; 1989. p. 87.
- 428. Henderson RF, Sun JD, Dahl AR, Sabourin PJ, Bond JA, Lucier GW, Birnbaum LS. Hemoglobin adducts reflect exposure but not toxicity in rodents treated with butadiene, isoprene, or benzene. Society of Toxicology Annual Meeting; February 27-March 3, 1989; Atlanta, GA: The Toxicologist; 1989. p. 281.
- 429. Sabourin PJ, Sun JD, Birnbaum LS, Lucier GW, Henderson RF. Effect of repeated benzene inhalation exposures on subsequent metabolism of benzene. Society of Toxicology Annual Meeting; February 27-March 3, 1989; Atlanta, GA: The Toxicologist; 1989. p. 282.
- 430. Medinsky MA, Singh G, Bechtold WE, Bond JA, Sabourin PJ, Birnbaum LS, Henderson RF. Disposition of three glycol administered in drinking water to male F344/N rats. Society of Toxicology Annual Meeting; February 27-March 3, 1989; Atlanta, GA: The Toxicologist; 1989. p. 85.
- 431. Hebert CD, Harris MW, Elwell MR, Birnbaum LS. Comparative toxicity of chlorinated dibenzodioxins and dibenzofurans. Society of Toxicology Annual Meeting; February 27-March 3, 1989; Atlanta, GA: The Toxicologist; 1989. p. 117.
- 432. Hejtmancik MR, Ryan M, Peters AC, Birnbaum LS. Chronic toxicity studies of o-benzyl-p-chlorophenol in F344 rats and B6C3Fl mice. Society of Toxicology Annual Meeting; February 27-March 3, 1989; Atlanta, GA: The Toxicologist; 1989. p. 211.
- 433. Couture LA, Harris MW, Birnbaum LS. Characterization of TCDD-induced hydronephrosis relative to cleft palate in C57BL/6N mice. Society of Toxicology Annual Meeting; February 27-March 3, 1989; Atlanta, GA: The Toxicologist; 1989. p. 117.
- 434. Stohs SJ, Abbott BD, Lin FS, Birnbaum LS. Biochemical effects of TCDD in skin and liver of HRS/J mice. Society of Toxicology Annual Meeting; February 27-March 3, 1989; Atlanta, GA: The Toxicologist; 1989. p. 117.
- 435. Banks YB, Brewster DW, Birnbaum LS. Age-related changes in dermal absorption of TCDD and 2,3,4,7,8-pentachlorodibenzofuran (4PeCDF). Society of Toxicology Annual Meeting; February 27-March 3, 1989; Atlanta, GA: The Toxicologist; 1989. p. 118.
- 436. McMahon TF, Diliberto JJ, Birnbaum LS. Age related changes in disposition of benzyl acetate (BA): a model compound for glycine conjugation. Society of Toxicology Annual Meeting; February 27-March 3, 1989; Atlanta, GA: The Toxicologist; 1989. p. 88.
- 437. Hebert CD, Birnbaum LS. Response of human squamous-cell carcinoma-cells to transforming growth-factor beta (TGF-beta). Federation of American Societies for Experimental Biology (FASEB) Annual Meeting; May 1-5, 1988; Las Vegas, NV: Federation proceedings; 1988. p. A1009.

- 438. Lin FS, Stohs S, Birnbaum LS, Lucier GW, Goldstein JA. Decreases in hepatic glucocorticoid (GCR) and epidermal growth-factor (EGF) receptor-binding in mouse-liver after treatment with 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD). Federation of American Societies for Experimental Biology (FASEB) Annual Meeting; May 1-5, 1988; Las Vegas, NV: Federation proceedings; 1988. p. A375.
- 439. Abbott BD, Birnbaum LS. Mechanism of TCDD-induced ureteric epithelial hyperplasia. Joint Meeting of the American Society for Cell Biology and the American Society for Biochemistry and Molecular Biology; January 29 February 2, 1989; San Francisco, CA: Journal of Cell Biology; 1988. p. 696a.
- 440. Brewster DW, Harris MW, Birnbaum LS. Toxicity of perfluorodecanoic acid (PFDA) is unlike that of TCDD. Society of Toxicology Annual Meeting; February 15-19, 1988; Dallas, TX: The Toxicologist; 1988. p. 99.
- 441. Harris M, Birnbaum LS. Teratologic evaluation of perfluorodecanoic acid (PFDA) in C57BL/6N mice. Society of Toxicology Annual Meeting; February 15-19, 1988; Dallas, TX: The Toxicologist; 1988. p. 99.
- 442. Couture LA, Harris MW, Birnbaum LS. Teratogenicity of 2,3,4,7,8-pentachlorodibenzofuran (4-PeCDF) in F344 rats. Society of Toxicology Annual Meeting; February 15-19, 1988; Dallas, TX: The Toxicologist; 1988. p. 98.
- 443. Birnbaum LS, Harris MW, Morrissey RE. Selective enhancement of teratogenicity in mice by TCDD and vitamin A (RA). Society of Toxicology Annual Meeting; February 15-19, 1988; Dallas, TX: The Toxicologist; 1988. p. 90.
- 444. Sabourin PJ, Birnbaum LS, Lucier GW, Henderson RF. Metabolism of 3H-benzene in F344/N rats and B6C3F mice: species and dose effect. Society of Toxicology Annual Meeting; February 15-19, 1988; Dallas, TX: The Toxicologist; 1988. p. 70.
- 445. Medinsky MA, Sabourin PJ, Henderson RF, Lucier GW, Birnbaum LS. Insight into the interspecies differences in benzene toxicity provided by a physiological model. Society of Toxicology Annual Meeting; February 15-19, 1988; Dallas, TX: The Toxicologist; 1988. p. 156.
- 446. Hejtmancik MR, Ryan M, Peters AC, Eastin WC, Birnbaum LS. Dermal initiation/promotion study of o-benzyl-p-chlorophenol in Swiss CD-l mice. Society of Toxicology Annual Meeting; February 15-19, 1988; Dallas, TX: The Toxicologist; 1988. p. 161.
- 447. Banks-Case YB, Brewster DW, Birnbaum LS. Dermal absorption of polychlorinated dibenzofurans (PCDFs) and TCDD. Society of Toxicology Annual Meeting; February 15-19, 1988; Dallas, TX: The Toxicologist; 1988. p. 124.
- 448. Sun JD, Dahl AR, Bond JA, Henderson RF, Birnbaum LS. Characterization of 14C-Butadiene adduct formation to hemoglobin in mice and rats. Society of Toxicology Annual Meeting; February 15-19, 1988; Dallas, TX: The Toxicologist; 1988. p. 215.
- 449. Diliberto JJ, Usha G, Burka LT, Birnbaum LS. Biotransformation of citral in rats. Society of Toxicology Annual Meeting; February 15-19, 1988; Dallas, TX: The Toxicologist; 1988. p. 208.

- 450. Abbott BD, Birnbaum LS. TCDD and Retinoic Acid Both Alter Epithelial EGF Receptor Expression During Palatogenesis. Teratology Society Annual Meeting; June 12-15, 1988; Palm Beach, FL: Teratology; 1988. p. 443.
- 451. Birnbaum LS, Harris MW, Morrissey RE. Teratogenicity of polychlorinated dibenzofurans (PCDFs) in mice. Conference Commemorating the Twentieth Anniversary of the National Institute of Environmental Health Sciences (NIEHS) and the Centennial of the National Institutes of Health (NIH); December 3-5, 1986; Research Triangle Park, NC: Environmental Health Perspectives; 1987. p. 147.
- 452. Borghoff SJ, Birnbaum LS. Glucuronidation changes with age measured both in vivo and in vitro using 4,4'-thiobis(6-tert-butyl-meta-cresol) as a model-compound. Conference Commemorating the Twentieth Anniversary of the National Institute of Environmental Health Sciences (NIEHS) and the Centennial of the National Institutes of Health (NIH); December 3-5, 1986; Research Triangle Park, NC: Environmental Health Perspectives; 1987. p. 147.
- 453. Brewster DW, Birnbaum LS. 2,3,4,7,8-pentachlorodibenzofuran (PCDF) toxicokinetics and metabolism in the rat. Conference Commemorating the Twentieth Anniversary of the National Institute of Environmental Health Sciences (NIEHS) and the Centennial of the National Institutes of Health (NIH); December 3-5, 1986; Research Triangle Park, NC: Environmental Health Perspectives; 1987. p. 147-8.
- 454. Sabourin PJ, Bechtold WE, Birnbaum LS, Lucier GW, Henderson RF. Water-soluble benzene metabolites in F344/N rats and B6C3F mice during and following 3H-benzene inhalation. Society of Toxicology Annual Meeting; February 23-27, 1987; Washington, DC: The Toxicologist; 1987. p. 232.
- 455. Medinsky MA, Bechtold WE, Birnbaum LS, Chico DM, Henderson RF, Gerlach RF. Uptake of vinylidene fluoride (VDF) in rats simulated by a physiological model. Society of Toxicology Annual Meeting; February 23-27, 1987; Washington, DC: The Toxicologist; 1987. p. 32.
- 456. Brewster DW, Birnbaum LS. Toxicity and disposition of 2,3,4,7,8-pentachlorodibenzofuran (PCDF) in the rhesus monkey. Society of Toxicology Annual Meeting; February 23-27, 1987; Washington, DC: The Toxicologist; 1987. p. 160.
- 457. Abbott BD, Birnbaum LS, Pratt RM. TCDD produces hydronephrosis in fetal mice by inducing hyperplasia of the ureteric epithelium. Society of Toxicology Annual Meeting; February 23-27, 1987; Washington, DC: The Toxicologist; 1987. p. 124.
- 458. Abbott BD, Birnbaum LS, Pratt RM. TCDD effects the basal lamina and extracellular matrix of the fetal mouse kidney. Society of Toxicology Annual Meeting; February 23-27, 1987; Washington, DC: The Toxicologist; 1987. p. 124.
- 459. Couture LA, Birnbaum LS. Evaluation of subchronic exposure to octachlorodibenzodioxin (OCDD). Society of Toxicology Annual Meeting; February 23-27, 1987; Washington, DC: The Toxicologist; 1987. p. 161.
- 460. Usha G, Diliberto JJ, Birnbaum LS. Distribution and excretion of 3,7-dimethyl-2,6-octadienal (citral) in rats. Society of Toxicology Annual Meeting; February 23-27, 1987; Washington, DC: The Toxicologist; 1987. p. 120.

- 461. Bond JA, Sabourin PJ, Dahl AR, Birnbaum LS, Henderson RF. Disposition and metabolism of inhaled 1-chloro-2-propanol in rats. Society of Toxicology Annual Meeting; February 23-27, 1987; Washington, DC: The Toxicologist; 1987. p. 30.
- 462. Diliberto JJ, Usha G, Birnbaum LS. Citral: Model for terpene disposition in rats. Society of Toxicology Annual Meeting; February 23-27, 1987; Washington, DC: The Toxicologist; 1987. p. 237.
- 463. Borghoff SJ, Stefanski SA, Birnbaum LS. Alterations in glucuronidation and toxicity with age using 4,4'-thiobis(6-t-butyl-m-cresol) (TBBC) as a model compound. Society of Toxicology Annual Meeting; February 23-27, 1987; Washington, DC: The Toxicologist; 1987. p. 119.
- 464. Birnbaum LS, Harris MW, Morrissey RE. Additive teratogenic effects of polychlorinated dibenzofurans (PCDFS). Society of Toxicology Annual Meeting; February 23-27, 1987; Washington, DC: The Toxicologist; 1987. p. 159.
- 465. Brewster DW, Birnbaum LS. 2, 3, 4, 7, 8-Pentachlorodibenzofuran (PCDF): Toxicokinetics and metabolism in the rat. Society of Toxicology Annual Meeting; February 23-27, 1987; Washington, DC: The Toxicologist; 1987.
- 466. Ryan RP, Nelson KG, Lucier GW, Birnbaum LS, Sunahara GI. 2,3,4,7,8-Pentachlorodibenzofuran and 1,2,3,4,7,8-hexachlorodibenzo-furan decrease glucocorticoid receptor binding in mouse liver and placental cytosol. Society of Toxicology Annual Meeting; February 23-27, 1987; Washington, DC: The Toxicologist; 1987. p. 125.
- 467. Dahl AR, Bond JA, Henderson RF, Birnbaum LS. Studies on the fate of inhaled isoprene (2-methyl-1,3-butadiene) in rats may predict its toxicity. Society of Toxicology Annual Meeting; March 3-7, 1986; New Orleans, LA: The Toxicologist; 1986. p. 57.
- 468. Bond JA, Dahl AR, Henderson RF, Birnbaum LS, Dutcher JS, Mauderly JL. Species differences in the disposition and metabolism of inhaled butadiene. Society of Toxicology Annual Meeting; March 3-7, 1986; New Orleans, LA: The Toxicologist; 1986. p. 56.
- 469. Mansur CA, Muni IA, Birnbaum LS. Prechronic dose feed toxicity studies of 4,4'-thiobis-(6-t-butyl-m-cresol) in rats and mice. Society of Toxicology Annual Meeting; March 3-7, 1986; New Orleans, LA: The Toxicologist; 1986. p. 300.
- 470. Tomaszewski K, Harrington F, Greenwell A, Rahn C, Moore J, Birnbaum L, Melnick RL. Interactive effects of Di(2-ethylhexyl)phthalate (DEHP) and 2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD) on lipid metabolism in F344 rats. Society of Toxicology Annual Meeting; March 3-7, 1986; New Orleans, LA: The Toxicologist; 1986. p. 44.
- 471. Mewhinney JA, Ayres PH, Bechtold WE, Dutcher JS, Cheng YS, Bond JA, Medinsky MA, Henderson RF, Birnbaum LS. The fate of inhaled azodicarbonamine in rats. Society of Toxicology Annual Meeting; March 3-7, 1986; New Orleans, LA: The Toxicologist; 1986. p. 56.
- 472. Chang MJW, Hejtmancik MR, Peters AC, Birnbaum LS. Effects of o-benzyl-p-chlorophenol (BCP) on porphyrin excretion in F344 rats. Society of Toxicology Annual Meeting; March 3-7, 1986; New Orleans, LA: The Toxicologist; 1986. p. 313.

- 473. Sabourin PJ, Chen BT, Henderson RF, Lucier G, Birnbaum LS. Effect of dose on absorption and excretion of 14C-benzene administered orally or by inhalation. Society of Toxicology Annual Meeting; March 3-7, 1986; New Orleans, LA: The Toxicologist; 1986. p. 163.
- 474. Birnbaum LS, Couture LA. Disposition of octachlorodibenzo-p-dioxin (OCDD) in Rats. Society of Toxicology Annual Meeting; March 3-7, 1986; New Orleans, LA: The Toxicologist; 1986. p. 310.
- 475. Borghoff SJ, Birnbaum LS. Alterations in glucuronidation with age in vivo and in vitro using 4,4'-thiobis (6-t-butyl-m-cresol) as a model compound. Society of Toxicology Annual Meeting; March 3-7, 1986; New Orleans, LA: The Toxicologist; 1986. p. 147.
- 476. Hebert CD, Birnbaum LS. Age-related changes in TCDD Absorption. Society of Toxicology Annual Meeting; March 3-7, 1986; New Orleans, LA: The Toxicologist; 1986. p. 310.
- 477. Birnbaum LS, Harris MW, Miller CP, Pratt RC, Lamb JC. Teratogenicity of TCDD in mice: enhancement by hydrocortisone. Society of Toxicology Annual Meeting; March 18-22, 1985; San Diego, CA: The Toxicologist; 1985. p. 201.
- 478. Miller CP, Harris MW, Birnbaum LS. Teratogenicity of hexabrominated naphthalene, a toxic contaminant of polybrominated biphenyls, in C57B1/6N mice. Society of Toxicology Annual Meeting; March 18-22, 1985; San Diego, CA: The Toxicologist; 1985. p. 122.
- 479. Bond JA, Dutcher JS, Medinsky MA, Henderson RF, Birnbaum LS. Metabolism and disposition of 14C-methyl bromide in Fischer-344 rats after inhalation. Society of Toxicology Annual Meeting; March 18-22, 1985; San Diego, CA: The Toxicologist; 1985. p. 73.
- 480. Dutcher JS, Bond JA, Henderson RF, Birnbaum LS. Effect of concentration on the disposition of inhaled C-methyl bromide in Fischer-344 rats after inhalation. Society of Toxicology Annual Meeting; March 18-22, 1985; San Diego, CA: The Toxicologist; 1985. p. 73.
- 481. Kao LR, Birnbaum LS. Disposition of O-benzyl-p- chlorophenol in rats. Society of Toxicology Annual Meeting; March 18-22, 1985; San Diego, CA: The Toxicologist; 1985. p. 239.
- 482. Borghoff SJ, Birnbaum LS. Age-related changes in the metabolism and excretion of allyl isothiocyanate. Society of Toxicology Annual Meeting; March 18-22, 1985; San Diego, CA: The Toxicologist; 1985. p. 239.
- 483. Eastin WC, Birnbaum LS. Age-related changes in intestinal transport. Society of Toxicology Annual Meeting; March 18-22, 1985; San Diego, CA: The Toxicologist; 1985. p. 160.
- 484. Birnbaum LS, Borghoff SJ. Changes in metabolism and excretion of allyl isothiocynate in senescent rats. American Aging Association (AGE) Annual Meeting; October 18-20, 1984; New York, NY: GeroScience; 1984. p. 139.
- 485. Birnbaum LS, Johnson L, Eastin W. Age-related-changes in glucose-absorption. American Aging Association (AGE) Annual Meeting; October 18-20, 1984; New York, NY: GeroScience; 1984. p. 140.

- 486. Borghoff SJ, Birnbaum LS. Changes in metabolism and excretion of allyl isothiocyanate in senescent rats. American Aging Association (AGE) Annual Meeting; October 18-20, 1984; New York, NY: GeroScience; 1984. p. 139.
- 487. Birnbaum LS, Johnson L, Eastin WC. Age-related changes in glucose absorption. American Aging Association (AGE) Annual Meeting; October 18-20, 1984; New York, NY: GeroScience; 1984. p. 140.
- 488. Muni IA, Mansur CA, Birnbaum LS. 14-day dose-feed toxicity study of 4,4-thiobis (6-tert-butyl-meta-cresol) in rats and mice. American Chemical Society (ACS) National Meeting; April 8-13, 1984; St. Louis, MO: Abstracts of Papers of the American Chemical Society (ACS); 1984. p. 53-MEDI.
- 489. Deskind R, Grumbein SL, Kurtz P, Peters AC, Birnbaum LS. Prechronic toxicity evaluation of Obenzyl-p-chlorophenol: comparison between F344 rats and B6C3Fl mice. Society of Toxicology Annual Meeting; March 12-16, 1984; Atlanta, GA: The Toxicologist; 1984. p. 176.
- 490. Dutcher JS, Medinsk MA, Bond JA, Cheng YS, Snipes MB, F. HR, Birnbaum LS. Effect of vapor concentration on the disposition of inhaled 2,3-dichloropropene in Fischer-344 rats. Society of Toxicology Annual Meeting; March 12-16, 1984; Atlanta, GA: The Toxicologist; 1984. p. 4.
- 491. Birnbaum LS, L. J. Disposition of benzo(f)quinoline in rats. Society of Toxicology Annual Meeting; March 12-16, 1984; Atlanta, GA: The Toxicologist; 1984. p. 98.
- 492. Borghoff SJ, Birnbaum LS. Changes in glucuronidation and deglucuronidation in hepatic and extrahepatic tissues of aging rats. Society of Toxicology Annual Meeting; March 12-16, 1984; Atlanta, GA: The Toxicologist; 1984. p. 99.
- 493. Borghoff SJ, Birnbaum LS. Age-related changes in glucuronidation and deglucuronidation in hepatic and extrahepatic tissues of rats. American Aging Association (AGE) Annual Meeting; October 6-9, 1983; Washington, DC: GeroScience; 1983. p. 140.
- 494. Birnbaum LS. Changes in the Distribution and Excretion of Two Hexachlorobiphenyls in Senescent Rats. National Institute of Environmental Health Sciences Third Science Seminar; November; Research Triangle Park, NC: Environmental Health Perspectives; 1983. p. 280-1.
- 495. Birnbaum LS, Matthews HB. Disposition of 4,4'-thio-bis-(6-ter-butyl-m-cresol) in rats. Society of Toxicology Annual Meeting; March 7-11, 1983; Las Vegas, NV: The Toxicologist; 1983. p. 89.
- 496. Birnbaum LS, Darcey DJ. Disposition of 1,2,3,4,6,7-hezabromonaphthalene in the rat. American College of Toxicology (ACT) Annual Meeting; December 1982; Washington, DC: International Journal of Toxicology; 1982. p. 128.
- 497. Dieter MP, Birnbaum LS. Intermediary metabolism in lymphoid components of aging f344 rats. Federation of American Societies for Experimental Biology (FASEB) Annual Meeting; April 15-23, 1982; New Orleans, LA: Federation proceedings; 1982. p. 1673.
- 498. Decad GM, Birnbaum LS, Matthews HB. Disposition of 2,3,7,8-tetrachlorodibenzofuran in mice. Society of Toxicology Annual Meeting; March 1-5, 1981; San Diego, CA: The Toxicologist; 1981. p. 65.

- 499. Robertson IGC, Birnbaum LS. Changes in mutagen activation with senescence in rat tissues American Aging Association (AGE) Annual Meeting; October 2-4, 1980; Houston, TX: GeroScience; 1980. p. 107.
- 500. Armbrecht HJ, Birnbaum LS, Zenser TV, Davis BB. Changes in hepatic-microsomal membrane fluidity with age. Federation of American Societies for Experimental Biology (FASEB) Annual Meeting; April 13-18, 1980; Anaheim, CA: Federation proceedings; 1980. p. 2099.
- 501. Birnbaum LS, Decad GM, Matthews HB. Disposition of tetrachlorodibenzofuran in male-rats. Federation of American Societies for Experimental Biology (FASEB) Annual Meeting; April 13-18, 1980; Anaheim, CA: Federation proceedings; 1980. p. 999.
- 502. Birnbaum LS. Enhanced metabolism of 7-ethoxycoumarin in senescent rodents. American Aging Association (AGE) Annual Meeting; September 20-22, 1979; Washington, DC: GeroScience; 1979. p. 125.
- 503. Baird MB, Birnbaum LS. Vitamin-a inhibits mutagenicity by 2-fluoreneamine in salmonellatyphimurium. Federation of American Societies for Experimental Biology (FASEB) Annual Meeting; April 6-10, 1979; Dallas, TX: Federation proceedings; 1979. p. 701.
- 504. Zenser TV, Armbrecht HJ, Birnbaum LS, Mattammal MB, Davis BB. Characterization of renal cytochrome P450 systems. Federation of American Societies for Experimental Biology (FASEB) Annual Meeting; April 1-10, 1979; Dallas, TX: Federation proceedings; 1979. p. 658.
- 505. Birnbaum LS, Baird MB. Senescent changes in mouse hepatic aryl-hydrocarbon hydroxylase. Federation of American Societies for Experimental Biology (FASEB) Annual Meeting; April 6-10, 1979; Dallas, TX: Federation proceedings; 1979. p. 658.
- 506. Birnbaum LS, Baird MB. Altered metabolism of carcinogens by senescent rodents. American Aging Association (AGE) Annual Meeting; September 29-October 1, 1977; New York, NY: GeroScience; 1978. p. 71.
- 507. Birnbaum LS, Baird MB. Senescent alterations in hepatic epoxide metabolism in rodents. Federation of American Societies for Experimental Biology (FASEB) Annual Meeting; April 10-14, 1978; Atlantic City, NJ: Federation proceedings; 1978. p. 888.
- 508. Baird MB, Massie HR, Birnbaum LS. Decreased rate of hepatic-metabolism of benzo a pyrene in senescent rats. American Association for Cancer Research (AACR) Annual Meeting; May 4-8, 1976; Toronto, Canada: Proceedings of the American Association for Cancer Research; 1976. p. 212.
- 509. Birnbaum LS, Kaplan S. In vitro transcription of ribosomal RNA genes in Escherichia coli. American Society for Microbiology Annual Meeting; April 23-28, 1972; Philadelphia, PA: Abstracts of the Annual Meeting of the American Society for Microbiology; 1972. p. 161.
- 510. Birnbaum LS, Kaplan S. Localization and enrichment of ribosomal RNA cistrons in Escherichia coli. American Society for Microbiology Annual Meeting; May 2-7, 1971; Minneapolis, MN: Abstracts of the Annual Meeting of the American Society for Microbiology; 1971. p. 163.

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EXHIBIT P

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Professor Jonathan W. Martin, Ph.D.

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Academic Appointments Professor and SciLifeLab Faculty, Stockholm University (2016-present)

Department of Environmental Science, Exposure & Effects Unit

Director, SciLifeLab National Facility for Exposomics (pilot facility), Metabolomics Platform (2021-present)

Adjunct Professor, Department of Laboratory Medicine and Pathology, University of Alberta (2017-2021)

Faculty of Medicine & Dentistry, Division of Analytical & Environmental Toxicology

Professor, University of Alberta (2004-2017)

Faculty of Medicine & Dentistry, Division of Analytical & Environmental Toxicology

Associate Professor (2010-2014), Assistant Professor (2004-2010)

Graduate Program Chair, University of Alberta, Department of Laboratory Medicine and Pathology (2008-2012)

Faculty of Medicine & Dentistry

Adjunct Professor, Department of Chemistry, University of Alberta (2008-2012)

Faculty of Science

Elected Membership Elected to Royal Society of Canada College of New Scholars, Artists and Scientists (Class of 2015)

Recognition for the emerging generation of Canadian intellectual leadership

Postdoctoral Appointments NSERC Postdoctoral Fellow, University of Toronto (2003-2004)

Graduate Department of Pharmaceutical Sciences, Supervisor Dr. Peter J O'Brien,

Postdoctoral Fellow, University of Toronto (2002-2003) Department of Chemistry, Supervisor Dr. Scott A Mabury

Degrees

Ph.D. Toxicology (1998-2002), University of Guelph Co-Supervisors Drs. Derek CG Muir, Keith R Solomon

B.Sc. Toxicology (1994-1998), University of Guelph

Honours and Distinction

Journal Editorial Positions Associate Editor (2020-present), Environmental Science & Technology Letters (2019 Impact Factor 7.7)

Editorial Board Member (2021-present), Exposome (New Journal in 2021)

Associate Editor (2015-2020), Journal of Environmental Sciences

Guest Editor (2015), Proceedings of the National Academy of Sciences

Editorial Board Member (2014-2018), Science of the Total Environment

Editorial Board Member (2008-2011), Environmental Toxicology and Chemistry

National Science Fonds National de la Research Luxembourg, ATTRACT Programme Expert Panel Member (2018)

Committees

University of Luxembourg, Luxembourg

and

Swedish Foundation for Strategic Environmental Research, Scientific Review Committee on PFAS (2013-2017)

Grant Review

MISTRA, Stockholm, Sweden

Panels

Chemicals Management Plan Science Committee, Core Member (2013-2016)

Health Canada / Environment Canada, Safe Environments Directorate. Ottawa, Canada

SETAC Chemistry Advisory Group Steering Committee (2012-2015)

Society of Environmental Toxicology and Chemistry

Natural Sciences & Engineering Research Council (NSERC), Grant Selections Panel (2011-2014)

Strategic Grants Program. Ottawa, Canada

US National Institutes of Environmental Health Sciences (NIEHS) Special Emphasis Review Panel (2006, 2008)

United States

Scholarly **Profiles**

Google Scholar: h-index=72, total citations > 18,500

ORCID 0000-0001-6265-4294

Scopus ID 9270827400 ResearcherID J-3824-2013

Awards

Elected to Royal Society of Canada College of New Scholars, Artists and Scientists (2015)

Members of the RSC College are Canadians and Permanent Residents who, at an early stage in their career, have demonstrated a high level of achievement.

Annual Award for Excellence in Mentoring (2015)

Awarded by the Faculty of Medicine & Dentistry, University of Alberta, this recognizes outstanding mentoring of graduate students.

Thomson Reuters Highly Cited Researcher and World's Most Influential Scientific Minds (2014)

Three thousand researchers in the world, and <100 in Canada, earned this distinction in 2014 by authoring the greatest numbers of reports officially designated by Essential Science Indicators™ as Highly Cited Papers—ranking among the top 1% most cited for their subject field over a 10 year period.

ES&T Excellence in Review Award (2011)

From the highly cited journal Environmental Science & Technology, this award recognizes "service in providing scholarly and timely reviews".

Fred Beamish Award, Canadian Society for Chemistry (2011)

Awarded annually and recognizes an individual who demonstrates innovation in research in analytical chemistry, where the research is anticipated to have significant potential for practical applications.

International Young Scholar, National Natural Science Foundation of China (2011)

To foster research collaboration between young international scientists and Chinese Universities.

Alberta Ingenuity New Faculty Award (2006)

Provides startup to outstanding new faculty members in Alberta. Providing significant funding as they set-up their first research laboratory guarantees that these researchers will have an impact on Alberta's academic landscape.

Leaders Opportunity Fund Award, Canada Foundation for Innovation (2006)

To recognize leaders who strengthen Canada's capacity for world-class research and technology development.

SETAC Roy F Weston Environmental Chemistry Award (2005)

To encourage the advancement of environmental problem solving, and to support the professional development of young scientists. The award is given to a scientist under the age of 40 for contributions made to the field of environmental chemistry.

Natural Sciences and Engineering Research Council of Canada (NSERC) Postdoctoral Fellowship (2003)

Competitive Canadian postdoctoral fellowship for research in the area of basic sciences and engineering

Career	Citation
Ran	kinas

By 2020 my career citation metrics ranked in the top 0.4% of environmental scientists, and top 0.36% among all

Career Citation Rankings					
Graduate	2020-present	Contaminant Analysis, SU, Dept Environmental Science (1 d/yr)			
Teaching	2020-present	Research Trends in Toxicology, SU, Dept Environmental Science (Course Responsible, 3 wk/yr)			
	2020-present	Toxicology for Environmental Scientists, SU, Dept Environmental Science (1 week/yr)			
	2020-present	Large-Scale Challenges to Climate and Environment, SU, Dept Environmental Science (1 d/yr)			
	2017-present	Introduction to Environmental Chemistry, SU, Dept Environmental Science (1d/yr)			
	2015-2016	Toxicology and Regulation, UofA, Dept Lab Medicine & Pathology (Main instructor, 65 hr/yr)			
	2013-2016	Analytical Environmental Toxicology, UofA, Lab Medicine & Pathology (Co-instructor, 35 hr/yr)			
	2013-2015	Children's Health and the Environment, UofA, Dept Pediatrics (5 hr/yr)			
	2009-2016	Experimental Design & Scientific Commun., UofA, Dept Lab Medicine & Pathology (3 hr/yr)			
	2005-2013	Principles of Toxicology, UofA, Dept Public Health Sciences (Main instructor, 65 hr/yr)			
	2008-2009	Introduction to Environmental Health, UofA, Dept Public Health Sciences (5 hrs/yr)			
	2004-2010	Environmental Exposure Assessment, UofA, Dept Public Health Sciences (6 hrs/yr)			
Undergraduate	2018-present	Introduction to Environmental Chemistry, SU, Dept Environmental Science (1 d/yr)			
Teaching	2014-2016	Applied Toxicology, UofA, Medical Laboratory Sciences Program (3 hr/yr)			
	2010-2012	Environmental Chemistry, UofA, Dept Chemistry (3 hr/yr)			
	2006-2008	People, Pollution and the Environment, UofA, Dept Biological Science (3 hrs/yr)			

PhD Thesis

1. 11/09/20. Örebro University, Sweden. PhD Defense of Dr. Alina Koch.

External Evaluator 2. or 'Opponent' 3.

- 2. 21/07/19. University of Tartu, Estonia. PhD Defense of Jaanus Liigand.
- 17/03/17. University of Queensland, Australia. External Thesis Evaluator of Dr. Jennifer Braunig
 04/11/16. Örebro University, Sweden. PhD Defense of Dr. Eriksson
- 5. 06/15/14. ETH Zurich, Switzerland. External Thesis Evaluator of Dr. Zhanyun Wang for ETH-Medal
- 6. 10/25/13. Stockholm University, Sweden. PhD Defense of Dr. Shahid Ullah
- 7. 09/28/12. Örebro University, Sweden. PhD Defense of Dr. Helena Nilsson
- 8. 09/09/11. Carleton University, Canada. PhD Defense of Dr. Wouter Gebbink

Peer-Review Publications

- 182. Papazian S, D'Agostino LA, Sadiktsis I, Froment J, Bonnefille B, Sdougkou K, Xie H, Athanassiadis I, Budhavant K, Dasari S, Andersson A, Gustafsson Ö, Martin JW. 2022. Nontarget and *in-silico* molecular characterization of air pollution from the Indian subcontinent. *Communications Earth & Environment*. Accepted 28 01 22.
- 181. Zhang P, Carlsten C, Chaleckis R, Hanhineva K, Huang M, Isobe T, Koistinen VM, Meister I, Papazian S, Sdougkou K, Xie H, Martin JW, Rappaport SM, Tsugawa H, Walker DI, Woodruff TJ, Wright RO, Wheelock CE. 2021. Defining the scope of exposome studies and research needs from a multidisciplinary perspective. *Environmental Science & Technology Letters*. 8: 839-852. DOI
- 180. Zhang Y, Pelletier R, Noernberg T, Donner MW, Grant-Weaver I, Martin JW, Shotyk W. 2021. Impact of the 2016 Fort McMurray wildfires on atmospheric deposition of polycyclic aromatic hydrocarbons and trace elements to surrounding ombrotrophic bogs. Environment International. 158: 106910. DOI
- 179. Lu Y, Zhang Y, Martin JW, Alessi DS, Goss GG, Ren Y, He Y. 2021. Suspended solids-associated toxicity of hydraulic fracturing flowback and produced water on early life stages of zebrafish (Danio rerio). *Environmental Pollution*. 287: 117614. DOI
- 178. Liu J, Martin LJ, Dinu I, Field CJ, Dewey D, Martin JW. 2021. Interaction of prenatal bisphenols, maternal nutrients, and toxic metal exposures on neurodevelopment of 2-year-olds in the APrON Cohort. *Environment International*. 155: 106601. DOI
- 177. McKew BA, Johnson R, Clothier L, Skeels K, Ross MS, Metodiev M, Frenzel M, Gieg L, Martin JW, Hough M, Whitby C. 2021. Differential protein expression during growth on model and commercial mixtures of naphthenic acids in Pseudomonas fluorescens Pf-5. *MicrobiologyOpen*. 10:e1196. DOI
- 176. Martin JW. 2021. Revisiting old lessons from classic literature on persistent global pollutants. *Ambio*. 50: 534-538. DOI
- 175. Li X, Liu Y, Martin JW, Yue Cui J, Lehmler HJ. 2021. Nontarget Analysis Reveals Gut Microbiome-dependent Differences in the Fecal PCB Metabolite Profiles of Germ-Free and Conventional Mice. *Environmental Pollution*. 268: 115726. DOI
- 176. Milestone CB, Sun C, Martin JW, Bickerton G, Roy JW, Frank RA, Hewitt LM. 2021. Non-target profiling of bitumen influenced waters for the identification of tracers unique to oil sands processed-affected water (OSPW) in the Athabasca watershed of Alberta, Canada. *Rapid Communications in Mass Spectrometry*. 35: e8984. DOI
- 174. Nyanza EC, Bernier FP, Martin JW, Manyama M, Hatfield J, Dewey D. 2021. Effects of prenatal exposure and co-exposure to metallic or metalloid elements on early infant neurodevelopmental outcomes in areas with small-scale gold mining activities in Northern Tanzania. *Environment International*. 149: 106104 DOI
- 173. Dulio V, Koschorreck J, van Bavel B, van den Brink P, Hollender J, Munthe J, Schlabach M, Aalizadeh R, Agerstrand M, Ahrens L, Allan I, Alygizakis N, Barcelo' D, Bohlin-Nizzetto P, Boutroup S, Brack W, Bressy A, Christensen JH, Cirka L, Covaci A, Derksen A, Deviller G, Dingemans MML, Engwall M, Fatta-Kassinos D, Gago-Ferrero P, Hernández F, Herzke D, Hilscherová K, Hollert H, Junghans M, Kasprzyk-Hordern B, Keiter S, Kools SAE, Kruve A, Lambropoulou D, Lamoree M, Leonards P, Lopez B, López de Alda M, Lundy L, Makovinská J, Marigómez I, Martin JW, McHugh B, Miège C, O'Toole S, Perkola N, Polesello S, Posthuma L, Rodriguez-Mozaz S, Roessink I, Rostkowski P, Ruedel H, Samanipour S, Schulze T, Schymanski EL, Sengl M, Tarábek P, Hulscher DT, Thomaidis N, Togola A, Valsecchi S, van Leeuwen S, von der Ohe P, Vorkamp K, Vrana B, Slobodnik J. 2020. The NORMAN Association and the European Partnership for Chemicals Risk Assessment (PARC): let's cooperate! *Environmental Sciences Europe*. 32: 100. DOI
- 172. England-Mason G, Martin JW, MacDonald A, Kinniburgh D, Giesbrecht GF, Letourneau N, Dewey D. 2020. Similar names, different results: Consistency of the associations between prenatal exposure to phthalates and parent-ratings of behavior problems in preschool children. *Environment International*. 142: 105892. <u>DOI</u>

- 171. England-Mason G, Liu J, Martin JW, Giesbrecht GF, Letourneau N, Dewey D. 2020. Postnatal bisphenol A is associated with increasing difficulties in executive function in preschool children. *Pediatric Research*. 89:686-693. DOI
- 170. Challis JK, Parajas A, Anderson JC, Asiedu E, Martin JW, Wong CS, Ross MS. 2020. Photodegradation of bitumen-derived organics in oil sands process-affected water. *Environmental Science Processes and Impacts*. 22: 1243-1255. DOI
- 169. Morandi G, Wiseman S, Sun C, Martin JW, Giesy JP. 2020. Effects of chemical fractions from an oil sands end-pit lake on reproduction of fathead minnows. *Chemosphere*. 249: 126073 DOI
- 168. England-Mason G, Grohs MN, Reynolds JE, MacDonald A, Kinniburgh D, Liu J, Martin JW, Lebel C, Dewey D. 2020. White matter microstructure mediates the association between prenatal exposure to phthalates and behavior problems in preschool children. *Environmental Research*. 182: 109093. DOI
- 167. Nyanza E, Dewey D, Martin JW, Manyama M, Hatfield J, Bernier BF. 2020. Maternal exposure to arsenic and mercury and associated risk of adverse birth outcomes in small-scale gold mining communities in Northern Tanzania. *Environment International*. 137: 105450. <u>DOI</u>
- 166. Mehler WT, Nagel A, Flynn S, Zhang Y, Sun C, Martin JW, Alessi D, Goss GG. 2020. Understanding the effects of hydraulic fracturing flowback and produced water (FPW) to the aquatic invertebrate, Lumbriculus variegatus under various exposure regimes. *Environmental Pollution*. 259: 113889. DOI
- 165. Grohs MN, Reynolds JE, Liu J, Martin JW, Pollock T, Lebel C, Dewey D. 2019. Prenatal Maternal and Childhood Bisphenol A Exposure and Brain Structure and Behavior of Young Children. *Environmental Health*. 18: 85. DOI
- 164. Wu J, Jin H, Li L, Zhai Z, Martin JW, Hu J, Lin P, Wu P. 2019. Atmospheric Perfluoroalkyl Acid Occurrence and Isomer Profiles in Beijing, China. *Environmental Pollution*. 255: 113129. DOI
- 163. Reardon AJF, Karathra J, Ribbenstedt A, Benskin JP, MacDonald AM, Kinniburgh DW, Hamilton TJ, Fouad K, Martin JW. 2019. Neurodevelopmental and Metabolomic Responses from Prenatal Co-Exposure to Perfluorooctane Sulfonate (PFOS) and Methylmercury (MeHg) in Sprague-Dawley Rats. *Chemical Research in Toxicology*. 32: 1656–1669. DOI
- 162. Sun C, Zhang Y, Alessi DS, Martin JW. 2019. Nontarget Profiling of Organic Compounds in a Temporal Series of Hydraulic Fracturing Flowback and Produced Waters. *Environment International*. 131, 104944. <u>DOI</u>
- 161. Liu J, Martin JW. 2019. Comparison of Bisphenol A and Bisphenol S Percutaneous Absorption and Biotransformation. *Environmental Health Perspectives*. 127: 067008 DOI
- 160. Folkerts EJ, Blewett TA, Delompré P, Tyler Mehler W, Flynn SL, Sun C, Zhang Y, Martin JW, Alessi DS, Goss G. 2019. Toxicity in aquatic model species exposed to a temporal series of three different flowback and produced water samples collected from a horizontal hydraulically fractured well. *Ecotoxicology and Environmental Safety*. 180: 600-609. DOI
- 159. Reardon AJF, Khodayari-Moez E, Dinu I, Goruk S, Field CJ, Kinniburgh DW, MacDonald A, Martin JW. 2019. Longitudinal Analysis Reveals Early-Pregnancy Associations between Perfluoroalkyl Sulfonates and Thyroid Hormone Status in a Canadian Prospective Birth Cohort. *Environment International*. 129: 389-399. DOI
- 158. Zhong C, Li J, Flynn S, Nesbø C, Sun C, von Gunten K, Lanoil B, Goss G, Martin JW, Alessi D. 2019. Temporal Changes in Microbial Community Composition and Geochemistry in Flowback and Produced Water from the Duvernay Formation. *ACS Earth and Space Chemistry*. 3: 1047–1057. DOI
- 157. Liu Y, D'Agostino LA, Qu G, Jiang G, Martin JW. 2019. High-resolution mass spectrometry (HRMS) methods for nontarget discovery and characterization of poly- and per-fluoroalkyl substances (PFASs) in environmental and human samples. *Trends in Analytical Chemistry*. 121: 115420. <u>DOI</u>
- 156. Nyanza, EC, Bernier FP, Manyama M, Hatfield J, Martin JW, Dewey D. 2019. Maternal exposure to arsenic and mercury in small-scale gold mining areas of Northern Tanzania. *Environmental Research*. 173:432-442. DOI
- 154. Nyanza EC, Dewey D, Bernier F, Manyama M, Hatfield J, Martin JW. 2019. Validation of dried blood spots for maternal biomonitoring of non-essential elements in an artisanal and small-scale gold mining area of Tanzania. *Environmental Toxicology and Chemistry*. 38: 1285-1293. DOI
- 153. Funk S, Duffin L, He Y, McMullen C, Sun C, Utting N, Martin JW, Goss G, Alessi DS. 2019. Assessment of impacts of diphenyl phosphate on groundwater and near-surface environments: Sorption and toxicity. *Journal*

- of Contaminant Hydrology. 221: 50-57. DOI
- 153. Air synthesis review: polycyclic aromatic compounds in the oil sands region. 2018. Harner T, Rauert C, Muir DCG, Schuster JK, Hsu Y-M, Zhang L, Marson G, Watson JG, Ahad J, Cho S, Jariyasopit N, Kirk J, Korosi J, Landis MS, Martin JW, Zhang Y, Fernie K, Wentworth GR, Wnorowski A, Dabek E, Charland J-P, Pauli B, Wania F, Galarneau E, Cheng I, Makar P, Whaley C, Chow JC, Wang X. *Environmental Reviews*. 26: 430-468. DOI
- 152. Liu Y, Richardson ES, Derocher AE, Lunn, Lehmler H-J, Li X, Zhang Y, Cui JY, Cheng L, Martin JW. Hundreds of Unrecognized Halogenated Contaminants Discovered in Polar Bear Serum. 2018. *Angewandte Chemie International Edition*. 2018. 57: 16401-16406. DOI ChemRxiv
- 151. He Y, Zhang Y, Martin JW, Alessi DS, Giesy JP, Goss G. 2018. In Vitro Assessment of Endocrine Disrupting Potential of Organic Fractions extracted from Hydraulic Fracturing Flowback and Produced Water (HF-FPW). *Environment International*. 121: 824. DOI
- 150. Liu J, Wattar N, Field CJ, Dinu I, Dewey D, Martin JW. 2018. Exposure and dietary sources of bisphenol A (BPA) and BPA-alternatives among mothers in the APrON cohort study. *Environment International*. 119: 319. DOI
- 149. Jariyasopit N, Zhang Y, Martin JW, Harner T. 2018. Comparison of polycyclic aromatic compounds in air measured by conventional passive air samplers and passive dry deposition samplers and contributions from petcoke and oil sands ore. Atmos. Chem. Phys. 18:9161. <u>DOI</u>
- 148. Liu Y, Qian M, Ma X, Zhu L, Martin JW. 2018. Non-target mass spectrometry reveals new perfluoroalkyl substances in fish from the Yangtze River and Tangxun Lake, China. *Environmental Science & Technology.* 52: 5830. DOI
- 147. He Y, Sun C, Zhang Y, Folkerts E, Martin JW, Goss G. 2018. Developmental toxicity of the organic fraction from hydraulic fracturing flowback and produced waters to early life stages of zebrafish (*Danio rerio*). *Environmental Science & Technology*. *Cover Article*. 52: 3327. DOI
- 146. Land M, de Wit CA, Bignert A, Cousins IT, Herzke D, Johansson JH, Martin JW. 2018. What is the effect of phasing out long-chain per- and polyfluoroalkyl substances on the concentrations of perfluoroalkyl acids and their precursors in the environment? A systematic review. *Environmental Evidence*. 7:4. DOI
- 145. Liu J, Martin JW. 2017. Prolonged exposure to bisphenol A from single dermal contact events. *Environmental Science & Technology*. 51: 9940–9949. DOI
- 144. Sun C, Shotyk W, Cuss CW, Donner MW, Fennell J, Javed M, Noernberg T, Poesch Mark, Pelletier R, Sinnatamby N, Martin JW. 2017. Characterization of Naphthenic Acids and Other Dissolved Organics in Natural Water from the Athabasca Oil Sands Region, Canada. *Environmental Science & Technology*. *Cover Article*. 51: 9524. DOI
- 143. Casal P, Zhang Y, Martin JW, Pizarro M, Jiménez B, Dachs J. 2017. Role of Snow Deposition of Perfluoroalkylated Substances at Coastal Livingston Island (Maritime Antarctica). *Environmental Science & Technology*. 51: 8460-8470. DOI
- 142. Makey CM, Webster TF, Martin JW, Shoeib M, Harner T, Dix-Cooper L, Webster GM. 2017. Airborne precursors predict maternal serum perfluoroalkyl acid concentrations. *Environmental Science & Technology*. 51: 7667–7675. DOI
- 141. Morandi GD, Wiseman SB, Guan M, Zhang XW, Martin JW, Giesy JP. 2017. Elucidating mechanisms of toxic action of dissolved organic chemicals in oil sands process-affected water (OSPW). *Chemosphere*. 186: 893-900
- 140. Giesbrecht GF, Ejaredar M, Liu J, Thomas J, Letourneau N, Campbell T, Martin JW, Dewey D, APrON Study Team. 2017. Prenatal bisphenol A exposure and dysregulation of infant hypothalamic-pituitary-adrenal axis function: Findings from the APrON cohort study. *Environmental Health*. 16:47 DOI
- 139. Manzano CA, Marvin CH, Muir DCG, Harner T, Martin JW, Zhang Y. 2017. Heterocyclic aromatics in petroleum coke, snow, lake sediments and air samples from the Athabasca oil sands region. *Environmental Science & Technology*. 51: 5445–5453. DOI
- 138. Crump D, Williams K, Chiu S, Zhang Y, Martin JW. 2017. Athabasca oil sands petcoke extract elicits biochemical and transcriptomic effects in avian hepatocytes. *Environmental Science & Technology*. 51: 5783–5792. DOI
- 137. Casal P, González-Gaya B, Zhang Y, Reardon A, Martin JW, Jiménez B, Dachs J. 2017. Accumulation of Perfluoroalkylated Substances in Oceanic Plankton. *Environmental Science & Technology*. 51: 2766–2775. DOI

- 136. Yuhe H, Flynn SL, Folkerts E, Zhang Y, Ruan D, Alessi DS, Martin JW, Goss GG. 2017. Chemical and toxicological characterizations of hydraulic fracturing flowback and produced water. *Water Research*. 114: 78-87. DOI
- 135. Liu J, Li J, Wu Y, Zhao Y, Luo F, Li S, Yang L, Moez EK, Dinu IA, Martin JW. Environ Sci Technol. 2017. Bisphenol A metabolites and bisphenol S in paired maternal and cord serum. *Environmental Science & Technology*. DOI [Epub ahead of print]
- 134. Ye M, Beach J, Martin JW, Senthilselvan A. 2017. Pesticide exposures and respiratory health in general populations. *Journal of Environmental Sciences*. 51: 361–370. DOI
- 133. He Y, Folkerts EJ, Zhang Y, Martin JW, Alessi DS, Goss GG. 2017. Effects on biotransformation, oxidative stress, and endocrine disruption in Rainbow Trout (*Oncorhynchus mykiss*) exposed to hydraulic fracturing flowback and produced water. *Environmental Science & Technology*. 51: 940–947. DOI
- 132. Gerner N, Koné M, Ross MS, Pereira A, Ulrich AC, Martin JW, Liess M. 2017. Stream invertebrate community structure at Canadian oil sands development is linked to concentration of bitumen-derived contaminants. *Science of the Total Environment*. 575: 1005-13. DOI
- 131. Zetouni NC, Siraki AG, Weinfeld M, Pereira A, Martin JW. 2017. Screening of genotoxicity and mutagenicity in extractable organics from oil sands process-affected water. Environmental Toxicology and Chemistry. 36: 1397–1404. DOI
- 130. Giesbrecht GF, Liu J, Ejaredar M, Dewey D, Letourneau N, Campbell T, Martin JW, APrON Study Team. 2016. Urinary bisphenol A is associated with dysregulation of HPA axis function in pregnant women: Findings from the APrON cohort study. *Environmental Research*. 151: 689-697. DOI
- 129. Morandi GD, Zhang K, Wiseman SB, Pereira ADS, Martin JW, Giesy JP. 2016. Effect of lipid partitioning on predictions of acute toxicity of oil sands process affected water to embryos of fathead minnow (*Pimephales promelas*). *Environmental Science & Technology*. 50: 8858–8866. DOI
- 128. Jin H, Zhang Y, Jiang W, Zhu L, Martin JW. 2016. Isomer–Specific Distribution of Perfluoroalkyl Substances in Blood. 2016. *Environmental Science & Technology*. 50: 7808-7815. DOI
- 127. Zhang K, Wiseman SB, Giesy JP, Martin JW. 2016. Bioconcentration of Dissolved Organic Compounds from Oil Sands Process-Affected Water by Medaka (Oryzias latipes): Importance of Partitioning to Phospholipids. *Environmental Science & Technology*. 50: 6574–6582. DOI
- 126. Zhang Y, Shotyk W, Zaccone C, Noernberg T, Pelletier R, Bicalho B, Froese D, Davies LJ, Martin JW. 2016. Airborne petcoke dust is a major source of polycyclic aromatic hydrocarbons in the Athabasca oil sands region. *Environmental Science & Technology*. 50: 1711-1720. <u>DOI</u>
- 125. Ye M, Beach J, Martin JW, Senthilselvan A. 2016. Urinary concentrations of pyrethroid metabolites and its association with lung function in a Canadian general population. *Occupational & Environmental Medicine*. 73: 119-126. DOI
- 124. Alharbi HA, Saunders DM, Al-Mousa A, Alcorn J, Pereira AS, Martin JW, Giesy JP, Wiseman SB. 2016. Inhibition of ABC transport proteins by oil sands process affected water. *Aquatic Toxicology*. 170: 81-88. DOI
- 123. Morandi GD, Wiseman SB, Pereira A, Mankidy R, Gault IG, Martin JW, Giesy JP. 2015. Effects-Directed Analysis of Dissolved Organic Compounds in Oil Sands Process-Affected Water. *Environmental Science & Technology*. 49: 12395-404. DOI
- 122. Martin JW, van den Heuvel MR, Hazewinkel R, Westcott K. 2015. Safe release and re-integration of oil sands process-affected water. *Environmental Toxicology and Chemistry*. 34: 2682-2686. DOI
- 121. Zhang K, Pereira A, Martin JW. 2015. Estimates of octanol-water partitioning for thousands of dissolved organic species in oil sands process-affected water. *Environmental Science & Technology*. 49: 8907-8913. DOI
- 120. Ye M, Beach J, Martin JW, Senthilselvan A. 2015. Associations between dietary factors and urinary concentrations of organophosphate and pyrethroid metabolites in a Canadian general population. *International Journal of Hygiene and Environmental Health*. 218: 616-26. DOI
- 119. Ye M, Beach J, Martin JW, Senthilselvan A. 2015. Urinary dialkyl phosphate concentration and lung function parameters in adolescents and adults: results from the Canadian Health Measures Survey. *Environmental Health Perspectives*. 123: 422-427 DOI
- 118. Beesoon S, Martin JW. 2015. Isomer-specific binding affinity of perfluorooctanesulfonate (PFOS) and perfluorooctanoate (PFOA) to serum proteins. *Environmental Science & Technology*. 49: 5722–5731. DOI

- 117. Jin H, Zhang Y, Zhu L, Martin JW. 2015. Isomer profiles of perfluoroalkyl substances in water and soil surrounding a Chinese fluorochemical manufacturing park. *Environmental Science & Technology*. 9: 4946–4954. DOI
- 116. Liu Y, Pereira AS, Martin JW. 2015. Discovery of poly- and perfluoroalkyl substances in water by in-line SPE-HPLC-Orbitrap with in-source fragmentation flagging. *Analytical Chemistry*. 87: 4260–4268. DOI
- 115. Land M, de Wit CA, Cousins IT, Herzke D, Johansson J, Martin JW. 2015. What is the effect of phasing out long-chain per- and polyfluoroalkyl substances on the concentrations of perfluoroalkyl acids and their precursors in the environment? A systematic review protocol. *Environmental Evidence*. 4(3):1-13 DOI
- 114. Pereira AS, Martin JW. 2015. Exploring the complexity of oil sands process affected water by high efficiency supercritical fluid chromatography-orbitrap mass spectrometry. *Rapid Communications in Mass Spectrometry*. 29: 735-744. DOI
- 113. Liu Y, Pereira AS, Beesoon S, Vestergren R, Berger U, Olsen GW, Glynn A, Martin JW. 2015. Temporal trends of perfluorooctanesulfonate isomer and enantiomer patterns in archived Swedish and American serum samples. *Environment International*. 75:215-322. <u>DOI</u>
- 112. Ye M, Beach J, Martin JW, Senthilselvan A. 2014. Association between lung function in adults and plasma DDT and DDE Levels: results from the Canadian Health Measures Survey. *Environmental Health Perspectives*. 123: 422-427. DOI
- 111. Genuis SJ, Liu Y, Genuis QIT, Martin JW. 2014. Phlebotomy treatment for elimination of perfluoroalkyl acids in a highly exposed family: a retrospective case-series. *Plos One*. 9(12):e114295. <u>DOI</u>
- 110. Afzal A, Chelme-Ayala P, Drzewicz P, Martin JW, Gamal El-Din M. 2014. Effects of ozone and ozone/hydrogen peroxide on the degradation of model and real oil-sands-process-affected-water naphthenic acids. *Ozone: Science & Engineering*. 37: 45-54. DOI
- 109. Rowland SJ, Pereira AS, Martin JW, Scarlett AG, West CE, Lengger SK, Wilde MJ, Pureveen J, Tegelaar EW, Frank RA, Hewitt LM. 2014. Mass spectral characterisation of a polar, esterified, fraction of an organic extract of an oil sands process water. *Rapid Communications in Mass Spectrometry*. 28: 2352–2362. DOI
- 108. Webster GM, Venners SA, Mattman A, Martin JW. 2014. Associations between perfluoroalkyl acids (PFASs) and maternal thyroid hormones in early pregnancy: a population-based cohort study. *Environmental Research*. 133: 338–347. DOI
- 107. Wu J, Martin JW, Zhai Z, Lu K, Li L, Fang X, Jin H, Hu J, Zhang J. 2014. Airborne trifluoroacetic acid and its fraction from the degradation of HFC-134a in Beijing, China. *Environmental Science & Technology*. 48: 3675–3681. DOI: and Response to Comment 48(16):9949.
- 106. Kaplan BJ, Giesbrecht GF, Leung B, Field CJ, Dewey D, Bell RC, Manca RC, Manca D, O'Beirne M, Johnston DW, Pop VJ, Singhal N, Gagnon L, Bernier FB, Eliasziw M, McCargar L, Kooistra L, Farmer A, Cantell M, Goonewardene L, Casey LM, Letourneau N, Martin JW. 2014. The Alberta Pregnancy Outcomes and Nutrition (APrON) cohort study: rationale and methods. *Maternal and Child Nutrition*. 10: 44–60. DOI
- 105. Wu J, Fang X, Martin JW, Zhai Z, Su S, Hu X, Han J, Lu S, Wang C, Zhang J, Hu J. 2014. Estimated emissions of chlorofluorocarbons, hydrochlorofluorocarbons, and hydrofluorocarbons based on an interspecies correlation method in the Pearl River Delta region, China. *Science of the Total Environment*. 470–471: 829–834. DOI
- 104. Burstyn I, Martin JW, Beesoon S, Bamforth F, Li Q, Yasui Y, Cherry NM. 2013. Maternal exposure to bisphenol-A and fetal growth restriction: a case-referent study. *International Journal of Environmental Research and Public Health*. 10: 7001-7014. DOI
- 103. Ye M, Beach J, Martin JW, Senthilselvan A. 2013. Occupational pesticide exposures and respiratory health. International Journal of Environmental Research and Public Health. 10: 6442-6471. DOI
- 102. Brown LD, Pérez-Estrada L, Wang N, Gamal El-Din M, Martin JW, Fedorak PM, Ulrich AC. 2013. Indigenous microbes survive in situ ozonation improving biodegradation of dissolved organic matter in aged oil sands process-affected waters. *Chemosphere*. 93: 2748–2755. DOI
- 101. Sohrabi V, Ross MS, Martin JW, Barker JF. Potential for in situ chemical oxidation of acid extractable organics in oil sands process affected groundwater. 2013. *Chemosphere*. 93: 2698–2703. DOI
- 100. Martin JW, Mabury SA, Solomon KR, Muir DCG. 2013. Progress toward understanding the bioaccumulation of perfluorinated alkyl acids. *Environmental Toxicology and Chemistry*. Invited "Impact Paper". 32: 2421–2423. DOI

- 99. Zhang Y, Beesoon S, Zhu L, Martin JW. 2013. Biomonitoring of perfluoroalkyl acids in human urine and estimates of biological half-life. *Environmental Science & Technology*. 47: 10619-10627. DOI
- 98. Pereira AS, Islam MDS, Gamal El-Din M, Martin JW. 2013. Ozonation degrades all detectable organic compound classes in oil sands process-affected water; an application of high-performance liquid chromatography/obitrap mass spectrometry. *Rapid Communications in Mass Spectrometry*. 27: 2317-2326. DOI
- 97. Toor NS, Han X, Franz E, Mackinnon MD, Martin JW, Liber K. 2013. Selective biodegradation of naphthenic acids and a probable link between mixture profiles and aquatic toxicity. *Environmental Toxicology and Chemistry*. 32: 2207–2216. DOI
- 96. Wang N, Chelme-Ayala P, Perez-Estrada L, Garcia-Garcia E, Pun J, Martin JW, Belosevic M., Gamal El-Din M. 2013. Impact of ozonation on naphthenic acids speciation and toxicity of oil sands process-affected water to *Vibrio fischeri* and mammalian immune system. *Environmental Science & Technology*. 47: 6518–6526. DOI
- 95. Pereira AS, Bhattacharjee S, Martin JW. 2013. Characterization of oil sands process-affected waters by liquid chromatography Orbitrap mass spectrometry. *Environmental Science & Technology*. 47: 5504–5513. DOI
- 94. Headley JV, Peru KM, Mohamed MH, Frank RA, Martin JW et al (+40 others). 2013. Chemical fingerprinting of naphthenic acids and oil sands process waters-A review of analytical methods for environmental samples. Journal of Environmental Science and Health, Part A: Toxic/Hazardous Substances and Environmental Engineering. 48: 1145-63. DOI
- 93. Zhang Y, Beesoon S, Zhu L, Martin JW. 2013. Isomers of perfluorooctanesulfonate and perfluorooctanoate and total perfluoroalkyl acids in human serum from two cities in North China. *Environment International*. 53: 9-17. DOI
- 92. S. Wiseman, Y. He, M. Gamal El-Din, J. Martin, P.D. Jones, M. Hecker, J.P. Giesy. 2013. Transcriptional responses of male fathead minnows exposed to oil sands process-affected water. *Comparative Biochemistry and Physiology, Part C.* 157:227–235. <u>DOI</u>
- 91. Beesoon S, Genuis S, Benskin J, Martin J. 2012. Exceptionally high serum concentrations of perfluorohexane sulfonate in a Canadian family linked to home carpet treatment applications. *Environmental Science & Technology*. 46: 12960-67. DOI
- 90. Ross MS, dos Santos Pereira A, Fennell J, Davies M, Johnson J, Sliva L, Martin JW. 2012. Quantitative and qualitative analysis of naphthenic acids in natural waters surrounding the Canadian oil sands industry. *Environmental Science & Technology*. 46: 12796–805. *Top Paper, Science 2012 (3rd runner up)*. DOI
- 89. He Y, Patterson S, Wang N, Hecker M, Martin JW, Gamal El-Din, M, Giesy JP, Wiseman SB. 2012. Toxicity of untreated and ozone-treated oil sands process-affected water (OSPW) to early life stages of the fathead minnow (Pimephales promelas). *Water Research*. 46: 6359-68. DOI
- 88. Afzal A, Drzewicz P, Pérez-Estrada L, Chen Y, Martin JW, Gamal El-Din M. 2012. Effect of molecular structure on the relative reactivity of naphthenic acids in the UV/H2O2 advanced oxidation process. *Environmental Science & Technology*. 46: 10727-34. DOI
- 87. He Y, Wiseman SB, Wang N, Perez-Estrada LA, El-Din MG, Martin JW, Giesy JP. 2012. Transcriptional responses of the brain-gonad-liver axis of fathead minnows exposed to untreated and ozone-treated oil sands process-affected water. 2012. *Environmental Science & Technology*. 46: 9701-8. DOI
- 86. Drzewicz P, Pérez-Estrada L, Alpatova A, Martin JW, Gamal El-Din M. 2012. The impact of peroxydisulfate in the presence of zero valent iron on the oxidation of cyclohexanoic acid and naphthenic acids from oil sands process-affected water. *Environmental Science & Technology*. 46: 8984-91. DOI
- 85. Asher BJ, Wang Y, De Silva AO, Backus S, Muir DC, Wong CS, Martin JW. 2012. Enantiospecific perfluorooctane sulfonate (PFOS) analysis reveals evidence for the source contribution of PFOS-precursors to the Lake Ontario foodweb. *Environmental Science & Technology*. 46: 7653–60. DOI
- 84. Benskin JP, Muir DCG, Scott B, Spencer C, De Silva A, Kylin H, Martin JW, Morris A, Lohmann R, Tomy GT, Rosenberg B, Taniyasu S, Yamashita N. 2012. Perfluoroalkyl acids in the Atlantic and Canadian Arctic oceans. *Environmental Science & Technology*. 46:5815-23. DOI
- 83. Afzal A, Drzewicz P, Martin JW, Gamal El-Din M. 2012. Decomposition of cyclohexanoic acid by the UV/H2O2 process under various conditions. *Science of the Total Environment*. 426:387-92. DOI
- 82. Hagen MO, Garcia-Garcia E, Oladiran A, Karpman M, Mitchell S, El-Din MG, Martin JW, Belosevic M. 2012.

- The acute and sub-chronic exposures of goldfish to naphthenic acids induce different host defense responses. *Aquatic Toxicology*. 109: 143-149. DOI
- 81. Ross MS, Wong CS, Martin JW. 2012. Isomer-specific biotransformation of perfluorooctane sulfonamide in Sprague-Dawley rats. *Environmental Science & Technology.* 46:3196-203. DOI
- 80. Benskin JP, Ahrens L, Muir DCG, Scott B, Spencer C, Rosenberg B, Tomy GT, Kylin H, Lohman R, Martin JW. 2012. Manufacturing origin of perfluorooctanoate in Atlantic and Canadian Arctic seawater. *Environmental Science & Technology*. 46(2):677-85. DOI
- 79. Anderson J, Wiseman S, Wang N, Moustafa A, Perez Estrada L, Gamal El-Din M, Martin JW, Liber K, Giesy JP. 2012. Effectiveness of ozonation treatment in eliminating toxicity of oil sands process-affected water to Chironomus dilutus. *Environmental Science & Technology*. 46: 486-493. DOI
- 78. Garcia-Garcia E, Pun J, Perez-Estrada LA, Gamal El-Din M, Smith DW, Martin JW, Belosevic M. 2012. Commercial naphthenic acids and the organic fraction of oil sands process water induce different effects on pro-inflammatory gene expression and macrophage phagocytosis in mice. *Journal of Applied Toxicology*. 32:968-79. DOI
- 77. Wang Y, Beesoon S, Benskin JP, De Silva AO, Genuis SJ, Martin JW. 2011. Enantiomer fractions of chiral perfluorooctanesulfonate (PFOS) in human sera. *Environmental Science & Technology*. 45: 8907-8914. DOI
- 76. Pourrezaei P, Drzewicz P, Wang Y, Gamal El-Din M, Perez-Estrada LA, Martin JW, Anderson J, Wiseman S, Liber K, Giesy JP. 2011. The Impact of Metallic Coagulants on the Removal of Organic Compounds from Oil Sands Process-Affected Water. *Environmental Science & Technology*. 45:8452-8459. DOI
- 75. Garcia-Garcia E, Ge JQ, Oladiran A, Montgomery B, Gamal El-Din M, Perez-Estrada L, Stafford JL, Martin JW, Belosevic M. 2011. Ozone treatment ameliorates oil sands process water toxicity to the mammalian immune system. *Water Research*. 45: 5849-5857. DOI
- 74. Gamal El-Din M, Fu H, Wang N, Chelme-Ayala P, Pérez-Estrada L, Drzewicz P, Martin JW, Zubot W, Smith DW. 2011. Naphthenic Acids Speciation and Removal during Petroleum-Coke Adsorption and Ozonation of Oil Sands Process-Affected Water. *Science of the Total Environment*. 409: 5119-5125. DOI
- 73. Perez-Estrada LA, Han X, Drzewicz P, Gamal El-Din M, Fedorak PM, Martin JW. 2011. Structure–Reactivity of Naphthenic Acids in the Ozonation Process. *Environmental Science & Technology*. 45: 7431-7437. DOI
- 72. Benskin JP, Phillips V, St. Louis VL, Martin JW. 2011. Source Elucidation of Perfluorinated Carboxylic Acids in Remote Alpine Lake Sediment Cores. *Environmental Science & Technology*. 45:7188-94. DOI
- 71. Beesoon S, Webster GM, Shoeib M, Harner T, Benskin JP, Martin JW. 2011. Isomer Profiles of Perfluorochemicals in Matched Maternal, Cord and House Dust Samples: Manufacturing Sources and Transplacental Transfer. *Environmental Health Perspectives*. 119:1659-1664. DOI
- 70. He Y, Wiseman SB, Hecker M, Zhang X, Wang N, Perez LA, Jones P, Gamal El-Din M, Martin JW, Giesy JP. 2011. Effect of ozonation on the estrogenicity and androgenicity of oil sands process-affected water. *Environmental Science & Technology*. 45: 6268–6274. DOI
- 69. Garcia-Garcia E, Pun, J, Perez-Estrada LA, Gamal El-Din M, Smith DW, Martin JW, Belosevic M. 2011. Commercial naphthenic acids and the organic fraction of oil sands process water down-regulate proinflammatory gene expression and macrophage antimicrobial responses. *Toxicology Letters*. 2011. 203(1):62-73. DOI
- 68. Chan E, Burstyn I, Cherry N, Bamforth F, Martin JW. 2011. Perfluorinated acids and hypothyroxinemia in pregnant women. 2011. *Environmental Research*. 111:559-564. DOI
- 67. Benskin JP, Yeung L, Yamashita N, Taniyasu S, Lam P, Martin JW. 2010. Perfluorinated acid isomer profiling in water and quantitative assessment of manufacturing source. *Environmental Science & Technology*. 44: 9049–9054. DOI
- 66. Drzewicz P, Afzal A, Martin JW, Gamal El-Din M. 2010. Degradation of a model naphthenic acid, cyclohexanoic acid, by vacuum-UV (172nm) and UV (254 nm)/ H₂O₂. *Journal of Physical Chemistry A*. 114: 12067–12074. DOI
- 65. Martin, JW, Asher, BJ, Beesoon, S, Benskin, JP, Ross, MS. 2010. PFOS or PreFOS? Are perfluorooctane sulfonate precursors (PreFOS) important determinants of human and environmental perfluorooctane sulfonate (PFOS) exposure? *Journal of Environmental Monitoring*. 12:1979-2004. *Cover Article*. DOI
- 64. Martin JW, Barri T, Han X, Fedorak PM, Gamal El-Din M, Perez L, Scott AC, Tiange Jiang J. 2010. Ozonation of Oil Sands Process-Affected Water Accelerates Microbial Bioremediation. *Environmental Science & Technology*.

44: 8350-8356. DOI

- 63. Sharpe RL, Benskin JP, Laarman AL, MacLeod SM, Martin JW, Wong CS, Goss GG. 2010. An investigation of perfluorooctane sulfonate (PFOS) toxicity, isomer-specific accumulation and maternal transfer in Zebrafish (*Danio rerio*) and rainbow trout (*Oncorhynchus mykiss*). *Environmental Toxicology and Chemistry*. 29: 1957-1966. DOI
- 62. He Y, Wiseman SB, Zhang X, Hecker M, Jones PD, Gamel El-Din M, Martin JW, Giesy JP. 2010. Ozonation attenuates the steroidogenic disruptive effects of sediment free oil sands process water in the H295R cell line. *Chemosphere*. 80: 578-584. DOI
- 61. Oakes KD, Benskin JP, Martin JW, Ings JS, Heinrichs JY, Dixon DG, Servos MR. 2010. Biomonitoring of perfluorochemicals and toxicity to the downstream fish community of Etobicoke Creek following deployment of aqueous film-forming foam. *Aquatic Toxicology*. 98:120-129. DOI
- 60. Benskin JP, De Silva AO, Martin JW. 2010. Isomer profiling of perfluorinated substances as a tool for source tracking: a review of early findings and future applications. *Reviews of Environmental Contamination and Toxicology*. Invited Review, 208:111-160. <u>DOI</u>
- 59. Hamm MP, Chan E, Martin JW, Cherry NM, Burstyn I. 2010. Maternal exposure to perfluorinated acids and fetal growth. *Journal of Exposure Science and Environmental Epidemiology*. 20: 589–597. DOI
- 58. Armitage JM, Schenker U, Scheringer M, Martin JW, MacLeod M, Cousins IT. 2009. Modeling the global fate and transport of perfluorooctane sulfonate (PFOS) and precursor compounds in relation to temporal trends in wildlife exposure. *Environmental Science & Technology*. 43: 9274–9280. DOI
- 57. Benskin JP, Holt A, Martin JW. 2009. Isomer-specific biotransformation of a perfluoroctane sulfonate (PFOS)-precursor by cytochrome P450 isozymes and human liver microsomes. *Environmental Science & Technology*. 43: 8566–8572. DOI
- 56. Wang Y, Arsenault G, Riddell N, McCrindle R, McAlees A, Martin JW. 2009. Perfluorooctane sulfonate (PFOS) precursors can be metabolized enantioselectively: principle for a new PFOS source tracking tool. *Environmental Science & Technology*. 43: 8283–8289. DOI
- 55. Riddell NA, Arsenault GA, Benskin JP, Chittim BA, Martin JW, McAlees AA, McCrindle R. 2009. Branched perfluorooctane sulfonate isomer quantification and characterization in real samples by HPLC/ESI-MS(/MS). *Environmental Science &Technology*. 43: 7902–7908. DOI
- 54. Hamm MP, Cherry NM, Martin JW, Bamforth F, Burstyn I. 2009. The impact of isolated maternal hypothyroxinemia on perinatal morbidity. *Journal of Obstetrics and Gynaecology Canada*. 31: 1015-21. DOI
- 53. Zhang S, Bursian SJ, Martin PA, Chan HM, Tomy G, Palace VP, Mayne GJ, Martin JW. 2009. Reproductive and developmental toxicity of a pentabrominated diphenyl ether mixture, DE-71®, to ranch mink (*Mustela vison*) and hazard assessment for wild mink in the Great Lakes region. *Toxicological Sciences*. 110: 107-116. erratum. DOI
- 52. Chan E, Sandhu M, Benskin JP, Ralitsch M, Thibault N, Birkholz D, Martin JW. 2009. Endogenous HPLC-MS/MS Interferences and the Case of Perfluorohexane Sulfonate (PFHxS) in Human Serum; Are we overestimating exposure? *Rapid Communications in Mass Spectrometry*. 23: 1405–1410. DOI
- 51. Han X, Martin JW, MacKinnon M. 2009. Estimating the in situ biodegradation of naphthenic acids in oil sands process waters by HPLC/HRMS. *Chemosphere*. 76: 63-70. DOI
- 50. Headley JV, Peru KM, Armstrong SA, Han X, Martin JW, Mapolelo MM, Smith DF, Rogers RP, Marshall AG. 2009. Aquatic plant derived changes in oil sands naphthenic acid signatures determined by low, high and ultrahigh resolution mass spectrometry. *Rapid Communications in Mass Spectrometry*. 23: 515-522. DOI
- 49. Martin JW, Chan K, Mabury SA, O'Brien PJ. 2009. Bioactivation of Fluorotelomer Alcohols in Isolated Rat Hepatocytes. *Chemico-Biological Interactions*. 177: 196-203. DOI
- 48. Warner N, Martin JW, Wong C. 2009. Chiral polychlorinated biphenyls are biotransformed enantioselectively by mammalian cytochrome P-450 isozymes to form hydroxylated metabolites. *Environmental Science & Technology*. 43: 114–121. DOI
- 47. De Silva AO, Benskin JP, Martin JW, Martin LJ, Arsenault G, McCrindle R, Ridell N, Mabury SA. 2009. Disposition of Perfluorinated Acid Isomers in Sprague Dawley Rats; Part II: Sub-Chronic Exposure. *Environmental Toxicology and Chemistry*. 28: 555–567. DOI
- 46. Benskin JP, De Silva AO, Martin LJ, Arsenault G, McCrindle R, Ridell N, Mabury SA, Martin JW. 2009.

- Disposition of Perfluorinated Acid Isomers in Sprague Dawley Rats; Part I: Single Dose. *Environmental Toxicology and Chemistry*. 28: 542–554. DOI
- 45. McDonald GR, Hudson AL, Dunn SM, Haitao Y, Baker GB, Whittal RM, Martin JW, Jha A, Edmondson DE, Holt A. 2008. Bioactive contaminants leach from disposable laboratory plasticware. *Science*. 322: 917. DOI
- 44. Schenker U, Scheringer M, MacLeod M, Martin JW, Cousins IT, Hungerbühler K. 2008. Contribution of volatile precursor substances to the flux of perfluorooctanoate to the Arctic. *Environmental Science & Technology*. 42: 3710-6. DOI
- 43. Martin JW, Han X, Peru KM, Headley JV. 2008. Comparison of high- and low- resolution electrospray ionization mass spectrometry for the analysis of naphthenic acid mixtures in oil sands process water. *Rapid Communications in Mass Spectrometry*. 22: 1919-24. DOI
- 42. Zhang S, Bursian S, Martin PA, Chan HM, Martin JW. 2008. Dietary accumulation, disposition, and metabolism of technical pentabrominated diphenyl ether (DE-71) in pregnant mink (*Mustela vison*) and their offspring. *Environmental Toxicology and Chemistry*. 27:1184-93. DOI
- 41. Han X, Scott AC, Fedorak PM, Bataineh M, Martin JW. 2008. Influence of molecular structure on the biodegradability of naphthenic acids. *Environmental Science & Technology*. 42:1290-5. DOI
- 40. Wallington TJ, Mabury SA, Hurley MD, Sulbaek Andersen MP, Nielsen OJ, Ellis DA, Martin JW. 2008. Comment on "Atmospheric chemistry of linear perfluorinated aldehydes: Dissociation kinetics of C_nF_{2n+1}CO radicals". *Journal of Physical Chemistry A*. 112:576-7. DOI
- 39. Benskin JP, Bataineh M, Martin JW. 2007. Simultaneous characterization of perfluoroalkyl carboxylate, sulfonate, and sulfonamide isomers by liquid chromatography-tandem mass spectrometry. *Analytical Chemistry*. 79: 6455-64. *Accelerated Article*. DOI
- 38. Bull K, Basu N, Zhang S, Martin JW, Bursian S, Martin P, Chan LHM. 2007. Dietary and *in utero* exposure to a pentabrominated diphenyl ether mixture did not affect cholinergic parameters in the cerebral cortex of ranch mink (*mustela vison*). *Toxicological Sciences*. 96:115-22. <u>DOI</u>
- 37. Stock NL, Martin JW, Ye Y, Mabury SA. 2007. An undergraduate experiment for the measurement of perfluorinated surfactants in fish liver by liquid chromatography-tandem mass spectrometry. *Journal of Chemical Education*. 84:310-11. DOI
- 36. Bataineh M, Scott AC, Fedorak PM, Martin JW. 2006. Capillary HPLC/QTOF-MS for characterizing complex naphthenic acid mixtures and their microbial transformation. *Analytical Chemistry*. 78:8354-61. DOI
- 35. Hurley MD, Ball JC, Wallington TJ, Sulbaek Andersen MP, Nielsen OJ, Ellis DA, Martin JW, Mabury SA. 2006. Atmospheric chemistry of n- $C_xF_{2x+1}CHO$ (x = 1, 2, 3, 4): Fate of n- $C_xF_{2x+1}C(O)$ radicals. *Journal of Physical Chemistry A*. 110: 12443-7. DOI
- 34. Sulbaek Andersen MP, Toft A, Nielsen OJ, Hurley MD, Wallington TJ, Chishima H, Tonokura K, Mabury SA, Martin JW, Ellis DA. 2006. Atmospheric chemistry of perfluorinated aldehyde hydrates ($n-C_xF_{2x+1}CH(OH)_2$, x=1, 3, 4): Hydration, dehydration, and kinetics and mechanism of Cl atom and OH radical initiated oxidation. *Journal of Physical Chemistry A*. 110:9854-60. <u>DOI</u>
- 33. Houde M, Martin JW, Letcher RJ, Solomon KR, Muir DCG. 2006. Biological monitoring of polyfluoroalkyl substances: A review. *Environmental Science & Technology*. 40:3463-73. DOI
- 32. Martin JW, Ellis DA, Mabury SA, Hurley MD, Wallington TJ. 2006. Atmospheric chemistry of perfluoroalkanesulfonamides: Kinetic and product studies of the OH radical and Cl atom initiated oxidation of N-ethyl perfluorobutanesulfonamide. *Environmental Science & Technology*. 40:864-72. <u>DOI</u>
- 31. Wallington TJ, Hurley MD, Xia J, Wuebbles DJ, Sillman S, Ito A, Penner JE, Ellis DA, Martin J, Mabury SA, Nielsen OJ, Sulbaek Andersen MP. 2006. Formation of C₇F₁₅COOH (PFOA) and other perfluorocarboxylic acids during the atmospheric oxidation of 8:2 fluorotelomer alcohol. *Environmental Science & Technology*. 40:924-30. <u>DOI</u>
- 30. Scott BF, Spencer C, Martin JW, Barra R, Bootsma HA, Jones KC, Johnston AE, Muir DCG. 2005. Comparison of haloacetic acids in the environment of the northern and southern hemispheres. *Environmental Science & Technology*. 39: 8664-70. DOI
- 29. Hurley MD, Misner JA, Ball JC, Wellington TJ, Ellis DA, Martin JW, Mabury SA, Andersen MPS. 2005. Atmospheric chemistry of CF₃CH₂CH₂OH: Kinetics, mechanisms and products of Cl atom and OH radical initiated oxidation in the presence and absence of NO_x. *Journal of Physical Chemistry A*. 109: 9816-26. DOI
- 28. Martin JW, Mabury SA, O'Brien PJ. 2005. Metabolic products and pathways of fluorotelomer alcohols in

- isolated rat hepatocytes. Chemico-Biological Interactions. 155: 165-80. DOI
- 27. Smithwick M, Mabury SA, Solomon KR, Sonne C, Martin JW, Born EW, Dietz R, Derocher AE, Letcher RJ, Evans TJ, Gabrielsen GW, Nagy J, Stirling I, Taylor MK, Muir DCG. 2005. Circumpolar study of perfluoroalkyl contaminants in polar bears (ursus maritimus). *Environmental Science & Technology*. 39: 5517-23. DOI
- 26. Oakes KD, Sibley PK, Martin JW, MacLean DD, Solomon KR, Mabury SA, Van Der Kraak GJ. 2005. Short-term exposures of fish to perfluorooctane sulfonate: Acute effects on fatty acyl-CoA oxidase activity, oxidative stress, and circulating sex steroids. *Environmental Toxicology and Chemistry*. 24: 1172-81. DOI
- 25. Smithwick M, Muir DGG, Mabury SA, Solomon KR, Martin JW, Sonne C, Born EW, Letcher RJ, Dietz R. 2005. Perfluoroalkyl contaminants in liver tissue from East Greenland polar bears (*Ursus maritimus*). *Environmental Toxicology and Chemistry*. 24: 981-6. DOI
- 24. Sulbaek Andersen MP, Nielsen OJ, Hurley MD, Ball JC, Wallington TJ, Ellis DA, Martin JW, Mabury SA. 2005. Atmospheric chemistry of 4:2 fluorotelomer alcohol (n-C₄F 9CH₂CH₂OH): Products and mechanism of Cl atom initiated oxidation in the presence of NO_x. *Journal of Physical Chemistry A*. 109: 1849-56. DOI
- 23. Martin JW, Whittle DM, Muir DCG, Mabury SA. 2004. Perfluoroalkyl contaminants in a food web from Lake Ontario. *Environmental Science & Technology*. 38: 5379-85. DOI
- 22. Andersen MPS, Stenby C, Nielsen OJ, Hurley MD, Ball JC, Wallington TJ, Martin JW, Ellis DA, Mabury SA. 2004. Atmospheric chemistry of n-C_xF_{2x+1}CHO (x = 1, 3, 4): Mechanism of the C_xF_{2x+1}C(O)O₂ + HO₂ reaction. *Journal of Physical Chemistry A*. 108: 6325-30. DOI
- 21. Martin JW, Kannan K, Berger U, De Voogt P, Field J, Franklin J, Giesy JP, Harner T, Muir DCG, Scott B, Kaiser M, Järnberg U, Jones KC, Mabury SA, Schroeder H, Simcik M, Sottani C, Van Bavel B, Karrman A, Lindstrom G, Van Leeuwen S. 2004. Analytical challenges hamper perfluoroalkyl research. *Environmental Science & Technology*. 38:248A-55A. <u>Invited A-page Article</u>. <u>DOI</u>
- 20. Hurley MD, Ball JC, Wallington TJ, Andersen MPS, Ellis DA, Martin JW, Mabury SA. 2004. Atmospheric chemistry of 4:2 fluorotelomer alcohol (CF₃(CF₂)₃CH₂CH₂OH): Products and mechanism of Cl atom initiated oxidation. *Journal of Physical Chemistry A*. 108:5635-42. DOI
- 19. Andersen MPS, Nielsen OJ, Hurley MD, Ball JC, Wallington TJ, Stevens JE, Martin JW, Ellis DA, Mabury SA. 2004. Atmospheric chemistry of n- $C_xF_{2x+1}CHO$ (x = 1, 3, 4): Reaction with Cl atoms, OH radicals and IR spectra of $C_xF_{2x+1}C(O)O_2NO_2$. *Journal of Physical Chemistry A*. 108: 5189-96. DOI
- 18. Ellis DA, Martin JW, De Silva AO, Mabury SA, Hurley MD, Sulbaek Andersen MP, Wallington TJ. 2004. Degradation of fluorotelomer alcohols: A likely atmospheric source of perfluorinated carboxylic acids. *Environmental Science & Technology*. 38: 3316-21. DOI
- 17. Hurley MD, Wallington TJ, Sulbaek Andersen MP, Ellis DA, Martin JW, Mabury SA. 2004. Atmospheric chemistry of fluorinated alcohols: Reaction with Cl atoms and OH radicals and atmospheric lifetimes. *Journal of Physical Chemistry A*. 108: 1973-9. DOI
- 16. Stock NL, Lau FK, Ellis DA, Martin JW, Muir DCG, Mabury SA. 2004. Polyfluorinated telomer alcohols and sulfonamides in the North American troposphere. *Environmental Science & Technology*. 38: 991-6. DOI
- 15. Hurley MD, Andersen MPS, Wallington TJ, Ellis DA, Martin JW, Mabury SA. 2004. Atmospheric chemistry of perfluorinated carboxylic acids: Reaction with OH radicals and atmospheric lifetimes. *Journal of Physical Chemistry A*. 108: 615-20. DOI
- 14. Martin JW, Smithwick MM, Braune BM, Hoekstra PF, Muir DCG, Mabury SA. 2004. Identification of long-chain perfluorinated acids in biota from the Canadian Arctic. *Environmental Science & Technology*. 38:373-80. *Cover Article*. DOI
- 13. Sulbaek Andersen MP, Hurley MD, Wallington TJ, Ball JC, Martin JW, Ellis DA, Mabury SA. 2003. Atmospheric chemistry of C₂F₅CHO: Mechanism of the C₂F₅C(O)O₂ + HO₂ reaction. *Chemical Physics Letters*. 2003. 381: 14-21. DOI
- 12. Sulbaek Andersen MP, Hurley MD, Wallington TJ, Ball JC, Martin JW, Ellis DA, Mabury SA, Nielsen OJ. 2003. Atmospheric chemistry of C_2F_5CHO : Reaction with Cl atoms and OH radicals, IR spectrum of $C_2F_5C(O)O_2NO_2$. Chemical Physics Letters. 379: 28-36. DOI
- 11. Ellis DA, Martin JW, Mabury SA, Hurley MD, Sulbaek Andersen MP, Wallington TJ. 2003. Atmospheric lifetime of fluorotelomer alcohols. *Environmental Science & Technology*. 37: 3816-20. DOI
- 10. Martin JW, Mabury SA, Wong CS, Noventa F, Solomon KR, Alaee M, Muir DCG. 2003. Airborne haloacetic

acids. Environmental Science & Technology. 37: 2889-97. DOI

- 9. Ellis DA, Martin JW, Muir DCG, Mabury SA. 2003. The use of ¹⁹F NMR and mass spectrometry for the elucidation of novel fluorinated acids and atmospheric fluoroacid precursors evolved in the thermolysis of fluoropolymers. *Analyst*. 128: 756-64. DOI
- 8. Martin JW, Mabury SA, Solomon KR, Muir DCG. 2003. Bioconcentration and tissue distribution of perfluorinated acids in rainbow trout (*Oncorhynchus mykiss*). *Environmental Toxicology and Chemistry*. 22: 196-204. DOI
- 7. Martin JW, Mabury SA, Solomon KR, Muir DCG. 2003. Dietary accumulation of perfluorinated acids in juvenile rainbow trout (*Oncorhynchus mykiss*). *Environmental Toxicology and Chemistry*. 22: 189-95. DOI
- 6. Moody CA, Martin JW, Kwan WC, Muir DCG, Mabury SA. 2002. Monitoring perfluorinated surfactants in biota and surface water samples following an accidental release of fire-fighting foam into Etobicoke Creek. *Environmental Science & Technology*. 36: 545-51. DOI
- 5. Martin JW, Muir DCG, Moody CA, Ellis DA, Wai CK, Solomon KR, Mabury SA. 2002. Collection of airborne fluorinated organics and analysis by gas chromatography/chemical ionization mass spectrometry. *Analytical Chemistry*. 74: 584-90. DOI
- 4. Ellis DA, Mabury SA, Martin JW, Muir DCG. 2001. Thermolysis of fluoropolymers as a potential source of halogenated organic acids in the environment. *Nature*. 412:321-4. <u>DOI</u>
- 3. Moody CA, Wai Chi Kwan, Martin JW, Muir DCG, Mabury SA. 2001. Determination of perfluorinated surfactants in surface water samples by two independent analytical techniques: liquid chromatography/tandem mass spectrometry and ¹⁹F NMR. *Analytical Chemistry*. 73: 2200-6. <u>DOI</u>
- 2. Ellis DA, Martin JW, Muir DCG, Mabury SA. 2000. Development of an ¹⁹F NMR method for the analysis of fluorinated acids in environmental water samples. *Analytical Chemistry*. 72: 726-31. DOI
- 1. Martin JW, Franklin J, Hanson ML, Solomon KR, Mabury SA, Ellis DA, Scott BF, Muir DCG. 2000. Detection of chlorodifluoroacetic acid in precipitation: a possible product of fluorocarbon degradation. *Environmental Science & Technology*. 34:274-81. DOI

Letters & Popular Science Articles

- 4. Letter to the Editor: Optimism for Nontarget Analysis in Environmental Chemistry. Samanipour S, Martin JW, Lamoree MH, Reid MJ, Thomas KV. 2019. *Environmental Science & Technology*. 53(10): 5529-5530. <u>DOI</u>
- 3. LC/GC Magazine. Analyzing Alberta's Oil Sands. E-Separation Solution. Jun 23, 2014. JW Martin. DOI
- 2. ACCN. Canadian Chemical News. Can chemistry get the oil sands out of hot water? May 2013. JW Martin. Invited Guest Column. DOI
- 1. Holden A, Tompkins T, Haque S, Perez L, Sutherland H, Bowron M, Biggar K, Donahue R, Mendoza C, Martin JW, Ulrich Mayer K, Barker J, Sego D, Ulrich A. 2011. Fate and transport of process-affected water in out-of-pit tailings ponds in the oil sands industry. Geotechnical News. 29(1): 53-57.

Cover Articles



157. Liu Y, D'Agostino LA, Qu G, Jiang G, Martin JW. 2019. High-resolution mass spectrometry (HRMS) methods for nontarget discovery and characterization of poly- and per-fluoroalkyl substances (PFASs) in environmental and human samples. *Trends in Analytical Chemistry*. 121: 115420. DOI



147. He Y, Sun C, Zhang Y, Folkerts E, Martin JW, Goss G. 2018. Developmental toxicity of the organic fraction from hydraulic fracturing flowback and produced waters to early life stages of zebrafish (*Danio rerio*). *Environmental Science & Technology*.



144. Sun C, Shotyk W, Cuss CW, Donner MW, Fennell J, Javed M, Noernberg T, Poesch Mark, Pelletier R, Sinnatamby N. 2017. Characterization of Naphthenic Acids and Other Dissolved Organics in Natural Water from the Athabasca Oil Sands Region, Canada. *Environmental Science & Technology*. 51: 9524.





65. Martin, JW, Asher, BJ, Beesoon, S, Benskin, JP, Ross, MS. 2010. PFOS or PreFOS? Are perfluorooctane sulfonate precursors (PreFOS) important determinants of human and environmental perfluorooctane sulfonate (PFOS) exposure? *Journal of Environmental Monitoring*. 12:1979-2004.



14. Martin JW, Smithwick MM, Braune BM, Hoekstra PF, Muir DCG, Mabury SA. 2004. Identification of long-chain perfluorinated acids in biota from the Canadian Arctic. *Environmental Science & Technology*. 38:373-80.

Book Chapters

1. J.P. Giesy, S.A. Mabury, J.W. Martin, K. Kannan, P.D. Jones, J.L. Newsted, and K. Coady: Perfluorinated Compounds. In "Persistent Organic Pollutants in the Great Lakes," Handbook in Environmental Chemistry, Vol. 5, Part N, Springer-Verlag: Berlin & Heidelberg, Germany, 430 pp. (2006); R. A. Hites, editor.

Public Reports

Martin, JW. State of the science in environmental chemical forensics for distinguishing natural and anthropogenic sources of bitumen-impacted water. Contained in: Commission for Environmental Cooperation. 2020. Alberta Tailings Ponds II. Factual Record regarding Submission SEM-17-001. 204 pp. <u>Link</u>

Pereira, A.S. and J.W. Martin, 2014. On-Line Solid Phase Extraction – HPLC – Orbitrap Mass Spectrometry for Screening and Quantifying Targeted and Non-Targeted Analytes in Oil Sands Process-Affected Water and Natural Waters in the Athabasca Oil Sands Region. Report No. TR-45. 33 pp. http://hdl.handle.net/10402/era.37793

- Gabos S, Zemanek M, Cheperdak L, Kinniburgh D, Lee B, Hrudey S, Le C, Li XF, Mandal R, Martin JW, Schopflocher D. Chemicals in Serum of Pregnant Women in Alberta. 2008. Alberta Biomonitoring Program. Alberta Health and Wellness. http://www.health.alberta.ca/documents/Chemical-Biomonitoring-2008.pdf
- Gabos S., Cheperdak L, Kinniburgh D, MacDonald A, Lyon M, Braakman S, Lee B, Hrudey S, Le C, Li XF, Mandal R, Schopflocher D, Martin JW. The ALBERTA BIOMONITORING PROGRAM. Chemical Biomonitoring in Serum of Children from Southern Alberta (2004-2006)- Influence of Age and Comparison to Pregnant Women. A Final Report Submitted to Alberta Health and Wellness March 2010. http://www.health.alberta.ca/documents/Chemical-Biomonitoring-2010.pdf

Selected
Plenary, Keynote,
and Invited
Lectures
(mm/dd/yy)

- 02/12/20. JW Martin. State of the science in environmental chemical forensics for distinguishing natural and anthropogenic sources of bitumen-impacted water. Public Webinar hosted by Sustainability Network and Commission for Environmental Cooperation. Alberta Tailings Ponds II Factual Record, a submission under the North American Free Trade Agreement. **Public Lecture**.
- 03/05/20. JW Martin. Pittcon 2020. Environmental Nontarget Screening: Success Stories and Challenges. Chicago, IL. 40 min **Keynote**
- 06/19/18. 1st Meeting of the Swedish Chemical Society, Lund. Exposing Environmental Contaminants by NonTarget UltraHigh Resolution Mass Spectrometry. **Keynote**.
- 05/21/18. JW Martin. Peking University, Departmental Seminar Series. Contaminant Discovery by UltraHigh Resolution Mass Spectrometry. Invited Seminar (1 hr), Beijing, China.
- 05/19/18. 4th Conference on Environmental Pollution and Health, Tianjin, China. Contaminant Discovery by UltraHigh Resolution Mass Spectrometry. **Keynote**.
- 05/31/17. Canadian Society for Chemistry 100th Annual Chemistry Conference. Toronto, ON. Human Exposure to BPA and BPS. Martin JW, Liu J. **Keynote**.
- 03/22/16. Water Conference. Organized by COSIA & Alberta Innovates EES. BMO Centre, Stampede Park. Calgary, March 22. Known Unknowns in the Supercomplex World of Oil Sands Process Water. **Plenary**
- 07/14/15. Enviroanalysis 2015. Banff, AB. Investigating Known Unknowns in the Supercomplex World of Oil Sands Process Water. **Plenary**
- 07/21/14. Martin JW. Investigating Known Unknowns in Oil Sands Process Water. Department of Chemistry Lunchtime Seminar Series, University of British Columbia. 50 min. Invited Lecture.
- 10/27/13. 5th International Workshop on Fluorinated Compounds in materials, humans and the environment current knowledge and scientific gaps. Copenhagen, Denmark. Taking a Closer Look at PFA Exposure through Applications of Advanced Separations and Mass Spectrometry. **Keynote**
- 10/24/13. Martin JW. Mixing Oil and Water, the Canadian Oil Sand Industry and the Misunderstood Tailings Pond. Lectures in Contaminant Science. Stockholm University, Department of Applied Environmental Science. Stockholm, Sweden. Invited Lecture.
- 06/25/13. University of Toronto Environmental Chemistry Colloquium. Toronto, ON. Invited by the Environmental Chemistry Graduate Student Group. The Misunderstood Tailings Pond, what is known, unknown, and overblown about oil sands process water (OSPW). 60 minutes. **Plenary**
- 06/16/12. 3rd Annual Meeting of SETAC Prairie Northern Chapter. Saskatoon, SK. The Known and (Mostly) Unknown Risks of Oil Sands Process Affected Water. 60 minutes. **Keynote**
- 06/15/11. 3rd International Workshop on Anthropogenic Perfluorinated Compounds. Isomer and Enantiomer Signatures of Perfluorinated Acids in Humans and the Environment. Amsterdam, The Netherlands. 45 min **Keynote** 09/14/10. 30th International Symposium on Halogenated Persistent Organic Pollutants. Dioxin 2010. San Antonio, TX USA. Ten Years of PFOS: Past, Present and Future Analytical Trends. 60 minutes. **Plenary**
- 03/06/10. Alberta Society For Human Toxicology Annual General Meeting, Delta Lodge, Kananaskis, AB. Oil Sands Process Affected Water Now What? 60 minutes. **Keynote**
- 03/06/10. Alberta Society For Human Toxicology Annual General Meeting, Delta Lodge, Kananaskis, AB. Chemicals in Our Blood that Shouldn't Be There. 60 minutes. **Plenary**
- 04/14/08. Kananaskis UofC/UofA Pharmacology Department Retreat. Environmental Toxicology and Pharmacology (Sex, Drugs, and Toxins). Slipping Through the Cracks Human and Environmental Exposure To Perfluorinated Substances. 30 min. **Plenary**

Selected Invited Conference Platforms & Seminars (mm/dd/yy)

- 12/21/11. Martin JW. Good News Stories from the Oil Sands. (50 minutes). Invited by Environment Canada (Dr Derek Muir). Centre for Inland Waters, Burlington, Ontario.
- 11/01/11. Martin JW. Banff Forum X. Invited Panel Member. Oil sands development and human health. People and Petroleum: Canada's Key Resources in a Geo-Strategic Context. September 20 to October 1, 2011. The Banff Centre Banff, Alberta. Presentation and Discussion.
- 06/07/11. Martin JW. Of Isomers and Enantiomers of Perfluorinated Acids. 94th Canadian Chemistry Conference.

Canadian Society of Chemistry Annual Meeting, Montreal. Fred Beamish Award Lecture, 20 minutes.

- 5/23/11. Martin JW.Tracking exposure sources of PFOA and PFOS by isomer and enantiomer profiling. College of Environmental Science and Technology, Nankai University, Tianjin, China. Invited by Dr. Lingyan Zhu. 50 minute invited lecture.
- 11/03/10. Martin JW. "Chemicals, Health and Pregnancy (CHirP): Thyroid Effects and Sources of Exposure to Perfluorinated Compounds (PFCs)". Insights into Perfluorinated Compound (PFC) Sources and Human Disposition by Isomer Profiling. Health Canada, Ottawa, ON, Brooke Claxton Building, Tunney's Pasture. Workshop on PFCs: 40 minutes. Invited Platform.

University Service

University Level

Board Member, Stockholm University's Center for Circular and Sustainable Systems (SUCCeSS). (January 2021-present)

Member. Stockholm University Working Group for Data Driven Life Science (DDLS) Initiative. (December 2020-present)

University of Alberta Water / COSIA EPA (Environmental Priority Area) Representative. The University of Alberta became an Associate Member of Canada's Oil Sands Innovation Alliance (COSIA) in 2013. Service to the Office of the Vice President - Research (April 2015-present).

Izaak Walton Killam and Grant Notley Memorial Postdoctoral Fellowships Selection Committee. Service to the Office of the Vice President - Research (2014, 2015).

Natural Sciences and Engineering Grant Assist Program (NSE GAP) "Academy of NSERC Reviewers". Service to the Office of the Vice President - Research (2014, 2015).

Killam Trust Committee. Service to the Office of the Vice President - Research (2015). University of Alberta Faculty of Graduate Studies and Research (FGSR) Council Member (2008-2014).

Dean Search and Selection Committee Member. 2008. Search committee for the 1st Dean of the School of Public Health, University of Alberta.

Faculty Level

Mentor, Science Faculty Mentoring Program for Assistant Professors (2020-present)

Chair, Medical Sciences Graduate Program (MSGP) (2011-2012)

Medical Sciences Graduate Program (MSGP) Committee (2008-2012)

Council of Faculty of Medicine and Dentistry Graduate Chairs (2008-2012)

Departmental Level

Strategic Committee (Rotating Chair), Department of Environmental Science (2020-present)

Chair, Graduate Program Committee, Department of Laboratory Medicine and Pathology (2008-2012)

Department of Laboratory Medicine and Pathology MacGregor Research Day Committee (2009-2012)

Department of Laboratory Medicine and Pathology, Awards Committee (2008-2012)

Department of Laboratory Medicine and Pathology, Rounds Committee (2009-2012)

Department of Public Health Sciences Computing Committee, University of Alberta (2004-2006)

Graduate Student Representative, Dept. Environmental Biology, University of Guelph (2000-2002)

Departmental Seminar Committee, Dept. Environmental Biology, University of Guelph (2001)

Selected Research Funding	Grantee	Proposal Title, Agency	Year	Amount
52	JW Martin (PI)	National Facility for Exposomics. Science for Life Laboratory. Stockholm University Co-Funding.	2021 2022	1M SEK 1M SEK
51	JW Martin (PI) with L Zhu (Nankai U)	Discovery and Characterization of Novel Contaminants in Chinese Environmental Samples by Comprehensive Non-Target Mass Spectrometry Workflows and Open-Science Resources. Joint China-Sweden Mobility programme. Swedish Foundation for International Cooperation in Research and Higher Education (STINT) and National Science Foundation of China (NSFC).	2021 2022 2023	200,000 SEK 200,000 SEK 200,000 SEK
50	JW Martin (PI)	National Facility for Exposomics. Science for Life Laboratory.	2021 2022 2023 2024	1.9M SEK 1.8M SEK TBD TBD
49	Anneli Kruve (PI) with Jon Martin and 2 other Co-I.	RapMixTox: Rapid and automated prediction of complex mixture toxicity by nontarget instrumental analysis. Formas, Sweden.	2021 2022 2023	997,833 SEK 997,833 SEK 997,833 SEK
48	Jonathan Martin (PI)	Virtual Effects-Directed Analaysis (vEDA) of Fine Particulate Matter (PM2.5) in South Korea. Korean Institute of Science and Technology – Europe, Germany. (KIST Europe).	2020 2021	60,000 Euro 60,000 Euro
47	John Munthe (PI) with Jon Martin and 30 Co-I.	Safe and Efficient Chemistry by Design (SAFECHEM). MISTRA Stiftelsen för miljöstrategisk forskning.	2020 2021 2022 2023	20 M SEK 20 M SEK 20 M SEK 20 M SEK
46	Kevin Thomas (PI) with Jon Martin and 3 other Co-I.	Comprehensive characterization of the PFAS exposome. National Health and Research Council (NHRC), Australia.	2020 2021 2022 2023	\$219,000 AUS \$219,000 AUS \$219,000 AUS \$219,000 AUS
45	Deborah Dewey (PI) with Jon Martin and 9 other Co-I.	Prenatal exposure to chemicals in plastics can cause epigenetic variation in genes associated with neurodevelopment in girls and boys. Canadian Institutes of Health Research (CIHR).	2020 2021 2022 2023	\$188,000 CDN \$188,000 CDN \$188,000 CDN \$188,000 CDN
44	Ji Eun (PI) with Jon Martin and 4 other Co-I.	Elucidation of mechanism of human cell damage by exposure to particulate matter using omics analysis and discovery of biomarkers for evaluation and treatment. National Research Foundation of Korea (NRF). International Research & Development Program.	2019 2020 2021 2022 2023	300 M Won 300 M Won 300 M Won 300 M Won 300 M Won

Selected Research Funding	Grantee	Proposal Title, Agency	Year	Amount
43	Catherine Lebel (PI) with Jon Martin and 4 other Co-I.	Advanced neuroimaging of the effects of prenatal BPA exposure on brain structure: a translational study. Canadian Institutes of Health Research (CIHR). New Frontiers in Research Fund, Exploration. Early Career Researcher Program.	2019 2020	\$125,000 CDN \$125,000 CDN
42	Oskar Karlsson (PI) with Jon Martin, Stefan Arver, Andrea Baccarelli, Russ Hauser, Ylva Trolle Lagerros.	The chemical exposome and male reproduction: sperm alterations and effects on child health. Formas, Non-Toxic Environment.	2019 2020 2021 2022	3M SEK 3M SEK 3M SEK 3M SEK
41	JW Martin (PI) with Oskar Karlssson, Bo Lundgren, Mathias Uhlen, Fredrik Edfors, Linn Fagerberg.	Toxicity of Personalized Contaminant Mixtures in Human Blood by NonTarget Exposomics and High-Throughput in vitro Screening. Formas, Non-Toxic Environment.	2019 2020 2021 2022	3M SEK 3M SEK 3M SEK 3M SEK
40	Oskar Karlsson (PI) with Jon Martin, Muhammad Faruque Parvez, Rubhana Raqib.	Characterization of environmental pollution in Bangladesh by novel non-target mass spectrometry 'exposomic' analysis. Swedish Research Council, Sustainability and Resilience.	2019 2020 2021	1.9M SEK 1.9M SEK 1.9M SEK
39	Cynthia deWit (PI) with Jon Benskin and Jon Martin	The organohalogen compound iceberg. Formas.	2019 2020 2021	1M SEK 1M SEK 1M SEK
38	JW Martin (PI)	Non-Target Analytical Methods for Contaminant Biomonitoring of Humans and Wildlife in the Era of the Exposome. Swedish Research Council .	2019 2020 2021 2022	720k SEK 720k SEK 720k SEK 720k SEK
37	JW Martin (PI) with Orjan Gustafsson, Paul Zieger, Illona Ripinen	Nontarget air observatories for organic contaminant discoveries. Formas.	2018 2019 2020	1M SEK 1M SEK 1M SEK
36	Yong-Lai Feng (PI) with JW Martin and 7 collaborators	Development of non-targeted screening analysis approaches for identifying emerging metabolites and chemicals in human fluids as exposure biomarkers using high-resolution mass spectrometry. Health Canada, Chemicals Management Plan Phase III.	2018 2019 2020 2021	\$40,000 \$40,000 \$40,000 \$40,000

Selected Research Funding	Grantee	Proposal Title, Agency	Year	Amount
			2016	\$75,000
		Discovery Exposomics by Non-Targeted	2017	\$75,000
35	J. Martin (PI)	Identification of Organic Contaminants in Human	2018	\$75,000
		and Environmental Samples. NSERC Discovery.	2019	\$75,000
			2020	\$75,000
			2015	\$199,000
		Informing best practices for hydraulic fracturing in	2016	\$199,320
34	D Alessi (PI) with JW Martin and G Goss	Alberta: water sources and characterizing the toxicity of produced fracturing fluids. NSERC CRD /	2017	\$199,029
	d doss	Encana Corporation.	2018	\$199,930
		·	2019	\$198,446
33	J. Martin (PI) with G Goss and D Alessi	High efficiency separations as new environmental forensics tools for water monitoring around oil sands and hydraulic fracturing activity. NSERC Research Tools and Instruments (RTI).	2015	\$146,943
			2014	\$150,000
		NSERC CREATE for Research in Environmental, Analytical Chemistry and Toxicology (REACT). NSERC, CREATE Training Program.	2015	\$300,000
	J. Martin (Institutional Lead)		2016	\$300,000
32	with Laurie Chan (PI) and 8		2017	\$300,000
	others.		2018	\$300,000
			2019	\$300,000
31	J. Martin with William Shotyk	Resolving natural and anthropogenic influences to groundwater and surface water environments of the Lower Athabasca region, including	2013 2014	\$315,000 \$315,000
31	(PI) with 6 others	their biological significance. Alberta Innovates – Energy and Environmental Solutions (AI-EES) Water Resources.	2015	\$315,000
		Atmospheric Deposition of Organic Contaminants in		
	J. Martin with William Shotyk	NE Alberta: Background Values and Industrial	2013	\$333,000
30	(PI)	Contributions of the Past 60 years. Alberta	2014	\$333,000
	•	Innovates – Energy and Environmental Solutions (AI-EES) Water Resources.	2015	\$333,000
29	J. Martin (PI)	Analysis of naphthenic acid signatures in groundwater samples by HPLC-Orbitrap MS. Suncor , Contract.	2012	\$50,000
28	J. Martin with G. Giesbrecht (PI) and 3 others.	Neurodevelopment of children perinatally exposed to environmental neurotoxicants: A pilot project in support of a CIHR proposal. Small grants competition, Alberta Children's Hospital Research Institute.	2013	\$3,837

Selected Research Funding	Grantee	Proposal Title, Agency	Year	Amount
		Neurodevelopment of preschoolers exposed	2012	\$254,376
	I Martin (DI) with 9 co	perinatally to bisphenol A and phthalates;	2013	\$254,376
27	J. Martin (PI) with 8 co- applicants.	interactions with diet and neurotoxicant co-	2014	\$254,376
	аррисансь.	exposures. Canadian Institutes of Health Research, Open Operating Grant.	2015	\$254,376
		open operating drant.	2016	\$254,376
			2012	\$333,333
26	J. Martin (PI) with John Giesy.	The Base-Mine Lake Toxicity Identification and Evaluation Study. NSERC CRD / Syncrude .	2013	\$333,333
		Evaluation Study. NSERC CRD / Synciade.	2014	\$333,333
		Alberta Pregnancy Outcomes and Nutrition (APrON)		4
	J. Martin (PI) with 8 co-	- Toxicant-Diet Interactions on Neurodevelopment	2012	\$100,000
25	applicants.	of Children Exposed Perinatally to Environmental Neurotoxicants. US National Institutes of Health ,	2013	\$100,000
		R21.	2014	\$100,000
24	J. Martin (Co-PI) with Dr Lingyan Zhu (Nankai University)	Perfluorochemical sources in the Chinese Population. International Young Scholar Program. National Natural Science Foundation of China.	2011	\$30,000
		Theme 5. Sustainable Oil Sands Tailings Water El-Din Management: From Sources to Discharge. Helmholtz Alberta Initiative.	2010	\$1 M
			2011	\$1 M
23	J. Martin, with M Gamal El-Din		2012	\$1 M
23	and 10 others		2013	\$1 M
			2014	\$1 M
			2010	\$50,000
			2011	\$50,000
22	J. Martin (PI)	Tracking the sources of PFOS by isomer and	2012	\$50,000
	. ,	enantiomer profile analysis. NSERC Discovery.	2013	\$50,000
			2014	\$50,000
			2009	\$1,333,600
21	J. Martin, with X. Le (PI) and 6	Safe, Secure Water Supplies for Alberta. Alberta Water Research Institute.	2010	\$1,333,600
	others.	vvater neseartii institute.	2011	\$1,333,600
		Separation and characterization of persistent	2008	\$35,000
20	J. Martin (PI)	organic acid mixtures in environmental samples. NSERC Discovery.	2009	\$35,000
			2008	\$200,000
	J. Martin, with G. Dixon (PI) and	Surface and Groundwater Management in the Oil	2009	\$200,000
19	20 others	Sands Industry. Canadian Water Network . Operating Grant.	2010	\$200,000
	20 0011013	operating draint.	2011	

Selected Research Funding	Grantee	Proposal Title, Agency	Year	Amount
			2008	\$157,658
		Fate and transport of process affected water in out-	2009	\$157,658
18	J. Martin, with D. Sego (PI) and 5 others.	of-pit tailings ponds in the oil sands industry in	2010	\$157,658
	5 others.	Canada. NSERC CRD with Suncor/Petro Canada.	2011	\$157,658
			2012	\$157,658
		Perfluorinated compounds and PBDEs in		,
17	J. Martin (PI)	pregnancy: thyroid effects and sources of exposure.	2008	\$33,875
	s. ma.c.i. (c.)	Health Canada , Canadian Environmental Protection Act.	2009	\$21,125
		Accelerated remediation of oil-sands process water	2008	\$141,432
16	J. Martin (PI) with 3 others	by complementary pairing of advanced oxidation	2009	\$141,432
		and biodegradation. NSERC Strategic.	2010	\$141,432
15	J. Martin	Naphthenic acid signatures in aged tailings water. Syncrude Canada Ltd, Contract.	2007	\$11,500
14	J. Martin, with G. Dixon (PI) and 20 others.	Surface and Groundwater Management in the Oil Sands Industry. Canadian Water Network . Value Added Strategic Proposal.	2007	\$12,500
13	J.Martin and CS Wong (Co-PI)	GC/LIT-MS for emerging contaminant fate research. NSERC, RTI.	2007	\$149,049
12	J. Martin (PI) + 2 others	Chemicals, Health, and Pregnancy. Health Canada.	2006	\$9,950
		Ultra-Trace Clean Lab for Research on Emerging	2006	\$250,000
11	J. Martin (PI)	Water Contaminants in Alberta. Alberta Health and	2007	\$200,000
		Wellness. Alberta Water for Life Strategy.	2008	\$200,000
	J. Martin (Project Leader) with	Development and Implementation of Population-	2006	\$500,000
10	S. Hrudey (PI) + 5 others	Based Health Surveillance: Biomonitoring. Alberta Health and Wellness , Contract.	2007	\$500,000
		High-Resolution Separation and Detection	2055	¢100.000
9	J. Martin (PI)	Techniques to Study the Fate of Persistent Acidic	2006 2007	\$100,000 \$100,000
5	3. March (Fi)	Pollutants in Alberta and Around the Globe. Alberta Ingenuity , New Faculty Award	2008	\$100,000
8	J. Martin (PI)	Ultra-Trace Clean-Laboratory for Environmental Health Sciences Research on Emerging Environmental Contaminants. Alberta Innovation and Science. Small Equipment Grants Program.	2006	\$183,586

Selected Research Funding	Grantee	Proposal Title	e, Agency	Year	Amount	
7	J. Martin (PI)	Health Sciences Environmental	an-Laboratory for s Research on Eme Contaminants. Ca i . Leader's Opportu	2006	\$200,001	
6	J. Martin (PI) + 3 others	Maternal Hypo	aminants as Deteri thyroxinaemia in E pital Foundation.		2006	\$24,446
5	J. Martin, with G. Dixon (PI) and 20 others.		oundwater Manag . Canadian Water I		2005 2006	\$35,000 \$35,000
4	J. Martin (PI)	•	ration and detection contaminants and C Discovery.		2005 2006 2007	\$38,000 \$38,000 \$38,000
3	J. Martin (PI)	Start-Up Funds	, University of Alb	erta.	2004	\$100,000
2	J. Martin (PI)		Perfluoroalkyl Sub es. NSERC , Postdoo	stances in Isolated toral Fellowship.	2003 2004	\$40,000 \$40,000
1	J. Martin, with D.Muir (PI), and S. Mabury.	compounds in	ssessment of perfl the Canadian Arcti Program (NCP).		2002	\$50,000
Graduate Student Supervision	Student Details	Defended?	MPH/MSc/PhD	Notes		
	Jonathan P Benskin 2005-2011 Current Position: Associate Professor Stockholm University Career Progression 2011-Present, Fisheries and Ocean Canada Visiting Scientist, Institute of Ocean Sciences. 2011-2013, NSERC Industrial R&D Fellowship, AXYS Analytical Ltd and Simon Fraser University		PhD Medical Sciences	Thesis: Application isomer profiles for exposure source do exposure source expellowship (SF = 2009 Society of Toxicology and Platform Prese = 2008 Laborator Pathology Rese = 2008 John and Environment S = 2007 Canadian (CSC) Confere Presentation A Chemistry Div = 2007 Alberta I	manufacture determination ations Durin ds: Industrial Postury Axis) Industrial Postury Medicine dearch Day Ford Patricia Scotholarship in Society for Ince Graduar Award (Analision)	ring and n. E-thesis ng Training: 17 stdoctoral ental r (SETAC) vard e and Poster Award hlosser r Chemistry te Student lytical

Matthew Ross

PhD

Thesis title: Enantiomer- and isomer-

2005-2011 Chemistry specific fate of persistent organic pollutants in the environment. E-thesis **Current Position:** (Co-Supervisor with Dr. Charles Wong) **Associate Professor Grant MacEwan University** Peer Review Publications During Training: 11 **Dept Physical Sciences Honours and awards:** Career Progression: Top Paper, Science (2012). Environmental Science and Technology. 2014-2019, Assistant Professor, Best Postdoctoral Fellow Oral Department of Physical Presentation, John W. Macgregor Sciences, Grant MacEwan Memorial Lecture and Research Day University. Best Student Poster, Environmental 2012-2014, Instructor, Chemistry Division 2007 90th Canadian Department of Physical **Chemistry Conference** Sciences, Grant MacEwan Travel Award, Society of Environmental University. Toxicology and Chemistry 2006, 2007 University of Alberta Graduate Entrance 2011-2012, Postdoctoral Fellow, Scholarship 2004 JW Martin Lab **Brian Asher** PhD (Co-Supervisor with Dr. Charles Wong) 1 Start: 2005-2011 Chemistry <u>Thesis:</u> Source apportionment of chiral **Current Position:** persistent organic pollutants. E-thesis 2013-Present: Peer Review Publications During Training: 6 Air Quality Analyst, Manitoba **Conservation and Water** Honours and awards: Stewardship 2007-20009 - National Sciences and **Engineering Research Council of Canada Career Progression** (NSERC) PGS-D award 2005-2006. NSERC CGS-M, University of 2012-2013, Environmental Alberta. Assessment Coordinator, 2008 Walter H. Johns Graduate **Environment Canada Fellowship** 2008 Society of Environmental 2010-2012. Toxicology and Chemistry (SETAC) Chemist/Contaminated Sites student platform presentation award Officer, 2006-2011 Alberta Ingenuity Fund Health Canada Studentship **Fiona Zhang** MSc Thesis: The Disposition of Polybrominated 2005-2008 Medical Diphenyl Ethers in Mink (Mustela vison). E-Sciences thesis **Current Position:** Peer Review Publications During Training: 3 Ph.D Candidate, Department of Neuroscience, University of Honours and awards: **British Columbia** 2007 Best Poster, The First Canada-China Symposium on Analytical **Career Progression** Chemistry on Life Sciences. 2006 Best Poster, International 2010, Workshop on Water Contaminants & NSERC Alexander Graham Bell **Health Effects** Canada Graduate Scholarship

Emily Chan 2006-2010 Career Progression: PhD in Pediatrics (2016) University of Alberta	✓	MSc Public Health	Thesis: Perfluorinated acids in human serum as determinants of maternal hypothyroxinemia. E-thesis Peer Review Publications During Training: 3 Honours and awards: 2007, 2010 QE II Scholarship
Laura Deakin 2007-2009 Current Position: Lecturer University of Waterloo, Chemistry Dept.	✓	MPH Occupational and Environmental Health	Course based program
Atefeh Afzal 2008-2013	✓	PhD Civil & Environmental Engineering	(Co-Supervisor with Dr. Mohamed Gamal El Din) Thesis: Application of Advanced Oxidation Processes for Treatment of Naphthenic Acids in Oil Sands Process Water. Peer Review Publications During Training: 3
Sanjay Beesoon 2008-2013 Current Position: Assistant Lead Scientist Surgery Strategic Clinical Network Alberta Health Services Career Progression: Lead Scientist, Healthy Environments, Alberta Health Services, Edmonton.	•	PhD Medical Sciences	Thesis research area: Perfluorinated compound exposure sources and isomer disposition. Peer Review Publications During Training: 9 Honours and awards: 2012 FGSR Dissertation Fellowship 2013 and 2011 Dynalife Research Prize, Department of Laboratory Medicine and Pathology 2012 Andrew Stewart Memorial Graduate Prize, UofA 2012 Graduate Student Association Interdisciplinary Research Award 2008-2013. Alberta Innovates Health Solutions Doctoral Studentship 2008 Faculty of Medicine & Dentistry 75th Anniversary Scholarship
Yifeng Zhang 2008-2013 Current Position: Fall 2013-present, Researcher University of Alberta Ultratrace Lab	✓	PhD Chemistry (Nankai University)	*Yifeng is a chemistry student from China who was awarded a competitive China Scholarship to conduct part of his thesis research in my lab. His degree was granted by Nankai University. Thesis area: Biomonitoring and disposition of perfluoroalkyl compounds and their isomers in humans. Peer Review Publications During Training: 3

Jiaying Liu	✓	PhD	Thesis research area: Exposure to Bisphenol
2011-2017		Medical Sciences	A (BPA), BPA alternatives, and child neurodevelopment.
Current Position:		Sciences	·
Postdoctoral Fellow			Peer Review Publications During Training: 6
Peking University Beijing, CN			 Honours and awards: 2012-2016. Alberta Innovates Health Solutions Doctoral Studentship. 2011 Alberta Health Services Graduate Student Recruitment Studentship 2011 75th Anniversary Award 2011 Medical Sciences Graduate Program Scholarship
Hannah Liu 2011-2017	✓	PhD Medical Sciences	<u>Thesis research area:</u> Sources of perfluorinated compounds in humans and the environment.
Current Position: Postdoctoral Fellow State Key Laboratory of			Peer Review Publications During Training:
Environmental Chemistry & Ecotoxicology Beijing, CN			 Honours and awards: 2011-2015. China Scholarship Council Doctoral Studentship. 2015 Andrew Stewart Memorial Graduate Prize, UofA 2015 Killam Graduate Scholarship, UofA
Jin Hangbiao 2012-2016 Current Position:	✓	PhD Chemistry (Nankai University)	Jin was a chemistry student from China whom was awarded a competitive China Scholarship to conduct part of his thesis research in my lab.
Assistant Professor Zhejiang University of Technology			Thesis area: Environmental monitoring of novel perfluoroalkyl compounds and their isomers in China
Anthony Reardon 2012-2017	✓	PhD Medical Sciences	Thesis research area: Exposure to perfluorinated compounds and neurodevelopment.
Current Position: Researcher			Peer Review Publications During Training: 2
Health Canada Ottawa, ON			 Honours and awards: 2012. MSGP Scholarship 2013. 75th Anniversary Award 2014. QEII Scholarship 2015-2016. WCHRI Scholarship
Nikolas Zetouni 2012-2015	✓	MSc Medical Sciences	<u>Thesis area:</u> Genotoxicity and mutagenicity of oil sands process affected water
Current Position:		Sciences	Honours and awards:2012. MSGP Scholarship
Pest control specialist Rentokil Steritech Edmonton, AB			• 2013. MSGP Scholarship
Career Progression:			
Quality Control Specialist			

	Cargill, Camrose	AB					
	lan Gault 2015-2018		✓	MSc Anal & Environ Toxicol	<u>Thesis research area:</u> Toxicity of oil sands process water fractions to mammalian cells		
	Current Position Golder Associate				Honours and awards:2015. NSERC Create Scholarship		
	Kalliroi Sdougko Start: September		In prog.	PhD Environ. Sci.	<u>Thesis research area:</u> Exposomics of huma biofluids		
	Hongyu Xie Start: September	r 2019	In prog.	PhD Environ. Sci.	Thesis research area: Exposomics of huma biofluids		
	Denise Strand Start: January 20)20	In prog.	PhD Environ. Sci.	Thesis research area: Toxicology of mixture using HTS and liquid handling robotics		
	May-Britt Rian Start: September	r 2020	recruited	PhD Environ. Sci.	Thesis research area: Nontarget Mass spec		
Postdoctoral & Researcher Supervision	2005-2006	Research area: Peer Review Pu	<u>e</u> : PhD Chen Naphthenic Iblications Du	nistry (Leipzig, Ger	ate in oil sands process water		
	2006-2008	Dr. Xiumei Han, PDF Previous Degree: PhD Chemistry (Queens University) Research area: Naphthenic acid microbial biodegradative fate in oil sands process water Peer Review Publications During Training: 5 Present Position: National Research Council, Plant Biotechnology Institute, Saskatoon SK					
	2006-2008	Dr. Rupasri Mandal, Research Associate Previous Degree: PhD Chemistry (Carleton University) Research area: Human biomonitoring and data interpretation Present Position: Research Associate, Mass Spectrometrist, Dept Bio Sci, UAlberta					
	2008-2011	Dr. Przemyslaw Drzewicz, PDF (Co-Supervision with Mohamed Gamal El-Din) Previous Degree: PhD Chemistry (Institute of Nuclear Chemistry and Technology, Poland) Research area: Mechanism of OH radical degradation of model naphthenic acids Peer Review Publications During Training: 7 Present Position: Head of Central Chemical Laboratory at Polish Geological Institute - National Research Institute					
	2009-2011	Dr. Leonidas Perez, PDF Previous Degree: PhD Chemistry, University of Almería, Spain Research area: Fate of OSPW NAs by advanced oxidation Peer Review Publications During Training: 10 Present Position: Assistant Professor, Dept Civil Environmental Engineering, U of Alberta					
	2008-2010	Sciences, Dalian Research area: Peer Review Pu Present Positio Concord, Canad Career Progres	e: PhD Chen n, P. R. China Enantiomer ublications Du n: 2013-Pres da.	ic analysis and sou uring Training: 3 ent, Software Verit	ute of Chemical Physics, Chinese Academy of rce assessment of perfluorinated compounds fication Specialist, Mass Spectrometry, AB Sciences, Analytical Chemistry, Key Laboratory o		

Sciences, Chinese Academy of Sciences Shanghai, China.

Nutrition and Metabolism, Institute for Nutritional Sciences, Shanghai Institutes for Biological

2011-2012 Dr. Matthew Ross, PDF

Previous Degree: PhD Chemistry, Dept Chemistry, University of Alberta

Research area: Multidimensional analysis of OSPW and environmental monitoring

Peer Review Publications During Training: 1

Present Position: Associate Professor, Grant MacEwan University, Edmonton AB.

2011-2014 Dr. Alberto Dos Santos Pereira, Research Associate

Previous Degree: DSc, Analytical Chemistry, University of Sao Paulo, Brazil

Peer Review Publications During Training: 4

Research area: Fractionation and high-resolution analysis of oil sands process affected water

Present Position: Alberta Innovates Scientist, Vegerville AB.

2012-2015 **Dr. Kun Zhang, PDF**

<u>Previous Degree</u>: PhD, Environmental Chemistry, Peking University, China <u>Research area</u>: bioaccumulation and metabolism of complex mixtures

Peer-Review Publications During Training: 3 in preparation

<u>Present Position</u>: Postdoc, University of Northwest Switzerland, Basil (Maternity Leave)

2014-2019 Dr. Chenxing Sun, PDF and Research Associate

Previous Degree: PhD, Lipid Chemistry, University of Alberta

Research Area: environmental forensics

Awards: University of Alberta Nominee for NSRC Banting Fellowship

Present Position: Scientist, Alberta Environment and Parks

2017 – present Dr. Lisa D'Agostino, PDF

<u>Previous Degree</u>: PhD, Chemistry, University of Toronto <u>Research Area</u>: nontarget analysis of air by HPLC-Orbitrap

2017-2019 Dr. Ioannis Sadikstsis, PDF

<u>Previous Degree</u>: PhD, Analytical Chemistry, Stockholm University

Research Area: nontarget analysis of air by GC-Orbitrap

Present Position: Researcher, Department MMK, Stockholm Univeristy

2019 – present Dr. Stefano Papazian, PDF

Previous Degree: PhD, Metabolomics, Umeå University

Research Area: nontarget analysis workflows and passive sampling

2020 – present Dr. Benilde Bonnefille, PDF

Previous Degree: PhD, Chemistry, University of Montpellier

Research Area: nontarget analysis of water and dietary items in Bangladesh

2020 – present Dr. Erik Nylander, PDF

Co-supervised with O. Karlsson

Previous Degree: PhD, Toxicology, Uppsala University

Research Area: HTS toxicology of mixtures using liquid handling robotics

2020 – present Dr. Jean Fromment, PDF

Previous Degree: PhD, Chemistry, University of Oslo

Research Area: nontarget analysis of air and effects-directed analysis