COMMENT

DEFINING THE BOUNDARIES OF "PERSONAL INJURY": *RAINER V. UNION CARBIDE CORP.*

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INTRODUCTION

For over fifty years, workers at the Paducah Gaseous Diffusion Plant (PGDP) in western Kentucky were exposed to dangerous amounts of toxic radiation—largely without their knowledge. Since the news of the exposure exploded onto the national press in the late 1990s,[1] over six thousand compensation claims have been filed with the Department of Labor, and more than $175 million has been paid out.[2] Other workers—joined by the Department of Justice—have opted to file separate lawsuits, claiming that the

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1. News of the contamination at the PGDP made national headlines as early as August 1999. *See* Joby Warrick, *In Harm's Way, and in the Dark: Workers Exposed to Plutonium at U.S. Plant*, WASH. POST, Aug. 8, 1999, at A1.

2. *See* James Malone, *Radiation Dosages Disputed*, COURIER-J. (Louisville), Feb. 11, 2005, at A1.

PGDP's operators fraudulently withheld information from them.[3] Individuals with property adjacent to the PGDP have also filed suit.[4] The legal fallout from the PGDP contamination is destined to keep federal courts busy for years to come.

This Comment focuses on just one group of PGDP workers and their families. This group consists of about thirty individuals who, over the course of the last quarter century, were exposed in various degrees to the dangerous toxins present at the PGDP. But, unlike the other workers filing compensation claims and lawsuits, these individuals have experienced no physical symptoms associated with their exposure. To the contrary, they are all healthy men and women. They are not sick, nor do they claim to be sick. This group of PGDP affiliates instead sued the plant's operators under a completely novel theory—that they have suffered asymptomatic damage to their DNA. Their claim was rejected by the Sixth Circuit Court of Appeals in *Rainer v. Union Carbide Corp.*,[5] a case of first impression for the federal appellate courts.

This Comment addresses this case. Part I briefly discusses *Rainer*'s factual and legal background. Part II analyzes the relevant precedent in the field. Part III summarizes *Rainer*'s legal arguments and public policy considerations, and Part IV discusses *Rainer*'s impact and highlights some of the problems left unanswered by the Sixth Circuit's opinion.

I. *RAINER*'S FACTUAL BACKGROUND

Uranium is a uniquely potent element. In its ordinary form, the element is extremely heavy. But through the "enriching" process, uranium becomes more commercially and militarily useful. The PGDP has, since its construction in the 1950s, enriched more than 100,000 metric tons of uranium.[6] In addition to its

3. *See, e.g.*, Cartwright v. Lockheed Martin Util. Servs., 40 Fed. App'x 147 (6th Cir. 2002); *see also* James R. Carroll, *U.S. Joins Lawsuit Against Uranium Plant Contractor*, COURIER-J. (Louisville), Aug. 30, 2003, at A1.

4. Smith v. Carbide & Chems. Corp., 298 F. Supp. 2d 561 (W.D. Ky. 2004), *appeal docketed*, No. 04-5323 (6th Cir. Mar. 25, 2004); Lamb v. Martin Marietta Energy Sys., 835 F. Supp. 959 (W.D. Ky. 1993).

5. 402 F.3d 608 (6th Cir. 2005). Judge Gilman wrote the panel's opinion in *Rainer*.

6. *Id.* at 611. For a history of the PGDP, see U.S. DEP'T OF ENERGY, PHASE II: INDEPENDENT INVESTIGATION OF THE PADUCAH GASEOUS DIFFUSION PLANT 12 (2002) (on file with author) [hereinafter DOE PHASE II REPORT]. The DOE report was once available on the Internet, *see* http://www.eh.doe.gov/csa, but security concerns have prompted its removal. It is important to note that, although the Department of Energy retains full ownership of the PGDP, the plant has always been managed by independent operators, who are also the *Rainer* defendants. *See* Rainer v. Union Carbide Corp., No. 03-6032, 2005 U.S. App. LEXIS 5079 (6th Cir. Mar. 25, 2005); *see also* U.S. DEP'T OF ENERGY, PHASE I: INDEPENDENT INVESTIGATION OF THE PADUCAH GASEOUS DIFFUSION PLANT 8-9 (1999) (on file with author) [hereinafter DOE PHASE I REPORT]. Like the DOE Phase II Report, the DOE Phase I Report was once available on the Internet, *see* http://www.eh.doe.gov/csa, but security concerns have prompted its removal as well.

enrichment activities, the PGDP produced various unwanted and toxic waste products, including two particularly dangerous radioactive elements: neptunium-237 and plutonium-239.[7] Both are extremely long lived and are absorbed readily by the body.[8] Substantial medical evidence exists linking these two elements with aggressive forms of cancer.[9]

Of the four plaintiffs' classes in the *Rainer* case, three were comprised of current or former PGDP workers.[10] These individuals were exposed in various capacities to neptunium-237 and plutonium-239 while working at the plant.[11] The other plaintiff class was composed of family members who, although not directly exposed to these elements, claimed that they had been injured as a result of secondary exposure.[12] But, although neptunium-237 and plutonium-239 are known carcinogens, none of the *Rainer* plaintiffs was, as the district court noted, "sick."[13] They suffered from nothing that would be characterized as a physical manifestation of disease. Nor was it their intent to claim that they were "sick" in the traditional sense of the word.[14]

Rather, the plaintiffs alleged that they had suffered chromosomal damage that was undetectable to the naked eye. In support, the plaintiffs submitted affidavits from an array of medical experts, who testified that, although the plaintiffs' injuries were not apparent to a lay observer, they were nonetheless "physical injuries." For example, the plaintiffs' main witness, Dr. Gordon Livingston, opined in an affidavit that eight percent of the plaintiffs' DNA

7. DOE PHASE I REPORT, *supra* note 6, at 12. The list also includes technetium-99, strontium-90, and polychlorinated biphenyl. *Id.*

8. *Id.* Neptunium-237 has a half-life of 2.14 million years, and plutonium-239 has a half-life of 24,065 years. *Id.*; *see also Rainer*, 402 F.3d at 612.

9. *See* James R. Carroll & James Malone, *Specialist: Cancer, Radiation Likely Tied*, COURIER-J. (Louisville), June 26, 2001, at B1; *see also Rainer*, 402 F.3d at 613.

10. The plaintiffs were broken up into four classes for the sake of evaluating their differing claims. *Rainer*, 402 F.3d at 613-14.

11. *Id.* at 612. As the court in *Rainer* observed, "[t]he rank-and-file PGDP employees were apparently kept ignorant about the presence of transuranics at the plant," *id.*, and were exposed to the radiation in shocking ways. The court noted that one researcher "watched one man push up his mask and smoke a cigarette using potentially contaminated hands and gloves." *Id.*; *see also* Joby Warrick, *Radiation Risks Long Concealed, Paducah Plant Memos Show Fear of Public Outcry*, WASH. POST, Sept. 21, 1999, at A1.

12. *Rainer*, 402 F.3d at 614.

13. *Id.* at 621.

14. The plaintiffs' lack of physical symptoms is discussed extensively by the Sixth Circuit in its factual background section. *Id.* at 612-13. For example, one plaintiff revealed that, at her last medical examination, she had exhibited no "problems of any kind." *Id.* at 612. The court also noted that another plaintiff

> was asked whether a doctor had ever told her that she should be "concerned" about her health because her father worked at the PGDP. She replied that "no, I don't know what they have had a reason to. Like I said, I'm in seemingly good health. I go for a regular checkup once a year, and I don't—I don't know that a doctor has had a reason to tell me."

Id. at 613.

exhibited structural chromosome abnormalities,[15] as opposed to an average of just over one percent for the general public.[16] As the court summarized:

> Dr. Livingston concluded that "the physical injuries sustained by the DNA and the misrepair of those DNA strands is analogous to a knife wound of the skin dividing the cells of the body and the scar tissue that is generated as the body attempts to repair that cellular damage." Dr. Martin Raff, another expert, drew the analogy to HIV, noting that "patients who test positive for the HIV virus may not have any signs or symptoms of clinical disease for many years . . . . But even though a person with HIV does not have 'clinical disease' they are clearly in a diseased state." He also explained that "radiation damage to chromosomes is the quintessential determinant of altered physiologic function because our chromosomes control each and every bodily function . . . . As such this premorbid state is disease." Dr. Daniel M. Sullivan stated in his affidavit that "the physical injuries sustained by the DNA [of the plaintiffs] and the misrepair of those DNA strands is analogous to a cutting wound of the tissue of the body. . . . The primary difference is that DNA injury and chromosome misrepair have much more ominous consequences for the individual since such an injury is associated with an increased likelihood of the occurrence of cancer."[17]

The plaintiffs thus freely admitted that they suffered from no physical symptoms evincing a manifestation of disease. They instead contended that their irreparable chromosomal damage was by itself sufficient to stand as a cause of action under personal injury law.

II. RELEVANT PRECEDENT: DEFINING SUBCELLULAR INJURY

Although tort law requires that a successful claimant demonstrate some sort of harm, little discussion has been devoted to the topic of what *defines* harm—at least in the personal injury context.[18] Must the injury be obvious to the naked eye? Does it depend entirely on medical definitions? Must it be permanent? Of course, the average personal injury lawsuit generally involves a painfully obvious physical injury—e.g., a bruised head after a suitcase full of firecrackers has exploded on a railway platform[19]—as opposed to some ambiguous subcellular "harm" discernible only through advanced medical screening. Courts have thus had little need to explore the boundaries between salient physical injury and latent subcellular damage.

15. The DNA tests discussed by Dr. Gordon Livingston were performed on only three of the plaintiffs: Alphonse Rainer, Charles Ramsey, and David Sacharnoski. *Id.* at 613. The court assumed for purposes of summary judgment that all of the plaintiffs had similar subcellular damage. *Id.*

16. *Id.*

17. *Id.* (alterations in original).

18. More discussion has, for example, been devoted to the injury requirements in other areas of tort law, such as defamation and the intentional infliction of pain and suffering.

19. The latter example is, of course, the factual background of *Palsgraf v. Long Island Railroad Co.*, 162 N.E. 99 (N.Y. 1928).

The earliest cases involving asymptomatic or subcellular injuries arose in the late 1970s and early 1980s, when medical advancements first made it possible for such injuries to be identified.[20] Plaintiffs first brought forth claims under the broad argument that subcellular injuries placed them at an increased risk of future disease.[21] Eventually, plaintiffs' lawyers developed more sophisticated theories. Of particular note is the claim of medical monitoring, in which plaintiffs seek to be reimbursed for the costs associated with regular hospital visits, physical examinations, and diagnostic tests—all expenses incurred because their injury has presumably led them to become more vulnerable to developing a disease at a later point in life.[22] Under these theories, subcellular injury may present a cause of action, but only because the particular injury might very well lead the plaintiff to develop at some later time those physical symptoms normally associated with disease.

The *Rainer* plaintiffs presented a related, but more direct theory—that subcellular injury *standing alone* is a cause of action. And, although the case was one of first impression for a federal appellate court, a handful of jurisdictions had already addressed this particular claim. The most thorough consideration of the topic—and certainly one of the earliest ones—was in *Brafford v. Susquehanna Corp.*[23] In that case, the plaintiffs, a family of five, had lived for over two years near a uranium-milling facility. As in *Rainer*, none of the plaintiffs suffered from any salient physical symptoms. They nonetheless sought damages for various injuries, including "chromosome damage" and an "increased risk of contracting cancer during their lifetimes."[24] The district court judge noted the link between the claims, observing that the plaintiffs "conclude that the chromosomal damage is itself a present injury that *can give rise to a claim for future risk of cancer*."[25] He further cautioned the plaintiffs that he

20. One of the earliest cases involving a subcellular injury was *Mink v. University of Chicago*, 460 F. Supp. 713 (N.D. Ill. 1978). In that case, a group of women who had been part of a medical experiment sued the researchers, claiming that they had suffered an increased risk of cancer. The district court rejected their claims, foreshadowing *Rainer* when it noted that "[t]here is no allegation of specific injury to any named plaintiff." *Id.* at 716 n.2.

21. For a survey of the case law in this field, see Barbara Wrubel, *Damage Issues in Toxic Tort Litigation*, *in* TOXIC TORT LITIGATION 69-79 (Richard J. Lippes et al. eds., 1992). *See, e.g.*, *Mink*, 460 F. Supp. 713 (rejecting the claim by plaintiffs that they were entitled to damages on the basis of an increased risk of cancer).

22. *See generally* Arvin Maskin et al., *Medical Monitoring: A Viable Remedy for Deserving Plaintiffs or Tort Law's Most Expensive Consolation Prize?*, 27 WM. MITCHELL L. REV. 521 (2000); Allen T. Slagel, *Medical Surveillance Damages: A Solution to the Inadequate Compensation of Toxic Tort Victims*, 63 IND. L.J. 849, 851-52 (1988). Wrubel provides a list of cases dealing with medical-monitoring claims. *See* Wrubel, *supra* note 21, at 125-34; *see also In re* Paoli R.R. Yard PCB Litig., 916 F.2d 829 (3d Cir. 1990) (predicting that the Pennsylvania Supreme Court would recognize the claim of medical monitoring); Miranda v. Shell Oil Co., 7 Cal. Rptr. 2d 623, 625-29 (Ct. App. 1992) (accepting the theory of medical monitoring in California).

23. 586 F. Supp. 14 (D. Colo. 1984).

24. *Id.* at 17.

25. *Id.* (emphasis added).

perceived their "characterization of subcellular changes as a present injury [as] an attempt to circumvent the present injury requirement."[26] Nonetheless, the court allowed the case to proceed, citing the consideration that the "plaintiffs have at least raised a question of fact with respect to whether a present injury in the form of chromosome damage was suffered by the plaintiffs as a result of their exposure to the radiation emitted from the mill tailings."[27] *Brafford* thus stands for the proposition that subcellular injury can stand as a cause of action. But drawing a legal conclusion from the district court's ruling is difficult, as it is unclear whether the district court would have entertained the plaintiffs' claims in the absence of their argument that their alleged "present injury" could give rise to a "claim for future risk of cancer."[28]

A similar result was reached in *Werlein v. United States*.[29] In that case, the plaintiffs' property was located adjacent to an Army ammunition plant and had become contaminated with trichloroethylene. The plaintiffs filed suit, claiming that they had sustained "actual physical injury in the form of chromosomal breakage" and demanding a medical-monitoring fund.[30] But the district court, like the district court in *Brafford*, discussed the plaintiffs' claims of present physical injury and of medical monitoring together. Initially, the court observed that

> Minnesota law does not recognize a cause of action generally for increased risk of disease due to mere exposure to a toxic substance. However, where a plaintiff has suffered a *present physical injury* that itself *causes plaintiff to suffer an increased risk of physical harm in the future*, plaintiff may recover damages for that increased risk of harm.[31]

Based on the facts before it, the district court refused to say whether both prongs had been met:

> [T]his Court cannot rule as a matter of law that plaintiffs' alleged injuries are not "real" simply because they are subcellular. The effect of volatile organic compounds on the human body is a subtle, complex matter. It is for the trier of fact, aided by expert testimony, to determine whether plaintiffs have suffered present harm.[32]

Werlein can perhaps be cited for the proposition that whether subcellular injury exists is a question of fact appropriately addressed by the jury. But the discussion is again tempered by the important caveat also present in *Brafford*: both causes of action were based, at least on some level, on the plaintiffs' allegation that the exposure led to some increased likelihood of disease.[33]

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26. *Id.* at 18.
27. *Id.*
28. *Id*. at 17.
29. 746 F. Supp. 887, 901 (D. Minn. 1990).
30. *Id*.
31. *Id.* (emphasis added) (citations omitted).
32. *Id.*
33. The state appellate court in another Minnesota case, *Bryson v. Pillsbury Co.*, 573

The only case to conclude to the contrary has been *Caputo v. Boston Edison Co*.[34] In that case, the plaintiff had been exposed to radiation while working in a power-plant boiler room. He sued, claiming "radiation-induced physical injury, psychological distress, and a fear of cancer based upon an increased statistical likelihood that he will develop the disease in the future" as the bases for his tort claim.[35] The district court largely focused on evaluating the credibility of an expert witness but paused to comment that, even "accepting as true the allegations in plaintiff's affidavit, such cellular damage does not rise to the level of physical injury as a matter of law because nothing in the record relates them to any objective symptoms of illness or disease."[36] Although *Caputo* is the only case aside from *Rainer* to establish that asymptomatic subcellular injury may not stand as a cause of action, the terseness of the opinion makes it difficult to draw from it any guiding legal principles.

In sum, the body of law dealing with subcellular injury is severely limited. Many plaintiffs have brought claims of medical monitoring, but only a handful have had the creativity (and the audacity, perhaps) to argue that an asymptomatic "injury"—in the absence of future physical symptoms—can stand as a cause of action. And before *Rainer*, only one case, *Caputo*, had considered and rejected the claim as a matter of law.

III. THE *RAINER* OPINION: REJECTING ASYMPTOMATIC DNA INJURY AS AN ADEQUATE CAUSE OF ACTION

The *Rainer* court relied heavily on the above-cited case law.[37] But it also looked extensively at cases from within the Commonwealth of Kentucky. This

N.W.2d 718 (Minn. Ct. App. 1998), also failed to articulate a clear rule. In that case, a woman's horse fell into a liquid waste pit maintained by the defendants. When the woman waded in to retrieve the animal, she realized that the water around her was contaminated with chemical insecticides. She then sued, claiming that she "suffered extensive chromosome breakage" and that, "because of the chromosome exposure, she ha[d] an increased risk of developing cancer." *Id.* at 720. The state appellate court concluded that summary judgment in favor of the defendants was improper in light of *Werlein*, while a dissent noted that "[m]ere allegations of emotional distress and possible medical monitoring expenses are insufficient to create a fact issue on whether [the plaintiff] now suffers from a present physical injury." *Id.* at 722 (Short, J., concurring in part, dissenting in part).

34. No. CIV.A.88-2126-Z, 1990 WL 98694, at *1 (D. Mass. July 9, 1990).

35. *Id.*

36. *Id.* at *4.

37. The *Rainer* opinion first dealt with several other claims, which are not pertinent to this Comment. Among them were the claims of the former PGDP employees, which the court concluded were barred by the Kentucky Workers' Compensation Act. *See* Rainer v. Union Carbide Corp., 402 F.3d 608, 614-16 (6th Cir. 2005). In addition, in a holding that might engender future controversy, the Sixth Circuit concluded that claims brought under *Bivens v. Six Unknown Named Agents of Federal Bureau of Narcotics*, 403 U.S. 388 (1971), were precluded by the Price-Anderson Act. *Rainer*, 402 F.3d at 622-25.

state-law focus is due to the fact that the *Rainer* court was limited by the federal law governing litigation relating to American nuclear facilities: the Price-Anderson Act.[38] The Act defines a "nuclear incident" as any occurrence causing "bodily injury, sickness, disease, or death . . . resulting from the radioactive . . . material."[39] More importantly, it also requires that "the substantive rules for decision in such [a public liability] action *shall be derived from the law of the State* in which the nuclear incident involved occurs . . . ."[40] The *Rainer* court was therefore required to tailor its analysis to draw primarily from Kentucky personal injury law.

Applying this standard, the Sixth Circuit began, like the courts in *Brafford* and *Werlein*, by examining the relevant case law in the area of medical monitoring. The court first looked to the state class-action case of *Wood v. Wyeth-Ayerst Laboratories*,[41] which rejected claims of medical monitoring[42] and provided the court with useful language. The lead plaintiff in that case claimed that she had taken the popular weight-loss drug fenfluramine (Fen-Phen). She did not claim that she had sustained any sort of present physical injury as a result of her exposure or that the ingestion was by itself sufficient to stand as a cause of action.[43] Rather, she alleged that as a result of her exposure she had suffered "significantly increased risk of serious injury and disease."[44] The Kentucky Supreme Court rejected her claim, largely on the grounds that the plaintiff "did not claim any present physical injury in her complaint"[45] and that her "body has not yet been impaired by her ingestion of fenfluramine."[46] In language particularly helpful to the *Rainer* court, the *Wood* court concluded that "a plaintiff must have sustained some physical injury before a cause of action can accrue. To find otherwise would force us to stretch the limits of logic and ignore a long line of legal precedent."[47] The *Wood* court, however, considered these issues within the context of medical monitoring, and the

38. 42 U.S.C. § 2011 (2006).

39. § 2014(q).

40. § 2014(hh) (emphasis added).

41. 82 S.W.3d 849 (Ky. 2002).

42. *Id.* at 857 ("We are supported in rejecting prospective medical monitoring claims (in the absence of present injury) by both the United States Supreme Court and a persuasive cadre of authors from academia.").

43. *Id.* at 851-52.

44. *Id.* at 851.

45. *Id.* at 854.

46. *Id.* at 855.

47. *Id.* at 853-54. The state supreme court further mused on the floodgates problem associated with the plaintiffs' position, citing an academic work that concluded that "'[g]iven that negligently distributed or discharged toxins can be perceived to lie around every corner in the modern industrialized world, and their effects on risk levels are at best speculative, the potential tort claims involved are inherently limitless and endless.'" *Id.* at 857-58 (quoting James A. Henderson, Jr. & Aaron D. Twerski, *Asbestos Litigation Gone Mad: Exposure-Based Recovery for Increased Risk, Mental Distress, and Medical Monitoring*, 53 S.C. L. REV. 815, 831 (2002)).

Rainer court was careful to distinguish this case on that basis,[48] relying on *Wood*'s language only insofar as it provided a useful starting point for its own public policy analysis.

The *Rainer* court also noted language in another Kentucky Supreme Court case, *Capital Holding Corp. v. Bailey*.[49] In that case, one of the plaintiffs was hired to remove pipes and ducts from a building owned by the defendant. Unbeknownst to him, however, the pipes were coated with asbestos. He sued, claiming that the "inhalation of the asbestos fibers, standing alone, constituted physical contact sufficient to allow recovery of damages for . . . increased risk of future injury or disease . . . ."[50] Like the plaintiff in *Wood*, the *Capital Holding* plaintiff did not claim that the inhalation alone was an actionable injury, nor did he present medical evidence demonstrating that the inhalation had caused any type of injury—detectable or undetectable. The Kentucky Supreme Court was swift to reject the plaintiff's contention: "[W]ith a substance capable of causing cancer," it noted, "just as with any other defective product, *no cause of action accrues until the potentially harmful exposure actually 'causes injury that produces loss or damage*.'"[51] Kentucky case law, although not addressing directly the issues raised by the *Rainer* plaintiffs, thus set forth a foundation from which the Sixth Circuit could extrapolate a denial of their claim.

Building on this precedent, the *Rainer* court set forth three public policy considerations for rejecting the plaintiffs' arguments.[52] The Sixth Circuit first pointed to the floodgate problem associated with accepting subcellular injury as a cause of action:

> Accepting the plaintiffs' claim would . . . throw open the possibility of litigation by any person experiencing even the most benign subcellular damage. Based upon the average American's exposure to chemically processed foods, toxic fumes, genetically modified fruits and vegetables, mercury-laden fish, and hormonally treated chicken and beef, this might encompass a very large percentage of the total population. Nowhere in their

48. *See infra* note 52.

49. 873 S.W.2d 187 (Ky. 1994).

50. *Id.* at 190.

51. *Id.* at 192 (quoting Louisville Trust Co. v. Johns-Manville Prods., 580 S.W.2d 497 (Ky. 1979) (emphasis added)).

52. It is important to note that, although the *Rainer* court heavily weighed the Kentucky precedent, it did so only once it had acknowledged the novelty of the plaintiffs' argument:

> The plaintiffs . . . note that *Wood* and *Capital Holding* are distinguishable in that those 3 plaintiffs did not (and perhaps could not) point to any concrete physical damage. Instead, their claims were based upon the theory that their exposure might lead to an increased risk of disease. Here, in contrast, the plaintiffs argue that "[a]ppellants have much more than 'potential' consequences from 'the mere ingestion' or exposure to a toxic substance. There is ample proof of a physical/bodily injury and disease from their exposure to plutonium and neptunium. [Their] injuries are not speculative."

Rainer v. Union Carbide Corp., 402 F.3d 608, 619 (6th Cir. 2005) (alterations in original).

> arguments do the plaintiffs address these "floodgate" concerns.[53]

Without citing any specific data, the court thus alluded to a commonly held belief: every American—whether or not directly exposed to negligent action—can likely claim some sort of subcellular change as a result of *someone's* activity.

This suspicion has been borne out by public health studies. For example, a July 2005 study by the Centers for Disease Control and Prevention (CDC) found that, of approximately 5000 individuals, all of them had at least 148 different toxins present in their bodies, including polychlorinated biphenyls, polychlorinated dibenzofurans, dioxins, lead, and dimethylphosphate.[54] A more limited study conducted by the Environmental Working Group (EWG) on hospital workers, news personalities, and environmental activists revealed similar results.[55] The EWG tested for 210 chemicals and found that most participants had traces of at least 80 of these chemicals. (The television newscaster Bill Moyers, for example, tested positive for 84 contaminants.[56]) Anecdotal evidence also suggests that subcellular injury can accrue while speaking on a mobile telephone,[57] waiting in traffic,[58] or flying in an airplane over the North Pole.[59] Allowing a subcellular injury to proceed as a cause of action would therefore open many avenues of litigation previously thought ludicrous.

At the same time, however, *Rainer* might have been too dismissive in relying on this "floodgates" concern. From an economic standpoint, the DNA damage caused by factories and businesses represents a type of externality. Forcing these factories and businesses to internalize the costs of these externalities—through the mechanism of tort—could be a much better public policy than having courts look the other way. No one doubts that exposure to "chemically processed foods, toxic fumes, genetically modified fruits and vegetables, mercury-laden fish, and hormonally treated chicken and beef"[60]

53. *Id.* at 621.

54. U.S. DEP'T OF HEALTH & HUMAN SERVS., THIRD NATIONAL REPORT ON HUMAN EXPOSURE TO ENVIRONMENTAL CHEMICALS (2005), *available at* http://www.cdc.gov/exposurereport/3rd/pdf/thirdreport.pdf.

55. ENVTL. WORKING GROUP, BODYBURDEN: THE POLLUTION IN PEOPLE (2003), http://www.ewg.org/reports/bodyburden.

56. *Id.*

57. *See, e.g.*, Nancy McVicar, *Cellular Phone Risk Cited in Study: Swedes Find Increased Danger of Tumors*, SUN-SENTINEL (Fort Lauderdale), Oct. 14, 2004, at 1A.

58. *See, e.g.*, *Traffic Fumes "Damage Human DNA,"* BBC NEWS, Mar. 22, 2005, *available at* http://news.bbc.co.uk/1/hi/health/4368093.stm.

59. *See, e.g.*, Andy Ho, *Radiation Danger on Long-Haul Flights? Experts Poles Apart*, STRAITS TIMES (Singapore), Apr. 2, 2005. But perhaps the adverse effects of flying over the pole can be thwarted with a drink. *See Beer Found To "Stop Cancer,"* DAILY TELEGRAPH (Sydney), Jan. 21, 2005, at 25.

60. Rainer v. Union Carbide Corp., 402 F.3d 608, 621 (6th Cir. 2005).

might, to a certain extent, be at fault for Americans' high rate of cancer.[61] And if one of the prime objectives of tort law is to hold individuals accountable for their actions that adversely affect others, then the floodgates concern should not be a reason to *deny* the *Rainer* plaintiffs' claims, but instead a good reason to agree with their arguments. Had courts embraced subcellular injury as a cause of action earlier, perhaps the presence of toxins documented by the CDC and the EWG would by now have been less of a public concern.

The second public policy consideration identified by the court is the fact that Kentucky, like many other states, has a "one-claim" rule,[62] which "limits plaintiffs in tort cases to one chance in which to have their grievances redressed."[63] In light of this rule, the court concluded that the plaintiffs "would be left adrift without a legal remedy and without recompense should they later develop a truly debilitating disease."[64] This consideration is perhaps the court's strongest. Many observers have already cited the one-claim rule (also referred to as the "single-controversy" rule[65]) as a procedural block for toxic-tort victims, arguing that, if a plaintiff must wait years for some symptomatic illness to develop, the required causal link between her illness and a defendant's action may be impossible to trace.[66] The problems posed by the single-controversy rule are even more salient for plaintiffs bringing suits under theories of subcellular damage. Whereas a plaintiff bringing a claim of medical monitoring (or for the increased likelihood of disease) does so, by definition, with the risk of future disease squarely in mind, the plaintiff bringing a suit under the theory of subcellular damage thinks only of the present subcellular injury. Not only would the medical-monitoring plaintiff recoup greater damages, but she would also have the protection of incorporating into her damage calculation the present value of the future disease. The plaintiff seeking to recover only for subcellular damage, by contrast, would be completely unprotected if she later developed a debilitating disease as a result of his injuries. Although the view taken by the Sixth Circuit still treats plaintiffs in a somewhat patronizing fashion, it does possess strong logic.

61. This is certainly the conclusion that the Environmental Working Group would suggest. *See* ENVTL. WORKING GROUP, *supra* note 55 ("Of the 167 chemicals found, 76 cause cancer in humans or animals, 94 are toxic to the brain and nervous system, and 79 cause birth defects or abnormal development.").

62. *Rainer*, 402 F.3d at 621.

63. *Id.*

64. *Id.* The court further noted, somewhat patronizingly, that "[a]llowing this suit to proceed would thus do a great disservice to those plaintiffs who might in fact later come down with the very diseases they so rightly fear." *Id.* at 621-22.

65. *See, e.g.*, Ayers v. Twp. of Jackson, 525 A.2d 287, 300 (N.J. 1987).

66. *See, e.g.*, Terry Morehead Dworkin, *Fear of Disease and Delayed Manifestation Injuries: A Solution or a Pandora's Box?*, 53 FORDHAM L. REV. 527, 528 (1984); Kenneth W. Miller, *Toxic Torts and Emotional Distress: The Case for an Independent Cause of Action for Fear of Future Harm*, 40 ARIZ. L. REV. 681, 696 (1998); Ann Taylor, *Public Health Funds: The Next Step in the Evolution of Tort Law*, 21 B.C. ENVTL. AFF. L. REV. 753 (1994).

The third—and by far weakest—public policy consideration cited by the court concerned the likely difficulty involved in calculating damages for chromosomal harm. "Losses resulting from salient physical diseases such as cancer or asbestosis are at least quantifiable," the court observed, "and courts have familiarized themselves with methods of computing the associated costs of medical care, absences from work, and physical pain."[67] On the other hand, in the case before it, the court observed that "[i]f any damages were to be assessed, they would fall in the realm of the purely theoretical, and would be nearly impossible for a trier of fact to accurately assess."[68] The court's discussion of damages is puzzling in a case still in the summary judgment stage—when no arguments had been presented to the court on the subject and, most likely, the plaintiffs' lawyers had given little thought to the mechanics of calculating a pecuniary sum. Moreover, the mere novelty of a damage claim has not deterred courts in the past. Many courts have acknowledged the legitimacy of awarding plaintiffs nominal damages, even in instances where no harm has been demonstrated.[69] The same theory could be applied to asymptomatic DNA damage, thus obviating to a certain extent the court's reliance on damages.

In light of these public policy considerations, the court declined to allow the plaintiffs' claim to proceed. And, unlike the previous cases addressing subcellular damage claims, it did so clearly—delineating the difference between medical-monitoring claims (which the plaintiffs explicitly did not raise) and claims of the "present injury of subcellular damage" (which were raised). The Sixth Circuit concluded:

> Although the plaintiffs contend that they have real and concrete physical injuries, the evidence shows that their DNA damage is harmful only insofar as it is predictive of future disease. The plaintiffs have amply demonstrated that chromosomal damage is directly linked with an increased likelihood of cancer. . . . [But] Kentucky caselaw provides sufficient guidance for us to conclude that, if this case were to be decided in that state's courts, the public policy considerations and the lack of any present physical illness would require the grant of summary judgment in favor of the defendants.[70]

Rainer thus definitively answered the question raised by *Brafford* and *Werlein* and hinted at in the case law on medical monitoring: asymptomatic DNA damage may not stand as a cause of action. And because of the

67. *Rainer*, 402 F.3d at 622.

68. *Id.*

69. The cases on this point are numerous. *See, e.g.*, Carey v. Piphus, 435 U.S. 247, 248 (1978) (holding that, in the case of two students whose due process rights had been violated, "in the absence of proof of actual injury, the students are entitled to recover only nominal damages"); *see also* Christopher J. McAuliffe, *Resurrecting an Old Cause of Action for a New Wrong: Battery as a Toxic Tort*, 20 B.C. ENVTL. AFF. L. REV. 265, 290 (1993) (noting that "plaintiffs can recover nominal damages under a battery cause of action for intentional, offensive invasions of their bodies, with or without harm").

70. *Rainer*, 402 F.3d at 622.

thoroughness of the opinion and because of its universally applicable public policy analysis, *Rainer* is likely to be considered one of the most important cases on this question.

IV. THE POST-*RAINER* WORLD: EVALUATING THE EFFECTS OF THE SIXTH CIRCUIT'S OPINION

Even though *Rainer* drew upon Kentucky case law in reaching its conclusion, the case will likely have an impact in other jurisdictions. Indeed, the opinion serves to illustrate the difference between claims for subcellular injury and claims of medical monitoring (or, relatedly, claims for an increased likelihood of disease)—an issue that had been muddled for some time. Although claims of medical monitoring have been raised in almost every jurisdiction, the same is not true for claims of subcellular injury. And the few cases that have dealt with subcellular injury have invariably addressed the issue through the lens of medical monitoring or an increased likelihood of disease. It was because the *Rainer* plaintiffs expressly rejected the argument that their claims hinged on a risk of future disease that the Sixth Circuit had no option but to set aside questions of medical monitoring in reaching its decision. *Rainer*'s analysis, which drew on broadly held public policy concerns, is thus applicable regardless of whether a jurisdiction allows suits based on medical-monitoring claims. This finding, combined with the fact that the Sixth Circuit was the first to address the issue directly, means that courts in other jurisdictions will likely weigh *Rainer* heavily when considering these types of claims.

Rainer also represents a step in reversing the trend of liberalizing personal injury requirements—one that will no doubt be acknowledged in other jurisdictions. Many scholars have argued that the standard components of tort law inhibit the ability of toxic-tort victims to bring forth successful claims.[71] To compensate for this inherent unfairness, many courts have allowed both claims of medical monitoring and those of increased likelihood of disease to go forward.[72] Commentators have viewed the limited acceptance of these theories as evidence that courts are willing to forego tort formalities in an effort to

71. The requirement that a plaintiff demonstrate a causal link between the defendant's action and her physical injury, for example, can be difficult to establish when the plaintiff has fallen ill twenty or thirty years after the exposure. For a survey of the ways in which courts have relaxed the requirements for a toxic-tort action, see Taylor, *supra* note 66. *See also* Miller, *supra* note 66, at 695-98; Carey C. Jordan, Comment, *Medical Monitoring in Toxic Tort Cases: Another Windfall for Texas Plaintiffs?*, 33 HOUS. L. REV. 473, 482-83 (1996) ("Several theories, which relax the fundamental requirements of causation and damages, have been advanced including recovery for the enhanced risk of developing a disease, fear of contracting a future disease, and medical monitoring.").

72. See Wrubel, *supra* note 21, for a comprehensive survey of the law regarding medical-monitoring and increased-likelihood-of-disease claims as of the early 1990s.

compensate victims of toxic torts fairly.[73] *Rainer*, however, is a retreat from this advancement. Pursuant to *Rainer*, plaintiffs who have been exposed to dangerous quantities of toxins and who can point to actual DNA damage will nonetheless be unsuccessful. Short of intervention by state legislatures or by Congress, victims of toxic torts will likely be unable to avail themselves of this and other more creative theories of tort law in the future.

The case also left several important questions unanswered. What, for example, constitutes a "physical injury" in the personal injury context? Indeed, where does the boundary between salient disease and subcellular injury lie? How does something like organ damage fit into the picture? Can the presence of toxins constitute an injury where DNA damage might not? And what about individuals who are infected with treatable contagious diseases, like HIV? The medical and legal communities would agree that people who are HIV-positive have clearly been "injured." At the same time, however, scientific advancements have made it possible for a number of these individuals to live healthy, long lives. Would their claims as a result be foreclosed under *Rainer*? These hypothetical situations illustrate the notion that, although *Rainer* greatly clarified certain issues, it did little in providing legal principles that future courts will be able to rely on in determining what is—and what is not—a "physical injury."

Rainer also poses something of an ethical dilemma. If damage to one's own DNA—the very building block of humanity—cannot stand as a cause of action, then how can courts claim to respect bodily autonomy or integrity? This troubling implication is further highlighted by looking at parallel cases in the field of property law, in which some courts have ruled that an intentional trespass onto another's property, however slight, is actionable.[74] This is the case even though the only "harm" to the property is the newfound presence of undetectable particles.[75] So while individuals whose bodies have been contaminated by imperceptible particles will be barred from litigation, similarly situated property owners will be able to proceed. This somewhat bizarre and unfortunate outcome is the result of applying the dictates of common law to a field continuously redefined by scientific advancements.

CONCLUSION

In sum, *Rainer* is likely to leave a strong mark in this nascent field of law. Although the case is limited in its scope, its conclusion—that asymptomatic DNA damage may not stand as a cause of action—sets significant boundaries.

73. *See* sources cited *supra* note 69.

74. *See, e.g.*, Martin v. Reynolds Metals Co., 342 P.2d 790 (Or. 1959).

75. *Id.* at 794 (defining trespass as "any intrusion which invades the possessor's protected interest in exclusive possession, whether that intrusion is by visible or invisible pieces of matter or by energy which can be measured only by the mathematical language of the physicist").

The case in effect prohibits plaintiffs who have suffered years of exposure to dangerous chemicals from pursuing litigation unless they can point to salient physical symptoms. But the opinion also realistically protects businesses and factories in an age when nearly everyone can claim some sort of environmentally induced chromosomal damage. Ultimately, as medical and scientific advancements further cloud our understanding of what it means to suffer a "physical injury," *Rainer*'s conclusion, as well as its public policy analysis, will become even more salient.