

1985

Allen v. the United States of America: The “Substantial” Connection Between Nuclear Fallout and Cancer

Daniel Swartzman

Tom Christoffel

Follow this and additional works at: <https://digitalcommons.tourolaw.edu/lawreview>



Part of the [Civil Procedure Commons](#), [Constitutional Law Commons](#), [Courts Commons](#), [Evidence Commons](#), and the [Torts Commons](#)

Recommended Citation

Swartzman, Daniel and Christoffel, Tom (1985) "Allen v. the United States of America: The “Substantial” Connection Between Nuclear Fallout and Cancer," *Touro Law Review*. Vol. 1: No. 1, Article 4.
Available at: <https://digitalcommons.tourolaw.edu/lawreview/vol1/iss1/4>

This Article is brought to you for free and open access by Digital Commons @ Touro Law Center. It has been accepted for inclusion in Touro Law Review by an authorized editor of Digital Commons @ Touro Law Center. For more information, please contact lross@tourolaw.edu.

ALLEN v. THE UNITED STATES OF AMERICA: THE “SUBSTANTIAL” CONNECTION BETWEEN NUCLEAR FALLOUT AND CANCER

Daniel Swartzman*
Tom Christoffel**

“Your best action is not to be worried about fallout.”

*Atomic Test Effects in the
Nevada Test Site Region (1955)*¹

Frank Butrico, an off-site monitor assigned to St. George, was not made aware of the imminent approach of the HARRY fallout to St. George until it arrived and registered on his own instruments beginning at 8:50 A.M. . . . By 9:15 A.M., in the center of St. George, Butrico’s own instrument was reading off the scale, indicating exposure rates of greater than 350 mr per hour. . . .

Q: Did you take a shower?

A [by F. Butrico]: Yes, a number of them that afternoon.

Q: Did Mr. Johnson tell you that you should tell other people in St. George to decontaminate themselves?

A: No. That subject was not brought up.

Q: But the [people of St. George] who were outdoors between 8:50 and 10:15 when the radio message came would have gotten the same exposures that you did?

A: Yes. That’s a reasonable assumption.²

* Assistant Professor of Health Resources Management, School of Public Health, University of Illinois. J.D., Northwestern University School of Law, 1975; M.P.H., University of Illinois at Chicago, 1978.

** Associate Professor of Health Resources Management, School of Public Health, University of Illinois. J.D., Harvard University School of Law, 1967.

1. Allen v. United States, 588 F. Supp. 247, 393 (D. Utah 1984) (citing Defendant’s Exhibit No. 1153, referred to by the court as DX-1153, a pamphlet issued by U.S. government in 1955 as part of public relations effort surrounding the TEAPOT nuclear testing series, at 23).

2. 588 F. Supp. at 390-91 (questions and answers from transcript of “Discussions with Frank Butrico,” August 14, 1980, Plaintiff’s Exhibit No. 290, referred to by the court as PX-290). “HARRY” was the government’s code name designating the test detonation which took place at the Nevada Testing Site on May 19, 1953. The code names for all of the relevant tests and test series are listed in Appendix B of the opinion, *id.* at 462-66. The abbreviation “mr” refers to a “millirad,” which is 0.001 “rads.” A “rad” is defined by the court as “the most commonly used unit to describe radiation dose, that is, the actual amount of ionizing radiation absorbed by living tissue Measurement of radiation dose in rads is accom-

Almost 1,200 lawsuits have been brought against the United States government to recover for harm allegedly suffered as a result of this country's atmospheric nuclear weapons testing programs conducted from 1951 to 1962 in Nevada. The U.S. District Court in Utah heard 24 "bellwether" cases intended to resolve legal and factual questions common to all the lawsuits. The court determined that the U.S. had been negligent because (1) it failed to adequately warn the people living in communities surrounding the test site, (2) it failed to adequately measure the radiation levels and nuclear fallout exposure rates in the surrounding communities, and (3) it failed to inform the residents of standard methods for preventing, minimizing or mitigating the impact of the test.³

Ionizing radiation⁴ released into the atmosphere during open-air testing of nuclear weapons can and will cause cancer and leukemia in some people, especially people who lived or worked in areas near the test sites. But some cancer and leukemia would be expected to occur in these populations even if weapons tests had not been conducted nearby, and there is no way to distinguish an individual instance of test-caused illness from those resulting from other causes. This poses a difficulty for an individual seeking compensation for allegedly test-caused cancer or leukemia; there is no way to prove that his or her illness resulted directly from test-produced radiation. Some instances of the community's cancer and leukemia are attributable to the tests, others are not. No one can tell with certainty which is which.

Does this mean that no individuals should be able to collect damages, even if negligence can be demonstrated on the part of those who subjected them to the radiation? Should everyone with an arguably radiation-related injury living in close proximity to the test site be allowed to collect damages? More broadly, what of the thousands of potential plaintiffs who claim to have suffered a variety of ills from exposure to toxic substances in the home, the community, and the workplace? Will the "day in court" for the victims of

plished by dividing the total radiation energy delivered by the mass (in grams) of the tissue which absorbs it." *Id.* at 311-12 (emphasis in original).

3. *Id.* at 477.

4. "Ionization" describes the phenomenon in which an "electron may absorb energy, (i.e., become 'excited') to a degree sufficient to allow it to leave the atom all together." *Id.* at 265. Ionizing radiation emanating from radioactive materials consists of three distinct types: alpha rays, beta rays, and gamma rays. *Id.* at 269.

toxic torts be only long enough for judges to throw their cases out for want of proof of causation?⁵

Rejecting traditional notions of “cause-in-fact” and “but-for causation,” the court in the case of *Allen v. United States* [hereinafter referred to as *Allen*]⁶ applied a new test for the evidentiary showing necessary to prove the causal linkage between a risk of radiation exposure and injury from cancer and leukemia. This innovative test, requiring the plaintiffs to “substantially” demonstrate a “reasonably exclusive factual connection,” allowed the court to find in favor of ten of the 24 plaintiffs.⁷ Because of this test, the *Allen* decision may provide an important, new policy approach in this growing area of tort law.

I. THE COURT'S OPINION

Between January of 1951 and July of 1962, the United States government conducted nuclear weapons tests at its Nevada Test Site (NTS) in southern Nevada. Nuclear weapons, with yields ranging from near zero up to 104 kilotons,⁸ were detonated at various altitudes, some having been dropped from airplanes, some suspended from balloons, some placed on metal towers, and some placed on or below the surface of the ground. Of 129 detonations during nine series of tests, 118 released radioactivity into the atmosphere.⁹ These

5. See generally Estep & Forgotson, *Legal Liability for Genetic Injuries From Radiation*, 24 LA. L. REV. 1 (1963) [hereinafter cited as Estep & Forgotson]; Latin, *The “Significance” of Toxic Health Risks: An Essay on Legal Decisionmaking Under Uncertainty*, 10 ECOLOGY L.Q. 339 (1982) [hereinafter cited as Latin]; O’Toole, *Radiation, Causation and Compensation*, 54 Geo. L.J. 751 (1966); Stason, *Tort Liability for Radiation Injuries*, 12 VAND. L. REV. 93 (1958); Titus, *Governmental Responsibility for Victims of Atomic Testing: A Chronicle of the Politics of Compensation*, 8 J. OF HEALTH POL., POL’Y AND L. 277 (1983) [hereinafter cited as Titus]; Note, *Radiation Injury and the Atomic Veteran: Shifting the Burden of Proof on Factual Causation*, 32 HASTINGS L.J. 933 (1981) [hereinafter cited as *Atomic Veteran*]; Note, *The Inapplicability of Traditional Tort Analysis to Environmental Risks: The Example of Toxic Waste Pollution Victim Compensation*, 35 STAN. L. REV. 575 (1983); Comment, *“Close Encounters of the Toxic Kind”—Toward An Amelioration of Substantive and Procedural Barriers for Latent Toxic Injury Plaintiffs*, 54 TEMP. L.Q. 822 (1981) [hereinafter cited as *“Close Encounters”*]; Comment, *Toxic Substances Contamination: The Risk-Benefit Approach to Causation Analysis*, 14 U. MICH. J.L. REF. 53 (1980) [hereinafter cited as *Risk-Benefit Approach*]; see also Comment, *The Burden of Proof in Environmental and Public Health Litigation*, 49 UMKC L. REV. 207 (1981).

6. 588 F. Supp. at 247.

7. *Id.* at 406-11, 428.

8. “A kiloton is approximately the amount of energy that would be released by the explosion of 1,000 . . . tons of trinitrotoluene (TNT), a high explosive.” *Id.* at 262 n.12 (emphasis in original).

9. *Id.* at 262-66 (Appendix B).

detonations created clouds of radioactive debris that descended to the earth at varying rates, carrying within them large numbers of radioactive fission products ranging widely as to their degree of dangerousness and the length of time they would remain dangerously radioactive.¹⁰

Although some efforts (such as avoiding detonations when winds were too intense and/or blowing from the wrong direction) were made to spare populated areas from being showered with radioactive matter, these efforts were far from successful. Similarly, while nearby residents were generally aware of the nature of the tests and the existence of fallout, information made available to them regarding potential hazards and possible protective actions was, at best, inadequate. The result was that populated areas of southeastern Nevada, southern Utah, and northern Arizona were subjected to significantly high levels of potentially hazardous ionizing radiation throughout this 1951-62 testing period without any serious effort being made to protect, decontaminate, or even monitor the exposed populations.¹¹

A quarter of a century later, negligence claims were brought against the United States government, under the Federal Tort Claims Act (FTCA),¹² in the names of 1,192 individuals who had lived near the bomb-test area and who had subsequently developed cancer or leukemia. These claims were consolidated into one case (i.e., the *Allen* case) in which it was alleged that plaintiffs' injuries were caused by governmental negligence (1) in conducting the open-air testing, (2) in monitoring the test results, (3) in failing to inform persons at risk of the attendant dangers of such testing and (4) in failing to inform such persons on how to avoid, minimize, or mitigate such dangers.¹³ For purposes of the trial of this large group of claims (the named plaintiffs being only a fraction of the potential claims), the parties mutually agreed to pursue 24 of the 1,192 claims that could serve as "bellwether" cases, i.e., "'typical' cases which when decided and reviewed may provide a legal and factual pattern

10. *Id.* at 287-311, 318-26.

11. *Id.* at 403-04.

12. 28 U.S.C. §§ 2671-2680 (1976). The enactment of the Federal Tort Claims Act (F.T.C.A.) generally eliminated governmental immunity to tort suits. Section 2674 of the F.T.C.A. provides "that the government shall be liable in tort as would an individual under like circumstances." 28 U.S.C. § 2674 (1976). *See generally* L. JAYSON, *HANDLING FEDERAL TORT CLAIMS: ADMINISTRATIVE AND JUDICIAL REMEDIES* (1980).

13. 588 F. Supp. at 386.

against which the remaining issues in the pending cases may be subsequently matched.”¹⁴

The government unsuccessfully advanced two arguments to shield it from any tort liability. It first argued for dismissal on the grounds that the actions involved fell under the “discretionary function” exception to the F.T.C.A..¹⁵ While the court did accept the applicability of the exception regarding the government’s initial decision to carry out open-air testing in the continental U.S.,¹⁶ it found the exception unavailable regarding the way in which the tests were carried out. “At the operational level employees of the United States had a duty to prepare and conduct tests carefully with full regard for public safety. The citizen adjacent to the testing site had a right to have that duty fulfilled.”¹⁷

The government also argued that the plaintiffs were barred by the two-year statute of limitations set forth in the F.T.C.A..¹⁸ However, the judge viewed the statute of limitations as commencing to run only after that point at which the plaintiff’s “knowledge of his injury and its cause is sufficient to fairly justify placing the burden of inquiry upon him as to its legal consequences.”¹⁹ This placed the gov-

14. *Id.* at 258.

15. 28 U.S.C. § 2680(a) (1976). See Reynolds, *The Discretionary Function Exception of the Federal Tort Claims Act*, 57 GEO. L.J. 81 (1968). The discretionary function exception to governmental liability, set forth in § 2680(a) of the F.T.C.A., provides that the Act shall not apply to

[a]ny claim based upon an Act or omission of an employee of the Government, exercising due care in the execution of a statute or regulation, whether or not such statute or regulation be valid, or based upon the exercise or performance or the failure to exercise or perform a discretionary function or duty on the part of a federal agency or an employee of the Government, whether or not the discretion involved be abused.

28 U.S.C. § 2680(a) (1976). Two important cases, *Dalehite v. United States*, 346 U.S. 15 (1953), and *Indian Towing Co. v. United States*, 350 U.S. 61 (1955), litigated under the F.T.C.A., established that the government is liable at an “operational” level as opposed to a “planning” level. The discretionary function exception, therefore, is applicable only at the planning level and does not apply at the operational level.

16. 588 F. Supp. at 336.

17. *Id.* The court, however, noted that “[a]t no time has the defendant ever asserted that as a matter of conscious choice it deliberately adopted a policy of not warning, not measuring and not educating the populace at hazard.” *Id.* at 337. Based on the extensive record reviewed in the opinion, an argument could be made that such a conscious choice likely had been made. Ironically, admitting this might have brought the government’s actions under the “discretionary function” exception, but such an admission would have been politically too costly for the government to make.

18. 28 U.S.C. § 2401(b) (1976), entitled “Time for commencing action against United States,” provides that a party suing the United States for a tort claim has two years “after such claim accrues” to bring an action. *Id.*

19. *Allen v. United States*, 527 F. Supp. 476, 490 (D. Utah 1981) (this was the first decision in *Allen*, disposing of a number of legal issues raised by the motions of the parties).

ernment in a dilemma. If it were to argue that plaintiffs had had long-standing knowledge of the harm they had suffered, it would be destroying its major defense, i.e., “that the existing scientific information about fallout and its effects on the human body falls far short of establishing a causal relationship between its conduct in open air atomic testing and the plaintiffs’ injuries. . . .”²⁰

The court in *Allen* found that the Atomic Energy Act, as amended,²¹ imposed a duty upon the government to protect the safety and health of those living near the test site from the specific risks of injury at issue in the lawsuit.²² After finding a duty on the part of the government toward the plaintiffs, and having dismissed the government’s first two defenses, the court then sought to define the standard of care that the government would need to demonstrate if it were to avoid liability. The standard that the court applied was a legal duty to act with “*the highest degree of care in light of the best available scientific knowledge.*”²³ The court reached this result based upon several factors: (1) the degree of risk involved,²⁴ (2) the imbalance of knowledge between the plaintiffs and the defendant,²⁵ and (3) the increased hazard to children.²⁶

Judge Jenkins, the trial judge, found that there was a breach of the defendant’s duty, established on the basis of the government’s failure to adequately monitor, warn, and educate the population at risk.²⁷ The Judge found that “the monitoring activities conducted in

20. 588 F. Supp. at 341.

21. 42 U.S.C. §§ 2011-2296 (1982).

22. 588 F. Supp. at 351-52.

23. *Id.* at 356 (emphasis in original). The court noted that

[w]here the Government undertook to test, to monitor, to warn and to protect, it did so according to its duty to act with great care. It did so with the vast storehouse of data and analysis at its disposal. It undertook those tasks with the full-fledged, constant legal duty to avoid injury or death arising from its negligence.

Id.

24. *Id.* at 353-54. In determining the degree of risk involved, the court considered the risks associated with the government’s “repeated release of huge quantities of the most toxic materials known to man directly into the atmosphere.” *Id.*

25. *Id.* at 354-55. The court noted that “the party having superior knowledge of the specific conduct and the particular risks created has been held to a stricter standard of care than the defendant who shares common knowledge and understanding of the risks with the plaintiff and others.” *Id.*

26. *Id.* at 355. The court noted that “in dealing with conduct of potential danger to children, there is a duty to observe extra caution for their safety.” *Id.*

27. Judge Jenkins determined that

[t]his court is convinced that part of the program of public safety, the public information program[,], was badly flawed, and that during the operation of the program, the information given to the off-site public as to the long-term biological consequences of exposure to ionizing radiation was woefully deficient—indeed, essentially non-existent.

the areas surrounding the Nevada Test Site in an effort to ascertain external doses of radiation were persistently negligent in philosophy and action.”²⁸ The techniques needed to conduct such monitoring were simple and well known at the time of the tests. As the court noted, “while on-site personnel were routinely monitored using instruments, film badges and pocket dosimeters, and continuing individual records were kept, no personal radiation exposure ‘diaries’ were kept for the thousands of people living in neighboring communities.”^{28.1}

Unlike the national laboratories such as Oak Ridge, where the quantities of material involved were a tiny fraction of those released at NTS, no routine urine, fecal or blood samples were taken from residents of local areas exposed to significant, measurable radioactive contamination. Not even in those circumstances where external exposures were estimated to meet or exceed the established safety guidelines . . . did the off-site [radiation-safety] personnel make any effort to check possible internal contamination among residents by direct methods. No thyroid or whole-body counters were constructed for use in screening members of the community—especially children—who may have been exposed to more than was permissible even for radiation workers. In fact, in the aftermath of HARRY, the monitors decided *not* to take a number of milk samples in order to avoid arousing public concern.²⁹

The court found that the government’s duty toward the plaintiffs was also breached by its failure to adequately warn the public regarding the nature and extent of the hazard they faced. In fact, the government’s main approach was to reassure, to minimize the hazard, and to recommend that “*Your best action is not to be worried*

The off-site personnel failed to adequately inform persons at hazard how to avoid or how to minimize such risk; failed to adequately, contemporaneously, and thoroughly measure and monitor such fallout so as to be able to inform persons at risk of the extent of the hazard faced by each; failed to explain the increased risks of radiation to children, infants and pregnant mothers; failed to adequately inform persons at risk of the dangers of eating or drinking food laced with radioactive fallout; failed to warn of the risk of feeding farm animals with forage dusted with radioactive fallout; failed to warn of the dangers of fallout entering into the food chain and the potential long-term biological risks involved in the eating of such food—particularly to children; and failed to adequately, intensively, and periodically advise persons at risk to do the simple things learned in prior Pacific experiments and laboratory practice, namely to stay indoors and under cover, shower, wash clothes, scrub and clean food, and if deeply worried, to evacuate or leave the area for other locations of less potential contamination.

Id. at 404.

28. *Id.* at 381.

28.1 *Id.* at 379.

29. *Id.* at 374-75 (emphasis in original).

about fallout.”³⁰ Informational material provided to the public stated that “the body can withstand considerably greater doses of radiation than that from normal background because the effects are repaired almost as rapidly as they are produced.”³¹ Yet, workers employed on-site were warned that: “Since there is not proof that living tissue is actually tolerant of ionizing radiation, even at background levels, the aim should be to keep radiation exposures as small as possible.”³² Similarly, a government public relations film contained the assurance that “[a]ctually, *when the invisible cloud has passed*, the total amount of radiation deposited on St. George was far from hazardous. Then you may ask: Why were the people asked to stay indoors? For a very simple reason. The Atomic Energy Commission doesn’t take chances on safety.”³³ Judge Jenkins noted that:

[To] fully appreciate the artistry of the script one needs to recall [that] . . . the off-site safety organization was well aware that a person standing in the open as a cloud of fine fallout particles passed would receive a significant dose, although little would be deposited on the ground after it had passed. . . .”³⁴

These and other instances of misleading information provided to the public appeared to outrage the court and convince the Judge that the government had breached its duty to warn the public regarding the true nature of the hazard faced by nearby residents.³⁵

30. *Id.* at 394 (emphasis in original). In 1955, the government issued its first informational pamphlet to the public advising them about the effects of atomic testing. The first pamphlet distributed in 1955 was entitled *Atomic Test Effects in the Nevada Test Site Region* (referred to by the court as Defendant’s Exhibit No. 1153). In describing the inadequacies of the instructions in the pamphlet, the court emphasized the obvious flaw in the “curious advice” given at the end of the pamphlet, which stated that, “your best action is not to be worried about fallout.” *Id.* The court stated that this advice “[ran] contrary to the established and sound principles of health physics and radiation protection followed at that time. . . .” *Id.* (emphasis in original). Noting this, the court found the pamphlet’s advice “patently absurd.” *Id.*

Additionally, the court noted that this advice was repeated in the informational pamphlet, distributed in 1957, entitled *Atomic Tests in Nevada*. *Id.* at 397.

31. 588 F. Supp. at 398, citing Defendant’s Exhibit No. 1149, referred to by the court as DX-1149 (booklet issued to residents in 1957 entitled *Atomic Tests in Nevada*), at 51.

32. 588 F. Supp. at 398, citing Defendant’s Exhibit No. 700, referred to by the court as DX-700 (booklet issued to the employees of a Nevada Test Site contractor in 1957 entitled *Basic Radiological Safety Training Manual*) at 4-8.

33. 588 F. Supp. at 400 (emphasis in original), citing Plaintiff’s Exhibit No. 913, referred to by the court as PX-913 (film produced by the Atomic Energy Commission titled *Atomic Tests in Nevada*).

34. 588 F. Supp. at 401. The court noted that the cloud referred to was the same one that had caused Frank Butrico’s instruments to peak off the scale. *Id.* See *supra* note 2 and accompanying text.

35. The court determined that

The government was also found to have breached its duty to warn members of the public regarding precautions they could have taken to reduce their exposure to fallout and to have reduced the resulting health risk.³⁶ Evidence presented to the court made it clear that various simple precautions were well known at the time of the test and were, in fact, followed by test personnel. These precautions included staying indoors when fallout was imminent, showering, and washing clothing. The result of the government's failure to adequately warn was that "many people were exposed to more radiation, *and greater risk*, than ever needed to be."³⁷

II. THE QUESTION OF CAUSATION

After Judge Jenkins held that the government had a duty and that the duty was breached, he turned to the question of the causal connection between radiation from the testing and the plaintiffs' injuries. The *Allen* court accepted a considerable body of evidence linking ionizing radiation with various cancers and leukemia. "At this point," the court noted, "there appears to be no question whether or not ionizing radiation causes cancer and leukemia. It does."³⁸ At the same time, however, nothing that can be found in a specific cancer cell will identify its cause. Thus ionizing radiation resulting from weapons testing can cause thyroid cancer, but so can x-rays, cosmic rays, and various other known, and some probably unknown, factors. "Ionizing radiation—or other carcinogens—seem to add to the number of cancers already occurring in people, rather than producing new, distinct varieties of cancer."³⁹

Moreover, the fact that a specific individual with cancer had earlier been exposed to ionizing radiation, even in high doses, does not

[f]rom the preponderance of the historical and scientific materials now before this court, the conclusion appears inescapable that a reasonable person, exercising great care in light of the best of available scientific knowledge, would err on the side of caution by assuming no "safe" threshold exposure to atomic radiation, i.e., that any degree of exposure equates with some corollary degree of biological risk, and by determining that every practicable step be taken to minimize unnecessary radiation exposure. The reasonable man would *not*, therefore, conclude [that] if radiation dosage is kept at or near the "maximum permissible" limits suggested by the NCRP, the ICRP or others, there is no increased risk of injury.

588 F. Supp. at 362.

36. The government neglected to warn the public of the precautions that could have been taken because it was reluctant to frighten the public for anything less than almost certain damage. *Id.* at 386.

37. *Id.* at 403 (emphasis in original).

38. *Id.* at 405.

39. *Id.* at 406.

necessarily mean that the ionizing radiation caused that particular cancer. Radiation exposure is not a guarantee of resultant cancer or leukemia. Dr. J. Gofman, an expert in the case quoted extensively in the court's opinion, noted that:

When we refer to radiation as a cause, we do not mean that it causes every case of cancer or leukemia. Indeed, the evidence we have indicating radiation in the causation of cancer and leukemia shows that not all cases of cancer are caused by radiation. Second, when we refer to radiation as a cause of cancer, we do not mean that every individual exposed to a certain amount of radiation will develop cancer. We simply mean that a population exposed to a certain dose of radiation will show a greater incidence of cancer than that same population would have shown in the absence of the added radiation.⁴⁰

From a scientific point of view, this is a careful and sensible way to view a specific "cause" of cancer. Thus epidemiology, which is "the study of the distribution and determinants of diseases and injuries in human populations,"⁴¹ is quite concerned with uncovering and understanding causal relations. But this understanding is based on statistical information, not individual cases. As one epidemiological text explains it, "[w]hile one-to-one specificity is strong evidence for causal association, lack of specificity is of less significance."⁴²

From a traditional tort law point of view, however, a statistical association approach is inadequate to the main causation enterprise, which is to "pick the defendant out of the crowd."⁴³ To achieve this purpose, it has generally been held that some sort of direct, "proximate" cause must be shown to connect the defendant's behavior to the plaintiff's harm. Thus, at first glance, the plaintiffs in *Allen*

40. *Id.* at 405. *Contra* Johnston v. United States, 597 F. Supp. 374 (D. Kan. 1984) (completely dismissing Dr. Gofman's testimony, stating that, "Indeed, he is an alarmist, truly, obsessed with the righteousness of his long-espoused concerns regarding exposure to radiation in any setting." *Id.* 380).

41. See J. MAUSNER & S. KRAMER, EPIDEMIOLOGY: AN INTRODUCTORY TEXT 185-86 (1985). Epidemiologists use five standard criteria to evaluate the likelihood that an association is causal: (1) strength of the association, (2) consistency of the association, (3) temporally correct association, (4) specificity of the association, and (5) coherence with existing information (e.g., biological plausibility).

42. *Id.* at 186. See also Black & Lilienfeld, *Epidemiologic Proof in Toxic Tort Litigation*, 52 FORDHAM L. REV. 732 (1984) [hereinafter cited as Black & Lilienfeld].

43. L. GREEN, W.H. PEDRICK, J.A. RAHL, E.W. THODE, C.S. HAWKINS, A.E. SMITH, J.M. TREECE, CASES ON THE LAW OF TORTS 3 (2d ed. 1977). See Large & Michie, *Proving That the Strength of the British Navy Depends on the Number of Old Maids in England: A Comparison of Scientific Proof with Legal Proof*, 11 ENVTL. L. 555 (1981). Environmental suits involve injuries which are often more difficult to prove than conventional torts because proof of harm in such cases depends on extensive and often tenuous scientific evidence. *Id.* at 560. See also Hoffman, *The Use of Epidemiologic Data in the Courts*, 120 AM. J. OF EPIDEMIOLOGY 190 (1984) [hereinafter cited as Hoffman].

would seem to have faced an insurmountable hurdle: “proving” that their cancers or leukemia were *caused* by the weapons tests conducted twenty-five years earlier.

This, then, is the context within which Judge Jenkins reached the question of causation. This section of the decision can be divided into three parts: first, establishing the standard of proof of causation; second, defining what would constitute an adequate evidentiary showing; and, third, applying these standards to the facts from the 24 cases.

A. *The Standard of Proof*

The first matter that had to be cleared away was the question of “causation-in-fact.” While this is the accepted, hornbook, starting point for building any proof of causation,⁴⁴ Judge Jenkins found that this inquiry was “complicated by the nature of the injuries suffered (various forms of cancer and leukemia), the nature of the causation mechanism alleged (ionizing radiation from nuclear fallout. . .) [and] the extraordinary time factors and other variables involved in tracing any causal relationship between the two.”⁴⁵ In putting aside the “cause-in-fact” standard, the court said that “within the scope of our present knowledge, the injury [alleged by each plaintiff] is not specifically traceable to the asserted cause on an injury-by-injury basis.”⁴⁶

At this point, the Judge could have ended the case with a showing of no causation. Instead, he continued with the analysis of case law and commentary in order to develop a more applicable standard of proof. From an article by E. Wayne Thode,⁴⁷ the Judge adopted the concept of “reasonably exclusive factual connections” as the basis for a finding of causation sufficient to support liability. According to Thode:

If plaintiff can not establish a cause-in-fact connection between his injury and defendant’s conduct that will support liability. . . plaintiff should attempt to establish the most exclusive factual connection that he can between his injury and the defendant. This will normally involve some kind of a relationship between plaintiff and defendant. . . . For example, the fact that both plaintiff and defendant are

44. See W. PAGE KEETON, PROSSER & KEETON ON TORTS § 41, at 263-72 (5th ed. 1984) [hereinafter cited as KEETON].

45. 588 F. Supp. at 405.

46. *Id.* at 406.

47. Thode, *Tort Analysis: Duty-Risk vs. Proximate Cause and the Rational Allocation of Functions Between Judge and Jury*, 1977 UTAH L. REV. 1 [hereinafter cited as Thode].

members of the human race is one of the less exclusive connections possible and does nothing to explain why this defendant is before the court. That the defendant was in the area when plaintiff was injured establishes a more exclusive connection.⁴⁸

A review of case law from a variety of jurisdictions, covering a variety of factual situations, followed. The cases supported the court's view that common law does not demand simple cause-in-fact, but that many courts have accepted evidence of factual connections short of this standard. The court cited *Summers v. Tice*,⁴⁹ *Ybarra v. Spangard*,⁵⁰ *Basko v. Sterling Drug*,⁵¹ and *Sindell v. Abbott Laboratories*⁵² as instructive. In each case, the plaintiff was unable to establish pure causation-in-fact, but was awarded damages after a showing of some reasonably exclusive factual connection between the injury and the defendant's actions. The *Allen* opinion went on to discuss a series of workmen's compensation decisions⁵³ and a set of de-

48. 588 F. Supp. at 406-07, citing *Thode*, *supra* note 47, at 5-6.

49. 588 F. Supp. at 407, citing 33 Cal. 2d 80, 199 P.2d 1 (1948). The California court solved the causation-in-fact problem by placing the burden of proof upon the two defendants. See *infra* note 86 and accompanying text.

50. 588 F. Supp. at 407, citing 25 Cal. 2d 486, 154 P.2d 687 (1944). The California court held that each defendant was individually liable although it was clear that not all of them could have been responsible. The basis of the decision appears to have been the special responsibility for the plaintiff's safety undertaken by each defendant. See *infra* note 87 and accompanying text.

51. 588 F. Supp. at 407-08, citing 416 F.2d 417 (2d Cir. 1969). The plaintiff, claiming that he had been blinded by one or both of two drugs administered by the defendant, demonstrated that each cause had in fact played an important part in producing the injurious result. See *infra* note 89 and accompanying text.

52. 588 F. Supp. at 408, citing 26 Cal. 3d 588, 607 P.2d 924, 163 Cal. Rptr. 132 (1980), *cert. denied*, 449 U.S. 912 (1980). The plaintiff, a woman, had contracted cancer allegedly as a result of her mother's ingestion of the drug DES during pregnancy. Plaintiff sued five drug companies since she could not tell which of them actually manufactured the specific pills her mother had taken. The court held that defendant-manufacturers who provided a substantial share of the drug on the market would be liable for the proportion of plaintiff's damages represented by each manufacturer's specific share of the market, unless it could be demonstrated that the particular manufacturer could not have made the drug in question (this has come to be known as "market share liability"). 26 Cal. 3d at 610-13, 607 P.2d at 936-37, 163 Cal. Rptr. at 144-45. See also *KEETON*, *supra* note 44, § 103, at 714.

53. 588 F. Supp. at 408-09, citing *McAllister v. Workmen's Compensation Appeals Bd.*, 69 Cal. 2d 408, 445 P.2d 313, 71 Cal. Rptr. 697 (1968) (fireman's work of 32 years connected to lung cancer, even though he smoked for 42 years); *Bolger v. Chris Anderson Roofing Co.*, 112 N.J. Super. 383, 271 A.2d 451 (Essex County Ct. 1970) (roofer's exposure to tar, pitch, asphalt and asbestos connected to cancer, even though he smoked); *Smith v. Humboldt Dye Works, Inc.*, 34 A.D.2d 1041, 312 N.Y.S.2d 612 (1970) (25 years working with carcinogens in dye connected with papillary tumors of bladder); *Besner v. Walter Kidde Nuclear Labs*, 24 A.D.2d 1045, 265 N.Y.S.2d 312 (1965) (physicist's exposure to cobalt-60 sources connected to acute myeloblastic leukemia); *Krumbach v. Dow Chem. Co.*, 676 P.2d 1215 (Colo. Ct. App. 1983) (nuclear weapons plant employment connected with cancer of the colon). The *Allen* court did not discuss two workmen's compensation cases that would seem to be relevant. In

cisions in which the finding of a factual connection was, at least in part, grounded on the defendant's failure to warn or safeguard the plaintiff.⁵⁴ These examples illustrated the ways in which courts have coped with complaints when demonstrating cause-in-fact would have been problematic.

Judge Jenkins noted that in many of these cases the courts shifted the burden of proof from the plaintiff to the defendant, requiring the defendant to show that his actions were not a cause of the plaintiff's injury.⁵⁵ In others, the court required some showing of factual connection by the plaintiff, short of cause-of-fact, followed by a shifting of the burden of rebuttal onto the defendant.⁵⁶ Judge Jenkins noted in particular that this shift was sometimes obtained when a court found the defendant to be primarily responsible for the lack of information necessary to establish causation.⁵⁷ In *Allen*, the government was largely responsible for the lack of contemporaneous information regarding who received what dose of radiation from which tests.

In preparing to adopt a standard of proof for causation, the court discussed the analogous situations presented by recent efforts to compensate victims of contamination from toxic substances. The opinion expressed approval of a proposed (but not adopted) federal law which would have required a demonstration by the plaintiff of a "causal linkage" between his or her injury and defendant's behavior, followed by a shifting of the burden to the defendant to rebut this

Bethlehem Steel Co. v. Industrial Accident Comm'n, 21 Cal. 2d 742, 135 P.2d 153 (1943), the court accepted the argument that plaintiffs' eye infections were possibly acquired at their place of employment. Although the infection was epidemic in the community, the court found, on the basis of epidemiologic evidence, that the relative risk for contracting the infection was greater in the work-site population than in the general population. In *Sacred Heart Medical Center v. Washington State Dep't of Labor*, 92 Wash. 2d 631, 600 P.2d 1015 (1979), the court held for the nurse-plaintiff because the harm involved, contracting the hepatitis B, was causally connected to the worksite, as evidenced by epidemiologic studies showing an increased risk of contracting the disease in hospitals over contracting it in the population in general. See the discussion of these two cases in Hoffman, *supra* note 43.

54. 588 F. Supp. at 410, citing *Haft v. Lone Palm Hotel*, 3 Cal. 3d 756, 478 P.2d 465, 91 Cal. Rptr. 745 (1970) (father and son drown in pool, motel provided neither lifeguard nor warning that none was on duty); *Reynolds v. Texas & Pac. Ry. Co.*, 37 La. Ann. 694 (1885) (unlit stairway "multiplied" chance of accident); *Kirincich v. Standard Dredging Co.*, 112 F.2d 163 (3d Cir. 1940) (failure of crew to throw life preserver to drowning seaman); *Berry v. Farmers Exch.*, 156 Wash. 65, 286 P. 46 (1930) (failure of building owners to provide fire escape not sufficient factual connection).

55. 588 F. Supp. at 411. See, e.g., *Summers v. Tice*, 33 Cal. 2d 80, 199 P.2d 1 (1948).

56. 588 F. Supp. at 411. See, e.g., *Basko v. Sterling Drug*, 416 F.2d 417 (2d Cir. 1969).

57. 588 F. Supp. at 412. See, e.g., *Haft v. Lone Palm Hotel*, 3 Cal. 3d 756, 478 P.2d 465, 91 Cal. Rptr. 745 (1970).

implication.⁵⁸ Finally, the Judge set out the test of causation which he would apply:

Where a defendant who negligently creates a radiological hazard which puts an identifiable population group at increased risk, and a member of that group at risk develops a biological condition which is consistent with having been caused by the hazard to which he has been negligently subjected, such consistency having been demonstrated by substantial, appropriate, persuasive and connecting factors, a fact finder *may* reasonably conclude that the hazard caused the condition absent persuasive proof to the contrary offered by the defendant.⁵⁹

This, then, is the court's combination of the two lines of inquiry pursued to this point. First, the plaintiff's burden is to demonstrate the existence of "substantial, appropriate, persuasive and connecting factors." Second, the defendant may then rebut this showing with proof to the contrary.⁶⁰

The opinion further states the more specific evidentiary showing against which each plaintiff's case would be judged in *Allen*:

In this case, such factors shall include, among others: (1) the probability that plaintiff was exposed to ionizing radiation due to nuclear fallout from atmospheric testing at the Nevada Test Site at rates in excess of natural background radiation; (2) that plaintiff's injury is of a type consistent with those known to be caused by exposure to radiation; and (3) that plaintiff resided in geographical proximity to the Nevada Test Site for some time between 1951 and 1962. Other factual connections may include but are not limited to such things as time and extent of exposure to fallout, radiation sensitivity factors such as age or special sensitivities of the afflicted organ or tissue, retroactive internal or external dose estimation by current researchers, a latency period consistent with a radiation etiology, or an observed statistical incidence of the alleged injury greater than the expected incidence in the same population.⁶¹

These are the specific factors which the court subsequently looked for in judging each plaintiff's case and determining whether or not each plaintiff's claim should have been awarded or denied.

58. 588 F. Supp. at 414.

59. *Id.* at 415 (emphasis in original).

60. For a discussion of the court's implicit adoption of the "Duty-Risk" standard as discussed in Thode, *supra* note 47, see *supra* text accompanying note 47; see *infra* notes 82-84, 102-03 and accompanying text.

61. 588 F. Supp. at 415.

B. An Adequate Showing of "Substantiality"

The next section of the *Allen* opinion goes on to discuss how a "substantial" connecting factor can be demonstrated. Drawing upon the Restatement (Second) of Torts⁶² and *Yazzie v. Sullivent*,⁶³ the Judge concluded that "implicit in the finding of [a] 'substantial factor' based upon relevant considerations is the exercise of sound judgment in light of the evidence."⁶⁴ The court quoted from *Yazzie v. Sullivent*:

It is enough that [the plaintiff] introduces evidence from which reasonable men may conclude that it is more probable that the event was caused by the defendant than that it was not. *The fact of causation is incapable of mathematical proof*, since no man can say with absolute certainty what would have occurred if the defendant had acted otherwise. If, as a matter of ordinary experience, a particular act or omission might be expected to produce a particular result, and if that result has in fact followed, the conclusion may be justified that the causal relation exists. In drawing that conclusion, the triers of fact are permitted to draw upon ordinary human experience as to the probabilities of the case.⁶⁵

Judge Jenkins proceeded to review three areas of epidemiological inquiry: the problem of mathematical proof, the problem of the dose-response relationship, and the problem of dosimetry.

1. Mathematical Proof

The Judge stated that one measure of substantiality could be an increased incidence of the plaintiff's type of injury in a particular population (e.g., a population exposed to radiation from the same source at the same time as the plaintiff). He discussed the scientific measure of whether such an increase is substantial, i.e., "statistical significance," and found this to be too stringent a standard to fill legal needs.

The mathematical tests of significance commonly used in research tend to be stringent; for an increase to be considered 'statistically significant,' the probability that it can be attributed to random chance usually must be five percent or less ($p = 0.05$). In other words, if the

62. RESTATEMENT (SECOND) OF TORTS § 433 (1965).

63. 561 F.2d 183 (10th Cir. 1977) (The court held that the defendant truck driver was negligently responsible for the death of plaintiff's decedent when decedent was hit by the truck and dragged for several miles.).

64. 588 F. Supp. at 415, citing Green, *The Causal Relation Issue in Negligence Law*, 60 MICH. L. REV. 543 (1962).

65. 588 F. Supp. at 416, citing *Yazzie v. Sullivent*, 561 F.2d 183 (10th Cir. 1977) (emphasis added by *Allen* court).

level of significance chosen by the researcher is $p = 0.05$, then an observed correlation is 'significant' if there is 1 chance in 20—or less—that the increase resulted from chance.⁶⁶

However, “the cold statement that a given relationship is not ‘statistically significant’ cannot be read to mean [that] ‘there is no probability of a relationship.’ Whether a correlation between a cause and a group of effects is more likely than not—particularly in a legal sense—is a different question. . . .”⁶⁷ This is compounded, the opinion observed, when one is dealing with small populations and small incremental changes.

The Judge distinguished between the usefulness to scientists of such stringent tests and the use of such analyses in the law:

That data from small populations must be handled with care does not mean that it cannot provide substantial evidence in aid of our effort to describe and understand events. Mathematical or statistical evidence, when properly combined with other varieties of evidence in the same case[,] can ‘supply a useful link in the process of proof.’ Tribe, “Tribal by Mathematics: Precision and Ritual in the Legal Process,” 84 *Harv. L. Rev.* 1329, 1350 (1971). If relied upon as a guide rather than as an answer, the statistical evidence offered in this case provides material assistance in evaluating the factual connection between nuclear fallout and plaintiffs’ injuries.⁶⁸

Evaluating the probabilities becomes part of the judge’s responsibility in determining whether the defendant’s actions will be subject to legal sanction. “Whether the defendant is ultimately held responsible for an injury which may likely have occurred anyway is inherently a question of policy, not of factual connection or causation.”⁶⁹ This completed the court’s acceptance of the “duty-risk” standard. Under the “duty-risk” standard advocated by Thode, the trier of fact would use the statistical evidence to determine whether or not there was a “factual connection,” and then the trier of law would determine whether or not such a connection, as a matter of policy, was sufficient to form the basis of legal relief.⁷⁰

66. 588 F. Supp. at 416. *See generally* Black & Lilienfield, *supra* note 42. The notation “ $p = 0.05$ ” is used by statisticians to denote the setting of a value of five percent as the level of statistical significance.

67. 588 F. Supp. at 417.

68. *Id.* at 418.

69. *Id.*

70. Thode, *supra* note 47. For a further discussion of the “Duty-Risk” standard, see *infra* notes 82-84, 102-03 and accompanying text.

2. Dose-Response

The court turned next to the question of what “dose-response” issues needed to be considered. A dose-response rate is a measure of the relationship between the amount of exposure to a hazard (in this case radiation) and the associated response (in this case cancer or leukemia).⁷¹ The Judge found that in determining the substantiality of the connecting factors, the evidence must show a factual connection which is consistent with known dose-response relationships. He rejected the threshold concept for radiation-related injury:

While there remains considerable uncertainty—and controversy—surrounding the precise quantitative mathematical description of the dose-response relationship for various radiations and cancers, none of the recent studies offer any direct evidentiary support for a threshold dose below which exposure is “safe,” harmless and without additional risk.⁷²

Reviewing the evidence before it, the court held that at least four dose-response related issues were relevant in deciding “substantiality”: the age at time of exposure, the body organ or tissue exposed, the latency period and gender-related sensitivities. The Judge ruled out, as insufficiently documented in the evidence, consideration of hormonal activity, other carcinogenic agents, immunological factors, genetic abnormalities, other stimuli of rapid cell growth, cellular repair mechanisms, and differential rates of exposure.⁷³

3. Dosimetry

Dosimetry is the measurement of the dose or amount of exposure that a particular individual may have suffered. Judge Jenkins acknowledged the problematic nature of this part of the evidence, particularly in light of the defendant’s failure to make contemporaneous measurements of individual and population exposures. The court relied on the meager evidence that was available, including the few contemporaneous exposure estimates the NTS officials did produce, limited film badge data from two of the test series, “human dosimeter” evidence (testimony from occurrence witnesses, recalling their observation of acute effects), a single test conducted by a Utah state official, present studies of remaining trace amounts, and a number of

71. T. LOOMIS, *ESSENTIALS OF TOXICOLOGY* 13 (1974).

72. 588 F. Supp. at 419 (citations omitted).

73. *Id.* at 420-28.

“educated guesses” (retrospective projections prepared by four expert witnesses).⁷⁴

While the Government argued that their estimates were “probable upper limits,” the Judge, after months of extensive review of the record and exhibits, deemed them “*minimum* figures for use in risk estimation.”⁷⁵ The Judge believed that, while some individuals may have received less exposure than the government estimates, it was extremely likely that many people received more radiation than the government’s conservative guesses indicated. These estimates varied widely for each plaintiff and by each expert, but the court explicitly approved of that evidence presented by one of the plaintiffs’ experts.⁷⁶ This evidence became the basis of the court’s ruling that a “substantial” connection can be demonstrated when “dosage materially exceeds that which is received from other sources, such as natural ‘background’ radiation and medical X-rays or other radiological treatments.”⁷⁷ The probative nature of this showing can be bolstered by a further showing of an “[i]ncreased incidence [within the population] of injuries consistent with such exposure.”⁷⁸

This part of the Judge’s discussion concluded with his holding regarding the evidentiary test sufficient to show “substantiality” in this case:

Where it appears from a preponderance of the evidence that the conduct of the defendant significantly increased or augmented the risk of somatic injury to a plaintiff and that the risk has taken effect in the form of a biologically and statistically consistent somatic injury, i.e., cancer or leukemia, the inference may rationally be drawn that defendant’s conduct was a substantial factor contributing to plaintiff’s injury. Unless the facts are proven otherwise by sufficient evidence, the inference provides a rational basis for imposing liability.⁷⁹

C. Application of the Standard

Finally, the Judge turned to the specific facts presented by the 24 plaintiffs and the defendant. For each of the plaintiffs, the opinion set aside a few paragraphs reviewing the evidence presented. Three of the plaintiffs were denied relief for failure to demonstrate one or

74. *Id.* at 427. See also Judge Jenkin’s discussion regarding dose estimates and computer projections, *id.* at 437.

75. *Id.* at 427 (emphasis in original).

76. *Id.* at 427-28.

77. *Id.* at 428.

78. *Id.*

79. *Id.*

more of the “must establish” factors: (1) exposure in excess of background radiation, (2) injury of a type caused by radiation, and (3) residence in proximity to the test-site. Eleven met this minimum showing, but did not present sufficient additional evidence or evidence of sufficient “substantiality” to collect damages. Ten of the plaintiffs were awarded damages based upon a showing of the minimum three factors, augmented by a demonstration of substantial connection between their injuries and the test fallout. Figure One presents the evidentiary findings and the holding for each of the 24 bellwether plaintiffs.

SUBSTANTIAL FACTOR DETERMINATION AND HOLDING FOR EACH PLAINTIFF

Plaintiff	Factors Which Must be Established			Factors That May Be Established							Holding
	Probability of Exposure Above Background	Injury Consistent With Radiation	Resided Near Test Site From 1951 to 1962	Time and Extent of Exposure	Age or Organ Sensitivities	Retroactive Dose Estimates	Correct Latency Period	Increased Incidence in Population	Contradictory Evidence		
Walker	x	no	x	x	x	x	x	x	x	denied	
Swapp	x	no	x	x	x	x	x	x	x	denied	
Berry	yes	yes	yes	x	low	x	x	no	yes	denied	
Thompson	yes	yes	yes	x	low	x	x	no	x	denied	
Bradsahw, D.	yes	yes	yes	x	high	poor data	no	no	x	denied	
Whipple	yes	yes	yes	high	high	low	yes	no	x	denied	
Bowler	yes	yes	yes	high	low	high	no	low	yes	denied	
Wood	yes	yes	yes	x	low	low	x	low	yes	denied	
Wilson	yes	yes	yes	x	medium	unknown	x	no	x	denied	
Bradshaw, J.	yes	yes	yes	x	medium	medium	x	no	yes	denied	
Orton, M.	yes	yes	yes	medium	low	x	yes	mixed	yes	denied	
Hunt	yes	yes	yes	x	low	x	x	no	yes	denied	
Hafen	yes	yes	yes	high	high	x	yes	high	some	awarded	
Johnson	yes	yes	yes	high	high	x	yes	high	some	awarded	
Nisson	yes	yes	yes	high	high	x	yes	high	some	awarded	
Orton, P.	yes	yes	yes	high	high	x	yes	high	some	awarded	
Bruhn	yes	yes	yes	high	medium	high	yes	medium	some	awarded	
Crabtree	yes	yes	yes	high	medium	x	yes	medium	some	awarded	
McKinney	yes	yes	yes	high	medium	x	yes	medium	some	awarded	
Tait	yes	yes	yes	high	medium	x	yes	medium	some	awarded	
Prince	yes	yes	yes	medium	low	x	yes	low	x	denied	
Pollitt	yes	yes	yes	high	high	weak	yes	yes	some	awarded	
Sanders	yes	yes	yes	high	high	high	yes	mixed	some	awarded	

II. THE LAW OF CAUSATION AND THE *ALLEN* DECISION

To recover for the tort of negligence, a plaintiff must prove defendant's duty, breach of that duty, an injury which was proximately caused by the breach, and actual harm.⁸⁰ Proximate cause is a combination of "cause-in-fact" and "legal cause."⁸¹ In order to collect for an injury, it must be shown that the defendant's actions directly, as a physical fact, caused the injury (cause-in-fact) and that the circumstances surrounding the events are such that the court should extend the law's coverage to this particular causal connection (legal cause).

How then to explain the court's decision in *Allen*? Certainly, the plaintiffs failed to establish cause-in-fact; as the Judge acknowledged, there is no way in a case of radiation-related injury that the complainant could show the step-by-step chain of events that the traditional view of causation suggests. And nowhere does Judge Jenkins go through the type of analysis which might normally be associated with the "legal cause" question.

The rationale for Judge Jenkin's approach is found in the article by E. Wayne Thode which is cited repeatedly by the court. In *Tort Analysis: Duty-Risk vs. Proximate Cause and the Rational Allocation of Functions Between the Judge and Jury*,⁸² Thode argues for the replacement of traditional proximate causation analysis with the "duty-risk" approach. The traditional approach asks the jury (or the judge sitting as the trier of fact) to decide both cause-in-fact and legal causation. Thode suggests that the cause-in-fact decision, if broadened to be an inquiry into "factual connections," is the proper domain of the trier of fact. However, if the legal causation decision is a determination of whether the court will extend legal sanction to cover the actions of the defendant, then this policy decision is not one that is appropriately given to the jury. It would more rationally be allocated to the judge, the trier of law.

Under a "duty-risk" analysis, the jury would decide whether or not there was a factual connection.⁸³ The judge would be given the task of determining whether, as a matter of policy, this particular

80. KEETON, *supra* note 44, § 30.

81. RESTATEMENT (SECOND) OF TORTS § 431 (1965).

82. See *supra* note 42. See also Green, *The Duty Problem in Negligence Cases*, 28 COLUM. L. REV. 1014 (1928) [hereinafter cited as Green].

83. Thode, *supra* note 47, at 24.

connection is within the scope of the law's protection.⁸⁴ It would then be up to the judge to apply precedent or decide cases of first instance by examining such policy ramifications as moral, justice and economic concerns, the potential deterrent impact of the decision, and questions of judicial administration.⁸⁵

Before applying this approach to the *Allen* decision, it maybe helpful to go back and examine the set of judicial decisions discussed by the *Allen* court and which form the basis of much of the commentary to date. Three of the cases involved "indeterminate defendants." [The] plaintiff had been injured and two or more people had each acted in such a way as to possibly be the cause of the injury. However, the specific defendant who was the actual cause was unknown or unknowable.

In *Summers v. Tice*,⁸⁶ the two defendants were hunters who both shot into the woods. The bullet of one of them struck and injured the plaintiff. The court decided that both defendants could be found to be the cause of the injury, even though no tracing of the chain of causation from injury to bullet to gun to trigger to specific defendant could be had. In *Ybarra v. Spangard*,⁸⁷ the plaintiff suffered an operating room mishap but had no evidence as to which of the doctors and nurses present was at fault. All were sued. The court held that each defendant was individually liable. The case of *Sindell v. Abbott Laboratories*⁸⁸ involved a woman plaintiff who contracted cancer, allegedly as a result of her mother's ingestion of the drug DES during pregnancy. Plaintiff sued five drug companies since she could not tell which of them actually manufactured the specific pills her mother had taken. All were held potentially liable, subject to their ability to show that they had not manufactured the pills in question.

Another of the cases cited by Judge Jenkins involved what could be called an indeterminate causal agent. In *Basko v. Sterling Drug*,⁸⁹ the plaintiff sued only one defendant, but claimed that he had been blinded by one or both of two drugs administered by that defendant. The court held that sufficient causal connection had been shown.

84. *Id.* at 26.

85. See Green, *supra* note 82, at 1034.

86. 33 Cal. 2d 80, 199 P.2d 1 (1948).

87. 25 Cal. 2d 486, 154 P.2d 687 (1944).

88. 26 Cal. 3d 588, 607 P.2d 924, 163 Cal. Rptr. 132 (1980), *cert. denied*, 449 U.S. 912 (1980).

89. 416 F.2d 417 (2d Cir. 1969).

In each of these cases, the plaintiffs were held to have established a factual connection between his or her injury and the actions of the defendant or defendants sufficient to warrant liability, subject to a finding on the other requisite elements of a negligence cause of action. However, one should not be too quick to say that Judge Jenkins was "following" these decisions in reaching his own.⁹⁰ The *Allen* case did not present the court with the same kind of decision as in *Summers*, *Ybarra*, and *Sindell*. In each of these cases, it was clear that the plaintiffs' injuries had to be a result of the behavior of at least one of the defendants. And in *Basko*, the plaintiff's blindness had to be an effect of at least one of the two causal agents. As one commentator, Richard Delgado, has pointed out,⁹¹ the same result may not be obtained when one of the possible causes of a plaintiff's injury is a natural force or an event beyond the control of the defendants. This was the situation in *Allen*. Each of the 24 plaintiffs could have contracted their illnesses entirely as a result of natural cancer-causing forces (e.g., cosmic rays or other naturally occurring radiation) or as a result of factors beyond the Government's control (e.g., medical X-ray exposure or smoking).

The *Allen* decision is not a mere extension of case-law from other jurisdictions. Nor did Judge Jenkins follow the suggestions of the many commentators who have offered solutions to the problem of legal causation in cases involving radiation or other environmental risks.⁹² He appears to have adopted a new test, the "substantially demonstrated, reasonably exclusive, factual connection" test.

As seen above, the opinion began by foregoing a strict cause-in-fact approach in favor of a "reasonably exclusive factual connections" view.⁹³ The Judge added to this the "substantiality" test, apparently borrowed from the Restatement (Second) of Torts.⁹⁴ These two parts make up the bifurcated analysis suggested by Thode: a factual determination and a policy decision as to whether or not the particular connection was sufficient to warrant extension of the law's protection.

90. Under the F.T.C.A., the judge is responsible for applying the law of the jurisdiction of the plaintiffs, in this case Utah, Arizona, and Nevada. 588 F. Supp. at 412 n.155.

91. Delgado, *Beyond Sindell: Relaxation of Cause-in-Fact Rules for Indeterminate Plaintiffs*, 70 CALIF. L. REV. 881, 887 n.30 (1982).

92. See *id.* (shifting burden of proof, lowering burden of proof, estoppel, etc.); *Atomic Veteran*, *supra* note 5 (shifting of burden of proof); "Close Encounters," *supra* note 5 (*res ipsa loquitur*); *Risk-Benefit Approach*, *supra* note 5 (a "floating" burden of proof based upon a judicial risk-benefit analysis); Estep and Forgotson, *supra* note 5 (establishing a "pedigree").

93. "But for" causation was ruled out summarily. 588 F. Supp. at 412 n.155.

94. RESTATEMENT (SECOND) OF TORTS § 433 (1965).

The result is not a simple matter of a court's holding all members of a class of indeterminate defendants liable, where one was certainly to blame, or of finding causation in each of the class of indeterminate causal agents, where one was certainly the cause. The *Allen* court was faced with only one defendant whose actions may or may not have been the cause of the plaintiffs' injuries, and only one alleged causal agent, which may or may not have been the culprit.

It is this distinction, and the distinctive manner in which the court addressed it, that make *Allen* a case of importance, for this could be the general structure of a long series of cases which is only now starting to find its way onto the calendars of U.S. courts. As Judge Jenkins recognized,⁹⁵ there is a close analogy between the facts presented in *Allen* and the larger set of cases now being discussed under the label of "toxic torts."⁹⁶

CONCLUSION

Cases have arisen or will arise from exposures to leaking toxic waste dumps, from consumer products like formaldehyde foam insulation, from occupational exposures to asbestos or Agent Orange, or from environmental contamination like that associated with Love Canal and Times Beach, Missouri. In each case, the court will be faced with an easily identified defendant (or set of defendants), a highly suspect causal agent, and an injury that could have been caused by the defendant's actions, but might not have been. In each case, the court will have to make the same determination as did Judge Jenkins: in light of the more or less tenuous nature of the causal connection, is the plaintiff's case persuasive?

What choices were available to the judge in *Allen*? He could have summarily dismissed the case for failure to show cause-in-fact, as at least one other court, in a bomb-test radiation exposure case, chose to do.⁹⁷ This would have been the simplest approach, making the

95. 588 F. Supp. at 413.

96. *Id.* at 413-14. See also *supra* note 5. For a recently decided case concerning mass toxic tort litigation, and for a discussion of the consolidation of related actions in toxic tort litigation, see, e.g., *In re Agent Orange Product Liab. Litig.*, 597 F. Supp. 740, 751-58 (E.D.N.Y. 1984). For a discussion on managing man-made-disaster litigation, see Address by Judge Weinstein, American College of Trial Lawyers: Preliminary Reflections on Managing Disasters (Mar. 19, 1985) (on file in the Touro Law Review Office).

97. See, e.g., Titus, *supra* note 5, at 292 n.44, reporting that in the "Baneberry" case (January 1983), where the widows of two government workers (who were exposed to radiation from the venting of underground bomb-tests and subsequently died of acute leukemia) sued for damages, Federal District Court Judge Roger Foley agreed that the tests had been conducted negligently, but "denied compensation to the widows, explaining that statistical studies of the

fewest waves in the surface of existing law. The benefit offered by such simple rules as "but-for" causation is that outcome is predictable. Potential defendants know where they stand, and the legal system avoids the spectacle of various judges—untrained in the probabilities of epidemiological analysis—handing down conflicting judgments based largely upon what seems to amount to "gut reactions."

It has been said that for every complex problem there is a simple and elegant solution and that this solution is very likely wrong. Howard Latin points out that cut-and-dried rules, while appealing, are inherently reductionistic; they do not cope with all of the meaningful aspects of the problems they purport to solve.⁹⁸ Rote application of traditional tort law would not be sufficient for the task. In order for the common law to address the growing problem presented by toxic torts in a way that will prove acceptable to the political pressures of public opinion, judges are going to have to deal directly with the complexities of the case involved and, in Judge Jenkins' words, proceed with the "exercise of sound judgment in light of the evidence."⁹⁹ The opinion in *Allen* is convincing evidence of the ability of the federal bench, untrained as it is in scientific and technical matters, to deal with the breadth and complexity of the material and issues presented in such cases.

Another approach seemingly available to the court in *Allen* was the liberal interpretation of previous case law, bending past decisions and the evidence to fit one another. A mindless extension of *res ipsa loquitur*¹⁰⁰ or the simple shifting of the burden of proof could have given the court a hook on which to hang a decision for the plaintiffs. Such a solution could have been used to find in favor of all 24 of the *Allen* bellwether plaintiffs, since the government's chance of proving that it was *not* the cause of the various injuries is no less a daunting prospect as that which was faced by the plaintiffs.

Instead of any of these traditional approaches, the Judge accepted (albeit *sotto voce*) the view that the responsibility for resolving the uncertainty inherent in these cases rested squarely on the shoulders of the court. Then, as a matter of policy,¹⁰¹ he proceeded to execute

incidence and distribution of illnesses in the human population are not sufficient, as a matter of law or of fact, to prove the cause of a particular case of cancer." *Id.*

98. Latin, *supra* note 5, at 349.

99. 588 F. Supp. at 415 n.161.

100. Rejected explicitly by the judge, *id.* at 407 n.149.

101. See Latin, *supra* note 5, at 340, for a discussion of how uncertainty leads to policy decisions. See also D'Amato, *Legal Uncertainty*, 71 CALIF. L. REV. 1 (1983); Gelpe &

his responsibility. At the same time that he avoided the injustice inherent in a summary dismissal for failure to show cause-in-fact, he provided an approach that avoids the danger that excessive litigation would result in social costs substantially outweighing the benefits to plaintiffs and to society. The criteria established in *Allen*, if followed, will provide potential litigants with an advance sense of the merits of their positions, without inviting the use of the courts for frivolous pursuit of weak claims.

The result will be decisions based upon the specific factors in particular cases. Thode argues that judges should take the nature of the defendant's behavior into account. The policy goals of tort law reach beyond compensation to deterrence. Consequently, if a judge is faced with a spectrum of connective possibilities and must look to policy considerations to determine which of the possibilities he will accept as "substantial," one could expect that particularly egregious action on the part of the defendant would likely result in an easier finding of causation, thereby enhancing the deterrence of similar behavior in the future. Judge Jenkins appeared to be less than enchanted with the government's actions as it carried out the nuclear testing program. His willingness to find the substantiality of the factual connections in ten cases appears to be, in part, a function of this attitude.

As for the fear of runaway court decisions, Thode avers that safeguards—practical, economic, and political—constantly surround the judicial decisionmaking process.¹⁰² He predicts that the "duty-risk" approach and the "factual connections" view of causation will lead to a steady building up of the catalog of cases which is the genesis of the common law, and that that collected experience will serve to guide and bound the progress of judicial determinations in such cases.¹⁰³ Judge Jenkins may make a significant contribution to that catalog, especially if he is allowed to adjudicate the 1,168 cases still pending before him.

The vitality of the *Allen* approach will depend largely on the willingness of the Tenth Circuit Court of Appeals, as well as other state and federal courts,¹⁰⁴ to follow Judge Jenkin's lead. If they do not, the future success of radiation-related and other toxic tort cases ap-

Tarlock, *The Uses of Scientific Information in Environmental Decisionmaking*, 48 S. CALIF. L. REV. 371 (1974); *II. Scientific Panel: Cause/Effect Relationships In Health Risk Cases*, 22 JURIMETRICS J. 378, 380 (1982) (speech by Leon Goldberg).

102. Thode, *supra* note 47, at 30.

103. *Id.* at 28-29.

104. For a recent decision discussing causation in toxic tort litigation, see *In re "Agent Orange" Product Liability Litigation*, MDL 381 (E.D.N.Y. May 8, 1985).

pears dim, and the victims of such problems may only find relief through statutory compensation mechanisms.¹⁰⁵

Theoretically, the type of policymaking engaged in by Judge Jenkins in *Allen* is a legislative responsibility. Legislatures would seem to be the most appropriate and potentially accountable forum for addressing the inherent social policy implications presented by claims of this type in a comprehensive fashion, in light of the demands of justice and competing social needs and interests. But there are several reasons not to turn to the legislature in these cases: (1) legislatures do not want such political hot potatoes and might find convenient excuses to duck or postpone making these decisions, (2) legislative decisions on these matters would likely be determined entirely on political bases, rather than on full consideration of the range of policy implications, (3) legislative actions tend to offer only "generic" solutions, which can be "equitable" only if too tight or too loose in their criteria.

It is only through case-by-case decisionmaking, by courts reviewing all of the evidence in specific cases and tailoring resolutions that best fit those specific facts, that equitable solutions can be applied in an optimal number of cases. Judge Jenkins has preserved this case-by-case approach. Both the recovery-for-none and the recovery-for-all solutions might have provoked sufficient public outcry to force a broad legislative response, with its likely sub-optimal results. Instead, the *Allen* decision pursues a course that should have considerable popular support as being a common-sense approach to a real human tragedy. If *Allen* is allowed to stand as a landmark, American courts will preserve their role in dealing with this area, and they will have a careful, innovative, and honest approach for resolving the technical difficulties inherent in the conjecture of epidemiology and the law.

105. For articles discussing relief through statutory compensation, see Estep & Forgotson, *supra* note 5; Titus, *supra* note 5; "Close Encounters," *supra* note 5.

