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Do We Want To See A Repeat Of "A Civil Action?": A Call For A Federal Private Right Of Action To Compensate Toxic Tort Victims

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I. INTRODUCTION

In late 1999, *A Civil Action*, a major motion picture starring John Travolta, told America the tragic story of twelve children diagnosed with leukemia in Woburn, Massachusetts between 1969 and 1979.[1] The parents, eight of whom lived within a half-mile radius of each other,[2] suspected that their children contracted the cancers because they drank water supplied by two contaminated city wells that were closed in 1979.[3] The "cluster" of 12 childhood leukemias in Woburn was in fact 2.3 times more than epidemiologists had expected.[4]

Jan Schlictmann, the families' attorney, soon determined that W.R. Grace, Inc. and the J.J. Riley tannery, a subsidiary of Beatrice Foods, may have contaminated the wells through their industrial practices. The families then sued Grace and Beatrice for damages caused by their exposure to the toxic substance trichloroethylene (TCE).[5] Schlictmann suspected the two companies because they had operated manufacturing facilities near the contaminated wells. Because the plaintiffs sued under Massachusetts tort law, they faced a difficult burden of proving that the defendants actually and proximately caused their injuries. This burden would prove insurmountable for the plaintiffs, as Schlictmann would spend the next four years unsuccessfully pursuing his case.

During the four years, Schlictmann and his law firm amassed volumes of evidence suggesting that the defendants were responsible for contaminating the wells,[6] and also that the contaminated wells caused the children to contract leukemia.[7] The scientific complexity of the case required Schlictmann to hire at least 12 medical experts, [8] and numerous engineers, geologists, and hydrogeologists,[9] all at a considerable expense. Unfortunately for the plaintiffs, however, this evidence was inadequate to hold the defendants liable.

In fact, the jury would absolve Beatrice of all liability and find Grace liable for negligence, but only after September, 1973.[10] The 1973 date seriously weakened the plaintiffs' case because the judge then instructed the jury to disregard all pre-1973 evidence. The jury's verdict would soon lead to an eight-million dollar settlement with Grace, and end the plaintiffs' hopes to send a "billion dollar" message to corporate boardrooms.[11]

After spending $2.6 million in expenses and accruing $2.2 million in legal fees,[12] the plaintiffs would net a smaller payout than the costs of the case. The $455,000 per family award seemed like petty change compared to the pain and suffering caused by the diseases and deaths. The verdict, instead of sending a message of fear to the corporate boardrooms, sent the opposite message: that toxic polluters can get away with anything.

Federal and state environmental statutes are designed to prevent the kinds of contamination that occurred in Woburn. The federal and state regulatory systems attempt to prevent the proliferation of harmful chemicals by closely monitoring major generators of pollution.[13] The federal system has also created an information base that tracks toxic chemicals and their exposure to the human environment.

The agencies' latest toxic release information is not encouraging. First of all, the Environmental Protection Agency's ("EPA") 1997 Toxics Release Inventory Report,[14] shows that 2.5 billion pounds of toxic wastes were released into the United States environment in 1997.[15] Considering the carcinogenic and systemic danger of toxic wastes, the 2.5 billion pounds of waste will further increase the risk to public health.

Other government documents discuss the current health risk posed by these toxic releases. For example, the Agency for Toxic Substances and Disease Registry ("ATSDR") recently completed a survey of extant toxicological information. This study describes the increasing human health threats posed by toxic waste releases.[16] The study reports that the number of abandoned (labeled "uncontrolled") toxic waste sites in the U.S. could range anywhere from 40,000 to 440,000.[17] Sources also estimate that between 1,500 and 3,500 of the sites covered by the Resource Conservation and Recovery Act ("RCRA")[18] require corrective action.[19]

Of the 40,000 to 440,000 uncontrolled sites, only 1,296 sites are on the CERCLA's National Priorities List ("NPL").[20] This list consists of the sites that may be cleaned up using federal funding.[21] Because of this, only a small minority of the uncontrolled sites will become controlled in the near future, while the majority will remain uncontrolled.

The ATSDR has also conducted 1,826 public health assessments of randomly selected, uncontrolled waste sites.[22] Over time, the agency has generally increased the number of sites characterized as "urgent public health hazards" and "public health hazards".[23] In fact, the number of sites that ATSDR classified in these two groups between 1992 and 1996 averaged 46%.[24]

In addition to its public health assessments, the ATSDR in 1997 found that 36% of NPL sites have "completed exposure pathways," meaning that toxic chemicals from 36% of these sites are currently penetrating human bodies.[25] At these "completed pathway" sites, the ATSDR has called the 30 most common chemicals CEPPS (Completed Exposure Pathway Priority Substances) and has found that 18 of the 30 CEPPS represent a carcinogenic hazard.[26] All of these CEPPS present other non-carcinogenic health hazards (called "systemic toxic risk") given a high enough exposure.[27]

Despite its efforts, the ATSDR maintains that the national extent of carcinogenic risk presented by uncontrolled hazardous waste sites is still unknown.[28] Though the actual risk is unknown, both the EPA and the ATSDR report that toxic wastes present an enormous public health hazard. This risk is increasing annually as companies release more toxics and as these toxics find their way to human populations.

Though the toxic tort common law and the federal command and control regulatory framework both work to reduce toxic injuries, they work separately because the toxic tort common law remedies harms while the regulatory system tries to prevent them. Both the Woburn case and the government toxic waste reports leave the reader with pressing questions. How can the common law allow a company like Beatrice to recklessly contaminate a community's water source? Why do the EPA and the Department of Justice fail to enjoin such actions? Will large corporations think twice before releasing toxic chemicals into the environment, or will they continue their practices with no fear of the consequences or possible harm? Should our legal system be modified so that plaintiffs can face a more surmountable burden of proof in toxic tort cases?

This paper answers the last question affirmatively because many plaintiffs face the same recovery barriers as did the Woburn residents. Such plaintiffs will go uncompensated until the causation level is reduced to a more realistic standard. This paper first investigates the treatment of causation in the toxic tort common law. Next, it explores law reviews, proposed and enacted legislation, and other legal theories for guidance as to toxic tort reform. Finally, the paper suggests that Congress create a federal private cause of action available to any toxic tort victim injured through violations of CERCLA, RCRA or TSCA. [29]

II. BACKGROUND

A. Toxic Tort Causes of Action

Like the plaintiffs in the Woburn case, victims can bring suit against any tortfeasor who may have exposed the plaintiff to harmful toxic chemicals. For many centuries, the tort system has compensated victims for injuries to their bodies, reputations, emotional states, and property. To recover compensation for their injuries, toxic tort victims have mainly employed tort theories of nuisance, negligence, and

strict liability.

1. Nuisance

A plaintiff may sue any individual who has disrupted the plaintiff's right to the private use and enjoyment of his land or who has unreasonably[30] interfered with a right common to the general public. These two types of interferences are known as private and public nuisances, respectively. [31] To recover under nuisance theory, the plaintiff must show that the interference was either intentional and unreasonable, or unintentional and otherwise actionable under negligence or strict liability theories.[32]

Because private parties do not have standing to bring public nuisance claims if they suffer the same injury as the general public, public nuisance actions are generally brought by public officials. [33] However, some toxic tort plaintiffs have successfully used the public nuisance action. For example, Judge Walter Jay Skinner granted public nuisance standing to the Woburn plaintiffs because their various illnesses were, by their nature, special and peculiar injuries.[34]

Most courts have maintained that plaintiffs must sustain an injury "different in kind" from that of the general public, not just "different in degree." For example, in *Venuto v. Owens-Corning Fiberglas Corp.*,[35] the plaintiffs complained of respiratory disorders and allergies resulting from the defendant's emission of fiberglass particles. The court held that this injury was not, by its nature, a special and peculiar injury, and therefore denied plaintiffs' standing.[36] Because courts may refuse to declare a toxic personal injury "different in kind" from that of the general public, plaintiffs may find the public nuisance cause of action largely ineffective.[37]

Plaintiffs have attempted to use the private nuisance cause of action to recover for certain toxic tort injuries, even though the cause of action is intended to compensate for an interference with the use of land. [38] Such plaintiffs often collect diminution in land value caused by the nuisance.[39] The plaintiffs in *Ayers v. Township of Jackson*[40] collected additional damages. In *Ayers*, residents alleged that a township interfered with the use and enjoyment of their land by operating a landfill that leached toxic chemicals into the groundwater. [41] In affirming the jury's award for impairment of quality of life, emotional distress, and medical surveillance, the court reasoned that a plaintiff could recover for "personal losses flowing directly from" the nuisance.[42] Thus, a plaintiff may successfully sue for certain personal injury damages under a private nuisance theory.

2. Negligence

Toxic tort victims have often alleged a negligence cause of action when seeking compensation. Negligence is conduct that "falls below the standards established by law for the protection of others against unreasonable risk of harm."[43] A toxic tort plaintiff often contends that the defendant's release of hazardous materials amounted to negligent conduct.[44] However, as was clear in the Woburn case, negligence is hard to prove because injuries often manifest themselves years after incriminating documents are hidden or destroyed by the defendant.[45] For example, after the jury exonerated Beatrice from negligence, Schlictmann found a hidden report that proved that Beatrice knew that its actions were contaminating the property's groundwater.[46]

Plaintiffs have employed the negligence per se doctrine as another way to show negligence. The doctrine compares the defendant's conduct with the conduct established by statute or regulation. In *Bagley v. Controlled Environment Corp.*,[47] the court noted that because the hazardous waste permit program protects the public, the failure of the defendant to abide by its permitting provisions was "sufficient to establish liability" under negligence.[48] Some cases like *Kenney v. Scientific, Inc.*[49] reject the negligence per se contention. In this case, the court ruled that violation of federal and state statutory standards for handling toxic chemicals did not amount to a negligence showing, but was only a fact the jury could consider in determining negligence.[50]

3. Strict Liability

Finally, plaintiffs unable to prove common law negligence have found success employing the strict

liability approach first described in *Rylands v. Fletcher*.[51] The strict liability doctrine helps the plaintiff that lacks documentary or testimonial proof of the defendant's "unreasonable" actions. Under the strict liability system, a defendant must compensate his victim even if he took reasonable precautions.

To aid the courts in determining when strict liability applies, the Restatement 2d of Torts lays out a six-factor balancing test.[52] The toxic tort plaintiff must use the test to show that the defendant's hazardous waste practices amount to an abnormally dangerous activity ("ADA"). Jurisdictions are inconsistent regarding ADA determinations. For example, many courts have held defendants strictly liable for the operation of a toxic waste dump, storage and disposal of chemical waste, or even operating a dam.[53] However, other courts have held that because reasonable care can prevent toxic releases, plaintiffs cannot seek strict liability recovery, therefore must pursue negligence instead.[54]

B. Proof of Causation

Most courts today use the "substantial factor" test of causation. The substantial factor standard often applies to cases with many potential causes of injury. Under the test, the law will hold the defendant responsible for the injury if the plaintiff can show by a preponderance of the evidence that the defendant played a substantial role among all the possible causes of injury.[55]

Unlike traditional tort cases, toxic tort cases often involve indirect links between cause and effect. For example, in a traditional negligence case, careless driver A rear-ends driver B, who was stopped at a traffic light. Such a case is straightforward because eyewitnesses often see that A failed to stop and caused an immediate damage to B's trunk and bumper. Toxic torts often lack these helpful elements because the defendant's chemical intrusion goes unnoticed and latent injuries manifest themselves years after the act. Because of these challenges, toxic tort courts may accept a less certain proof of causation.[56]

Because of the complexity involved in linking a toxic injury to a cause, judges will usually separate the causation issue into more understandable subparts. The PCB toxic tort case *In re Paoli Railroad Yard PCB Litigation*[57] describes the typical causation elements, stating, "the personal injury plaintiffs must show that they were exposed to the chemicals released by the defendants, that these chemicals can cause the types of harm they suffered, and that the chemicals in fact did cause them harm."[58] Legal commentators often refer to the first clause of this test as "exposure causation" and the last clauses as "medical causation."

1. Plaintiff was Exposed to a Hazardous Substance

Some toxic tort plaintiffs, especially those complaining of a pharmaceutical's product defect, will not need an environmental expert to prove their own exposure to the chemical or defendant's responsibility as the source of the exposure. In such a situation, a lay witness may prove exposure by testifying about his own experiences such as repeated ingestion of a pharmaceutical or smell of a chemical's odor.[59]

Most plaintiffs, however, claim exposure to odorless, colorless, or tasteless chemical agents. In these cases, the plaintiff must hire an expert to chemically prove that such exposure occurred. For example, in a situation like Woburn where plaintiffs complain about contaminated groundwater,[60] the plaintiff must chemically show that the contaminated groundwater entered their bodies.

Generally, a plaintiff must prove he was exposed to a concentration of the chemical generally higher than that of the general population.[61] In *Paoli*, the court accepted plaintiff's expert Dr. Nisbet's testimony that a 1987 exposure study by ATSDR showed PCB exposure levels for 89 Paoli residents that were much higher than the background level.[62] Often, however, the court demands more precise exposure information, such as the concentration of the exposure,[63] and the duration of exposure.[64]

Regardless of the extent of exposure information required by the court, the plaintiff must prove such an exposure through use of an expert, in which case the court will require that the expert be qualified to testify. All federal courts, and most state courts are now employing the test delineated in *Daubert v.*

Merrell Dow Pharmaceuticals,[65] which requires the judge to exclude an unqualified expert's testimony.[66] Thus, in order to withstand summary judgment, the toxic tort plaintiff must hope that its expert's study methodology satisfies the *Daubert* test.[67]

2. Defendant was Responsible for the Exposure

The toxic tort plaintiff faces a second proof barrier when it sets out to prove that the defendant caused the exposure in question. Such proof was problematic in Woburn because the plaintiffs' hydrogeologic experts were asked to recreate the 10-15 year-old footprints leading from the contaminated wells through the groundwater back to the defendants' plants.[68] Such proof would require the determination of the soil porosity, knowledge of underground water flow direction, and proof that the contaminated groundwater flowed underneath a river.[69]

Plaintiffs often fail to show that the defendants were a substantial factor in creating the chemical exposure, and thus fail to state a cause of action. For example, in *Carroll v. Litton Systems*,[70] the plaintiffs charged that they sustained injuries by drinking water from four TCE-contaminated wells. Plaintiffs' hydrologist testified that the TCE moved from defendant's manufacturing plant to the wells via the groundwater. However, he could not rebut the defendant's evidence that the groundwater moved in an opposite direction.[71] Thus the court weakened the plaintiffs' case by excluding expert testimony under *Daubert*. Similarly, the case of *Thomas v. Fag Bearings Corp*.,[72] though not a personal injury case, reiterated the requirement of linking contaminated water to its source. The court discounted the expert's opinion that a groundwater pathway ran from the defendant's plant to the drinking wells, a decision that was fatal to plaintiffs' cause of action.

Some toxic tort plaintiffs can trace the source of the exposure without aid of an expert witness. In a situation analogous to the layperson's exposure testimony in products liability cases, a plaintiff will testify that she ingested the medicine produced by the defendant, or that she used defendant's product.[73] Additionally, plaintiffs can link the cause of an odor to a plant emitting smoke at the time.[74]

Once the plaintiff proves exposure causation (proof of elements 1. and 2.), he must proceed to the second prong of the causation analysis: medical causation. As mentioned before, courts often bifurcate complex toxic tort cases so that a jury must reach a verdict on the exposure question before hearing evidence about plaintiff's injuries.[75] To prove medical causation, the plaintiff must show both that the exposure can cause the particular injury (general causation) and that the exposure did cause the injury (specific causation).

3. The Hazardous Substance Can Cause the Alleged Injury

Plaintiffs in toxic tort cases must prove general causation through medical expert testimony.[76] Such a requirement exists because a court will rarely take judicial notice that a substance is capable of producing the harm.[77] However, the court may often accept evidence from published studies from other scientific experts or government agencies regarding the known effects of the particular chemical.[78] The two medical causation elements are related in the fact that a plaintiff who proves general causation will often try to use his general causation evidence to show specific causation. Such a strategy will be discussed in section 4.

If the expert cannot use studies published by others, he must prove general causation to the jury on his own. The expert will usually present his evidence through an epidemiological study or an animal study. Courts prefer epidemiological studies (if available) over animal studies and often have excluded animal studies under the *Daubert* "gatekeeping" authority.[79]

The EPA and other health agencies often conduct animal studies to classify chemicals according to their carcinogenicity. Because ethical mores prevent scientists from conducting tests on humans, scientists often test rat or other laboratory animal reactions to high doses of the chemical in question. Scientists then extrapolate the measured health effects on the animals onto the human population.

Critics argue that animal studies overestimate risk in two ways. First, the high doses administered to the animals do not resemble the low-level, long-term exposures experienced by humans.[80] Next, biological differences between humans and the laboratory species may make the extrapolation of animal studies inaccurate.[81]

In the absence of generally accepted epidemiological studies, the court will likely admit a proper animal study. For example, in *Paoli*, the 3rd Circuit reversed the district court's exclusion of the plaintiffs' monkey laboratory studies.[82] According to the plaintiffs' expert, the studies showed that exposure to PCBs caused elevated levels of enzymes associated with liver damage, elevated lipids, and skin, liver and pancreatic cancer.[83] Because the defendant failed to submit any contradictory epidemiological studies, the court accepted the animal study as proof of general causation.

Courts prefer epidemiological studies as proof of general causation because the studies address the chemical's cause and effect relationships on people, not animals. Most commonly, the epidemiological study statistically compares the occurrence of harm in the group allegedly exposed to the chemical with the occurrence of harm in a group not exposed to the chemical.[84] Epidemiologists then perform statistical operations on the data in order to quantify the general risk of the chemical. They often quantify the risk through either a relative risk ratio or an attributable risk proportion ("ARP").[85]

The most common risk quantification method used in toxic tort cases is the risk ratio, which compares those exposed to the chemical with those not exposed.[86] With a risk ratio greater than one, a statistician will predict that more people exposed to the chemical will develop the disease than will those who are not exposed. Therefore, a chemical with a risk ratio of greater than one could be viewed as a general cause of the particular disease, meaning that the chemical can cause the injury in question.[87]

Critics of epidemiological studies point to uncertain results produced by small study populations ("small sample sizes"). A court may discredit such an epidemiological study, calling it "statistically insignificant." As an example of statistical insignificance, suppose that Stan, a statistician, wanted to determine Shaquille O'Neal's free throw ability. Stan attends one basketball game, in which O'Neal makes three of his four free throws (75%). Without witnessing many more free throws (increasing his sample size), Stan would unwisely conclude that O'Neal was a good shooter because O'Neal's success that night may have been an aberration.[88] Likewise, it would be unwise for a court or jury to conclude that contaminated water caused cancer just because 1 of 10 people who drank the water developed cancer. Because sample sizes of most epidemiological populations are generally small, relative risk calculations can vary tremendously. For instance, the EPA has published risk ratios for the association between exposure to radon and lung cancer that have ranged from 3 to 75.[89] The courts therefore seek epidemiological studies with less variance and more statistical significance.

Because of this potential for error, the courts will generally insist that the epidemiological studies be "statistically significant." The most common epidemiological indicator of statistical significance is the confidence interval. Confidence intervals are often described in terms of a percentage. If an epidemiologist states "the 95% confidence interval for radon's relative risk is between 1.5 and 2.5," he believes there is a 95% chance that the actual relative risk lies between 1.5 and 2.5, with the most likely actual risk being 2.0.[90]

Courts demand a 95% confidence interval that does not include a relative risk of 1.[91] Statistically, this requirement translates to a 95% chance that the relative risk is greater than 1, or, phrased differently, a 95% chance that exposure to the chemical can cause the injury. Thus the "95%" legal standard regarding epidemiological probability is much higher than the traditional "more likely than not" (51%) legal standard regarding causation.

A plaintiff can show general causation through published sources, animal studies, or epidemiological studies. The court will exercise its gatekeeping function by strictly monitoring the introduction of such evidence. The plaintiff therefore faces a risk that his suggested relationship between cause and effect will be excluded from the jury if it is not "statistically significant," a factor determined by sample sizes often out of his control.

4. The Hazardous Substance Did Cause the Plaintiff's Injury

Finally, once a plaintiff shows that the chemical can cause the injury complained of, he must prove that the chemical did in fact cause the injury. For this proof, the plaintiff's physician usually testifies that the plaintiff is ill and that the physician believes the alleged exposure caused the illness. Additionally, the plaintiff may introduce an epidemiological study to show the statistical chance that the plaintiff's injury resulted from the exposure.

Though some courts will allow the jury to infer specific causation from general causation, most courts require the physician to testify that (1) the plaintiff in fact suffered an injury and (2) the defendant caused the injury. Regarding the first element, the appeals court in *Paoli* excluded Dr. G. John Di Gregorio's testimony as to specific medical causation because he relied on plaintiffs' answers to a medical questionnaire instead of physically examining the plaintiffs or reviewing their medical records.[92] The court concluded that Di Gregorio "could not even reliably conclude that the plaintiffs had any illness." The court thus announces that, at a minimum, the physician must examine the patient when testifying as to specific causation.

When testifying about specific causation, the physician must conduct a differential diagnosis, a diagnosis that rules out alternative causes of the injury. Courts are divided as to what comprises an adequate differential diagnosis. In Paoli, the district court excluded the testimony of two physicians because they did not properly consider the alternative causes of their patient's illnesses.[93] The 3rd Circuit reversed, describing situations when "there is no need to examine alternatives."[94] Also, a doctor may perform an adequate differential diagnosis by merely considering alternative causes without having to rule them out.[95] On the other hand, some cases have required a more extensive differential diagnosis.[96]

Finally, physicians have been prohibited from testifying based on exposure testimony that is inaccurate or that has been excluded. For example, in *Curtis v. M&S Petroleum*,[97] the court stated that if the Acausation opinion is not based on sufficient information of the level of benzene to which plaintiffs were exposed, [the physician's] methodology would not be reliable, rendering his causation information inadmissible."[98] Another court has struck medical causation conclusions based on inadmissible exposure duration testimony.[99]

Epidemiological studies have played a large role in specific causation determinations. As mentioned before, epidemiologists use a relative risk of 2.0 to predict that an exposed person was twice as likely to develop the illness than a non-exposed person.[100] From the relative risk ratio, epidemiologists have derived the attributable risk proportion ("ARP") formula[101] to predict the likelihood that the harm to a person within the relative risk study population was actually caused by the exposure. According to the ARP formula, any relative risk greater than 2 will lead to the statistical conclusion that the chance that a member of the exposed study group suffered injury as a result of the chemical is greater than 50%. Some courts have instructed the jury to translate the statistical conclusion of the ARP to a legal conclusion. For example, courts have instructed jurors that an ARP of greater than .50 is sufficient proof of legal causation.[102] At the other end of the spectrum, however, other courts have prohibited a jury from inferring causation absent an ARP greater than .50.[103] Overall, epidemiological data plays such a large role in proof that the plaintiff should review the statistical limitations of his study before attempting to introduce it as evidence.

III. Analysis

Even though the federal government uses mechanisms designed to prevent releases, it is clear that toxic releases are continuing at an enormous rate that is threatening the public's health. Similarly, the common law attempts to deter releases by forcing the polluter to compensate the victim for his injury. It is possible that neither mechanism is ensuring an adequate public health level.

The tort system may not be accomplishing its deterrence goal in the toxic tort arena. Manufacturers continue to release massive quantities of carcinogens and other toxic wastes into the environment without much fear that the law will hold them liable for the damages they create. Such liability would likely motivate the manufacturers to take greater care to contain chemical releases or even to find alternate chemical processes that eliminate the production of the harmful chemicals in the first place.

The question remains: Can the tort system be modified, or combined with the federal regulatory scheme, to better protect the health of U.S. citizens? To find a solution to the perceived problem, it is useful to describe and discuss the main challenges for the toxic tort plaintiff and suggestions for reform.

A. Problems With the Current Proof Standard

For over two decades, many legal commentators have lamented the troubles of the toxic tort plaintiff and have called for improvements in the system.[104] These critics isolate the particular challenges the plaintiff faces. Some noted problems include the great expense of most lawsuits, the high level of scientific uncertainty, the latency problem, the lack of defendant documentation, and the substantial factor rule.

1. Prohibitive expense of trial

First of all, the toxic tort plaintiff may be reluctant to sue for financial reasons. As noted in the introduction, the Woburn plaintiffs spent approximately $4.8 million (in 1986 dollars) to try the first half of the bifurcated trial, a financial burden which fell on Schlictmann's firm because of its contingency fee arrangement.[105] The expense of the trial depleted all of the firm's resources,[106] and may have pressured the plaintiffs to settle for a much lower sum than they sought.[107] In most cases, the result is that toxic torts will be tried on a contingency basis, and the law firms will likely select only the largest and easiest claims. Thus, the firms may ignore the lesser injuries because the expert and legal fees greatly outnumber the expected recovery. As a result, toxic tortfeasors compensate only the most seriously injured.

2. Scientific Uncertainty

A second major problem for the toxic tort plaintiff stems from science's imperfect knowledge regarding disease etiology and the nature of exposures. When science cannot unequivocally trace injury back to its source, the judge will often exclude the evidence because it employs some speculation. Such tracing problems exist because the symptoms of diseases caused by toxics are often identical to symptoms caused by natural events. For example, there is no way for science to distinguish leukemia caused by benzene exposure from leukemia caused from a natural mutation.[108] One study panel's statement reflects the consensus view that imperfect scientific knowledge makes "proof of causal connection between exposure and injuryY an almost overwhelming barrier to recovery."[109]

3. Latency of Disease

Commentators often stress the latency problem, as many diseases allegedly caused by low-level toxic waste exposures manifest themselves only many years after the exposure. For example, some forms of cancer remain latent for 15 to 40 years between exposure and the onset of symptoms.[110] Such latency has a number of detrimental effects. First, it reduces the likelihood that the actual defendant will be available for trial. The defendant corporation may be out of business, or removed from the appropriate jurisdiction. Next, long latency periods make it very difficult for the plaintiff to accumulate relevant evidence.[111] Science is often faulted for being unable to trace the effect to the cause, but such inability often arises from the fact that natural processes cause the environment to change dramatically over time. Defendants can use this long latency period to cover up or remove any incriminating evidence that has not already been diluted by nature.

4. Defendant's Control of Release Data

In the Woburn case, the plaintiffs sought documentation regarding the defendants' knowledge of groundwater contamination, the amount of TCE they had dumped, and the duration they dumped TCE on the land. The plaintiffs obtained only a small fraction of this information because the defendants allegedly disposed of their old records.[112] However, after the settlement was finalized, Schlictmann discovered a hidden sixty page hydrogeologic report that the defendant had commissioned a few years before trial.[113] This helpful report, hidden from the plaintiff, exemplifies how the defendant can

control its own documents to keep the plaintiff and the court in the dark. With such a long latency period, the defendant has many opportunities to destroy or alter important documents.

5. Substantial Factor Rule

As mentioned before, a plaintiff can hold a defendant liable if he can show the defendant was a substantial factor in causing the alleged harm. One legal commentator has suggested that the all-or-nothing character of injury-based liability rules allows "significant but not 'substantial' risks [to] go unpenalized."[114] This is because a manufacturer may knowingly release toxic materials into the environment in small enough quantities that no court would call them a "substantial factor" in causing any carcinogenic injury. Though it may never be held accountable by the courts, the manufacturer's behavior may combine with many other small releases to cause enormous injury. The current causation system seems to induce this type of behavior. The cumulative effect of such induced behavior is a community that is exposed to an increased risk of developing disease.

B. Suggestions for Toxic Tort Reform

1. Administrative Compensation Scheme

In 1980, when the U.S. Senate was proposing Senate Bill 1480 (the hazardous waste cleanup bill which would become CERCLA), between 25 to 30 senators successfully deleted a provision that would have created a federal cause of action for medical expenses and income loss resulting from exposure to hazardous waste.[115] As a compromise between those proposing the revised bill and those supporting the old bill, the negotiators added '301(e), which called for a CERCLA-funded study to examine the adequacy of the common law in providing redress for those harmed by hazardous wastes.[116] After concluding that the existing statutory and common law remedies were inadequate, the study suggested the creation of an administrative compensation system to provide a limited, no-fault remedy for those injured by hazardous releases.[117]

The study proposed a system that would keep the existing common law in place, but would create a no-fault administrative scheme to provide a "speedy remedy" for those who sought "limited compensation" for costs like medical expenses or lost earnings.[118] The scheme would be funded through taxation of selected industries.[119] Finally, the strict liability system would ease the plaintiff's burden of proof by providing the plaintiff with rebuttable presumptions after the plaintiff showed basic causation facts.[120] Once granted, the rebuttable presumption would shift the burden of causation proof to the defendant. The Study Group's suggestions were never enacted by Congress, but legal commentators have likewise called for a similar administrative compensation scheme.[121]

Such an administrative scheme could greatly improve the toxic tort plaintiff's plight. For example, the scheme would reduce the financial burden that deters law firms from accepting cases where plaintiffs only suffer minor injuries as opposed to carcinogenic injuries.[122] Such "smaller" plaintiffs could then be compensated for their medical expenses and lost earnings so that these plaintiffs would have a good incentive to maintain good health. It appears the system of recovery would accomplish one of the main goals of the tort system: compensation.[123] Next, the system may be more efficient because the adjudicators could develop technical expertise to handle recurrent complex issues.[124] Finally, an administrative system could ease the current burden placed on the courts to handle lengthy and complex toxic tort trials.[125]

An administrative system contains drawbacks as well. First of all, paid medical expenses and lost earnings may not adequately compensate a victim for mental anguish, wrongful death, or reduction of life expectancy. [126] Such incomplete compensation could be a reason that most industrial manufacturers would support such a system.[127] Next, the industry funded system may provide little individual deterrence for toxic waste releases, resulting in a higher public health hazard. Finally, the costs involved in obtaining an attorney and proving causation under the reduced standard may still be high enough to deter "small plaintiffs."

2. Statutory Right of Action

Instead of an administrative compensation scheme, others have suggested statutory reform as an avenue to help the toxic tort plaintiff. Though all of these proposals have been rejected at the federal level, some legislation have actually been implemented at the state level.

The first of these proposals creates an express federal right of action for personal injuries caused by hazardous wastes.[128] In 1983, after CERCLA was passed without a private right of action, U.S. Representative LaFalce proposed the Toxic Compensation Act,[129] which would allow any victim the nonexclusive right to sue in federal courts for injuries caused by hazardous wastes.[130] The statute would have provided the plaintiff with a rebuttable presumption of guilt upon "reasonably likely" proof of causation.[131] Two years Congress rejected the LaFalce bill was rejected, it rejected U.S. Representative Frank's SARA[132] amendment proposal to allow victims to sue under Superfund.[133] Though nearly 15 years have passed since Congress has considered such proposals, there is no evidence that it is presently considering the option.

As opposed to federal inaction, some states have implemented statutory rights of action for toxic tort victims. For example, North Dakota allows any person injured by a state environmental law violation to bring an action for damages. [134] Pennsylvania provides a rebuttable presumption that a person who disposes of hazardous waste "shall be liable, without proof of fault, negligence, or causation, for all damages, contamination or pollution within 2,500 feet of the perimeter of the area where hazardous waste activities have been carried out."[135] New Hampshire gives the plaintiff a right to collect treble damages if the defendant is both convicted of a hazardous waste violation and is held liable in a civil action.[136]

Finally, Minnesota holds any person who is responsible for hazardous waste release strictly liable for personal injury damages, including pain and suffering.[137] In 1985, however, the legislature repealed a portion of the law that created rules for directed verdicts and medical testimony that arguably lowered the causation proof level.[138]

Even though plaintiffs have rarely used these statutes to plead their causes of action, the statutes provide further evidence that states recognize the utility of statutory rights of action. Compared to the administrative scheme which seems to improve only compensation, the statutory rights of action address both the deterrence and compensation goals of the tort system. For example, in antitrust law, scholars believe that treble damage actions[139] accomplish both goals.[140] New Hampshire's treble damage provision may prove to be just as effective. The statutory presumptions and reduced proof requirements make it easier for the plaintiff to prove causation. Finally, the North Dakota law allows the plaintiff to bootstrap his claim for damage by introducing evidence that defendant's conduct violated the law.

These state and federal proposals show that statutory reform is a realistic solution. Though these laws have not been greatly embraced yet, they may show some promise for the future.

3. Modification of the Common Law

One final hope for the plaintiff lies in the possibility that the common law will continue to evolve. If accepted in the majority of jurisdictions, certain legal theories that exist in both the toxic and traditional tort arenas could ease the plaintiff's burden.

In the toxic tort arena, the most famous example is the burden shifting approach used in the nuclear testing radiation case *Allen v. United States*.[141] In that case, Judge Bruce Jenkins laid out elements that the jury could balance to determine if the defendant was a substantial factor of injury. Some of the elements were the probability that the plaintiff was exposed to the defendant's radiation at a rate higher than background, the consistency between plaintiff's injury and those known to be caused by radiation, and the distance between plaintiffs' residence and the testing site.[142] More importantly, Jenkins states that if the jury finds enough circumstantial evidence like disease etiology and ARP to conclude defendant was a substantial factor, the court would shift the burden of proof to the defendant.[143] Jenkins even suggests than a less that 50% ARP would suffice to shift the burden of proof.[144]

Next, courts may soon entertain the argument that a defendant who fails to keep proper records of his

emissions is estopped from arguing that plaintiff's case fails for lack of data.[145] Such a rule would greatly help the plaintiff in proving the quantity of the chemicals to which the defendant may have exposed the plaintiff. Though no court has announced such a rule, the court in *Elam v. Alcolac, Inc*.[146] hinted at such a conclusion. After ruling for the plaintiff, the court noted that the record intended by the state's regulatory agency regarding toxic spills was never created.[147] Finally, in dicta, the court stated, "the but for proof [defendant] Alcolac insists upon the toxic tort plaintiffsYwas made impossible by the very conduct of the defendant,"[148] thus suggesting that the court would shift the burden of exposure proof from the plaintiff to the defendant because of the defendant's conduct.

Finally, courts could apply existing tort theories to toxic tort cases. For example, the court in the medical malpractice case of *Ybarra v. Spangard*[149] employed a res ipsa loquitur theory to explain causation even though the plaintiff had no evidence of the tortfeasor's identity due to the plaintiff's unconsciousness.[150] The court stated, "without the aid of the doctrine a patient...would be entirely unable to recover unless the doctors and nurses in attendance voluntarily chose to disclose...the facts establishing liability."[151] Such a theory could be employed in the toxic tort arena to shift the burden of proof when the defendant fails to produce sufficient hazardous waste records.

Next, in the wrongful death action of *Haft v. Lone Palm Hotel*,[152] a father and son drowned at defendant's motel. The defendant had failed to provide a lifeguard, "a primary requirement" of a state statute.[153] The court noted the plaintiff's proof problem, stating "the evidentiary void in the instant action results primarily from defendants' failure to provide a lifeguard to observe occurrences within the pool area."[154] The court thus shifted the burden of proof regarding drowning causation because requiring "plaintiffs to establish 'proximate causation' to a greater certainty...would permit defendants to gain the advantage of the lack of proof inherent in the lifeguardless situation which they have created." Plaintiffs should argue, and courts should accept, similar reasoning where, because the defendant failed to keep records required by law, the plaintiff cannot show the exposure level defendant created.

The courts have taken steps that can ease the toxic tort plaintiff's burden of proof. However, such steps must become common among all jurisdictions in order to protect the health of the nation. Additionally, courts could apply the theories expressed in *Ybarra* and *Haft* to shift the burden of proof when defendant has failed to maintain records.

IV. Proposal

For at least 20 years, legal commentators, national and state legislators, attorneys, and judges have sought to provide the toxic tort plaintiff a fair solution to its causation challenge. As potential solutions are debated, millions of tons of toxic chemicals continue to spew into the environment, often near someone's residence. As the need for a solution becomes more urgent, priority should be placed on deterrence of potentially harmful conduct until science can catch up to explain how these harms occur. Secondarily, those who have suffered toxic injuries should be compensated.

Of all the suggested reforms, an express, federal right of action is best suited to deter toxic releases and compensate victims. This paper suggests legislation that contains the following aspects: (1) the plaintiff has a right to sue in federal court for personal injuries sustained as a result of any violation of CERCLA, RCRA or TSCA; (2) the court cannot direct a verdict for the defendant if the plaintiff can show that he was exposed to hazardous waste partially caused by defendant, exposure to this waste can cause injury of the type suffered, and the exposure level would be reasonably likely to contribute to that type of injury; (3) If successful in his lawsuit, the plaintiff is entitled to treble damages.

There are many reasons why the proposed legislation should be federal as opposed to local. First of all, federal legislators have proposed this type of statute for almost 20 years.[155] The main opposition to these proposals is they will cause insurance costs to rise.[156] This argument is a poor reason to threaten the health of the nation. Next, others argue that the states should use their police powers to legislate so that a number of different approaches can be tested and studied.[157] Supporters of federal legislation can counter, arguing that the federal government has already accepted the responsibility to protect the nation through its extensive environmental legislation.

Most importantly, the government should allow the private sector to supplement current federal efforts to contain the proliferation of toxic chemicals in the environment. Though the EPA and the Department of Justice have powerful resources at their command, these resources are insufficient.[158] Allowing private victims to sue will avoid the challenge of using a limited budget to create a bureaucracy to handle a problem of unknown scope. Congress should help the environmental agencies like it helped the federal antitrust agencies in their enforcement efforts when it created an antitrust federal private right of action.[159]

In most ways, the proposal removes many of the plaintiff's barriers to recovery. However, the CERCLA/RCRA/TSCA provision burdens the plaintiff with another element to his prima facie case. This requirement is important to integrate the federal tort system with the federal hazardous waste regulatory structure. Once the plaintiff proves this requirement, he need not prove negligence because strict liability will apply. Thus the proposal borrows the rationale from the negligence per se doctrine, while simplifying the test.

In order to limit the breadth of the statutory right of action, the plaintiff may only sue for CERCLA, RCRA and TSCA violations. It is common for statutes to limit the types of violations to which the statutory right of action applies.[160] Limiting the right of action to these violations is sensible because most toxic waste releases fall within these statutes. Plaintiffs may complain that the statutes limit their ability to recover for injuries sustained as a result of lawful waste disposal. If necessary, the EPA could remedy these complaints by tightening its own standards. Additionally, if experience shows that the proposed law is limiting plaintiff recoveries resulting from toxics covered by other federal legislation, the right of action could be expanded to allow suit for other federal environmental law violations.

The directed verdict aspect of the proposal builds on repealed Minnesota '115B.07's[161] attempt to prevent directed verdicts. However, it uses the liberal language of the LaFalce bill to determine whether a judge can direct a verdict. To survive a directed verdict, a plaintiff need only show the defendant partially caused the exposure in a reasonably likely amount that can cause the particular injury. As a result of this new standard, the jury could possibly hear circumstantial scientific testimony that is currently excluded under *Daubert*.

This standard will permit the jury to make reasonable inferences regarding causation, instead of letting the judge determine the case at early phases of trial. Currently, only 2.8 percent of toxic substance cases reach a jury verdict.[162] Once a toxic substance case reaches the jury, 74% of the verdicts favored the plaintiff, compared to an overall 52% plaintiff success rate.[163] Thus, the new directed verdict standard will likely result in more plaintiff verdicts.

It should be noted that the proposed rule does not change the current causation standard per se. It merely allows the jury to decide the outcome of the case rather than the judge. This is especially important in cases of extreme scientific uncertainty because currently a judge may direct a verdict on the basis that neither the plaintiff's nor defendant's expert testimony is scientifically certain. Given that both sides present uncertain scientific testimony, the jury should be able to decide which of the "uncertain" scientific testimony is more credible. Our legal system entrusts the jury, not the judge, with the responsibility to assess the credibility of witnesses. Because the reduced directed verdict standard will prevent the judge from determining the case, the jury will have more power to decide toxic tort personal injury cases.

The treble damage provision borrows from the New Hampshire statute to supply extra deterrence for CERCLA/RCRA/TSCA violators. In the face of such scientific uncertainty, the best way to protect the public health is to deter producers of toxic discharges. Treble damage provisions provide extra deterrence because the defendant will be punished at a level three times greater than the damage he caused. One court has used deterrence as a justification for treble damages, stating, "Congress intended ...to impose sanctions to secure the more effective enforcement of antitrust legislation."[164] Others have reasoned that treble damages are granted because of the public interest of the antitrust laws. The treble damage provision is therefore sensible because the significant public health goals of the environmental laws call for deterrence.

V. CONCLUSION

Toxic tort plaintiffs like the ones in *A Civil Action* face a very challenging burden when attempting to prove causation of personal injuries. This is because a plaintiff must show by a preponderance of the evidence that he was exposed to a hazardous substance, that the defendant was responsible for the exposure, and that the hazardous substance can and did cause the plaintiff's injury. Additionally, the courts impose very tight restrictions on expert testimony. Thus the judge may exclude helpful indirect or circumstantial evidence of causation that the jury may have found helpful. At the same time, toxic waste generators continue to spew chemicals into the environment. Accordingly, the rules must be changed.

Though some local jurisdictions provide the plaintiff with helpful rules regarding the burden of proof and permissible inferences, these rules are rare, not widespread. Congress should pick up where it left off in the early 1980's and enact a law to create a federal private right of action for toxic tort victims. Such legislation would provide added artillery for the enforcement of federal toxic waste laws like CERCLA, RCRA, and TSCA. Additionally, the statute will let most toxic tort cases be resolved by a jury instead of a judge. If Congress passes the proposed legislation, the tragic story of *A Civil Action* will hopefully become an antiquated account of how life used to be in America.

Endnotes

[*] Third Year Student, Expected to Graduate in May, 2000 (Submitted for Academic Credit: March, 2000).

[1] See, generally, A Civil Action (Paramount Pictures 1999).

[2] See Jonathan Harr, A Civil Action 44 (Vintage Books 1996)(hereinafter "Harr").

[3] Id. at 38.

[4] See Massachusetts Department of Public Health, Woburn Childhood Leukemia Follow-Up Study (1997).

[5] At the time of the lawsuit, the U.S.EPA had listed TCE as a "probable carcinogen" based on animal testing. See Harr at 81.

[6] For example, groundwater contamination expert George Pinder, Princeton University Chairman of Engineering, would testify that the TCE in the wells originated from Beatrice and Grace's properties. Id. at 325. Likewise, geologist John Drobinski, who conducted extensive ground tests in Woburn, concluded that Beatrice's property was contaminated for at least 25 years. Id. at 299.

[7] Schlictmann's medical experts all concluded that exposure to TCE could cause and did cause the children's leukemias. Such experts included immunologist Dr. Alan Levin, (believing that exposure to TCE damages plaintiffs' immune systems) immunopathologist Dr. Robert Colvin, (believing to a reasonable medical certainty that the TCE caused or substantially contributed to immune dysfunction and leukemia) neurologist Robert Feldman, (finding that every plaintiff had a slower than normal functioning of the trigeminal nerve) and Dr. Vera Byers (stating that long term exposure to TCE impaired the plaintiffs' immune systems). See, generally Harr.

[8] Id. at 208.

[9] Id. at 209.

[10] I d. at 392.

[11] Plaintiffs' counsel Charles Nesson believed that a billion dollar verdict was within the realm of possibility. Id. at 251.

[12] Id. at 453.

[13] See Sheldon M. Novick, Law of Environmental Protection, section 3.07 at 3-49, 3-68 (1999).

[14] See Environmental Protection Agency, 1997 Toxics Release Inventory Public Data Release Report .

[15] Id. at table 2-4 (entitled ATRI On-Site and Off-Site Releases, by State, 1997). Texas led all states in 1997 with 261 million pounds released, followed by Louisiana with 186 million pounds. Id.

[16] See Barry L. Johnson & Christopher T. DeRosa, The Toxicological Hazard of Superfund Hazardous Waste Sites (1997).

[17] The Environmental Protection Agency's estimate is 40,000, whereas the Office of Technology Assessment's estimate is 440,000. Id.

[18] Resource Conservation and Recovery Act, 42 U.S.C.A. sections 6901-6987, 9001-9010 (West 1995).

[19] See R. Ruttenberg, et al., Labor Market Study of Hazardous Waste Workers and Associated Emergency Responders (1996).

[20] See Johnson.

[21] Id.

[22] Id.

[23] Id. The ATSDR defines an "urgent public health hazard" as a site that poses an urgent risk even if the exposures are short-term, while defining a "public health hazard" as a site that poses a risk if the exposures are long-term. Id.

[24] Id.

[25] Id. The ATSDR has a five-step method of determining whether the pathway is complete. A pathway is complete if there is a source of pollution (the waste site), an environmental medium of transport (e.g. groundwater), a point of exposure (e.g. a water well), a means of exposure (drinking water) and a receptor population (the community). In the absence of any one of the factors, the pathway is considered incomplete. However, an incomplete pathway can quickly become complete. Id.

[26] Id.

[27] Id. A "systemic toxic risk" is capable of damaging at least one of the following: the liver, the kidney, the lung, reproduction, the nervous system, the cardiovascular system, the immune system, skin, and the gastrointestinal system (nausea, etc.). Id.

[28] Id.

[29] Comprehensive Environmental Response, Compensation, and Liability Act of 1980, 42 U.S.C.A. section 9601 et seq. (West 1995); RCRA, supra note 18; and Toxic Substances Control Act, 15 U.S.C.A. section 2601 et seq. (West 1997).

[30] See Restatement (Second) of Torts, section 821A-D (1977).

[31] Id.

[32] See Restatement (Second) of Torts, section 822 (1977).

[33] See Restatement (Second) of Torts, section 821C (1977). The rule states, "In order to maintain a proceeding to enjoin to abate a public nuisance, one must...have authority as a public official or public agency to represent the state or a political subdivision in the matter." Id.

[34] See Anderson v. W.R. Grace & Co., 628 F. Supp. 1219, 1233 (D.Mass. 1986).

[35] 99 Cal.Rptr. 350 (Cal. Ct. App.1971).

[36] Id. at 356.

[37] See Michael C. Skotnicki, *Private Actions for Damages Resulting from an Environmental Public Nuisance: Overcoming the Barrier to Standing Posed by the "Special Injury Rule"*, 16 Am. J. Trial Advoc. 591, 597 (1992).

[38] See Restatement (Second) of Torts, section 821D (1977).

[39] See, e.g. Mel Foster Co. Properties, Inc. v. Amoco, 427 N.W.2d 171, 175 (affirming jury diminution in value award for landowner damaged by defendant's gasoline leakage)(Iowa 1988); Desario v. Industrial Excess Landfill, Inc., 587 N.E.2d 454, 457 (awarding diminution of value damages caused by leaking landfill contaminants in this private nuisance action)(Ohio Ct. App. 1991).

[40] 525 A.2d 287 (N.J. 1987).

[41] Id. at 295.

[42] Id. at 292.

[43] See Restatement (Second) of Torts section 282 (1965).

[44] See, e.g., Sterling v. Velsicol Chem. Corp., 647 F.Supp. 303, 316 (holding that Velsicol breached its duty to protect others from unreasonable harm by dumping harmful chemicals on its farm)(W.D. Tenn. 1986); Knabe v. National Supply Division of Armco Steel Corp., 592 F.2d 841 (5th Cir.1979) (deciding that Armco Steel breached its duty by releasing polluted water into neighboring dairy field); Pitre v. Opelousas Gen. Hosp., 530 So.2d 1151 (holding that defendant breached his duty of care owed to plaintiff) (La.1988).

[45] See, e.g. Harr, *supra* note 2, p. 384. The jury found that the negligence occurred after 1973. This date made the plaintiffs' pre-1973 evidence irrelevant. Id.

[46] See Harr,supra note 2, at 460.

[47] 503 A.2d 823 (N.H. 1986).

[48] Id. at 828.

[49] 497 A. 2d 1310 (N.J. Super. Ct. Law Div. 1985).

[50] Id. at 1324.

[51] L.R. 3 H.L. 330.

[52] Such factors include (a) existence of a high degree of risk of some harm; (b) likelihood that the harm that results from it will be great; (c) inability to eliminate the risk by the exercise of reasonable care; (d)

extent to which the activity is not a matter of common usage; (e) inappropriateness of the activity to the place where it is carried on; and (f) extent to which its value to the community is outweighed by its dangerous attributes. See Restatement (Second) of Torts section 520 (1977).

[53] See, e.g. Sterling, *supra* note 43, at 315 (deciding that "the operation of a toxic waste dump is inherently an abnormally dangerous activity"); Cities Service Co. v. State, 312 So. 2d 799, 803 (ruling that break in dam which impounded phosphate slime constituted a nonnatural use of land such that strict liability applied) (Ct. App. Fl. 1975); Schwartzman, Inc. v. Atchison, Topeka & Santa Fe Ry. Co., 842 F. Supp. 475, 479 (holding that the storage and disposal of toxic chemical waste poses a serious threat to health such that the defendant is strictly liable for the consequences of the abnormally dangerous activity) (D.N.M. 1993).

[54] See, e.g., Erbich Prods. Co. v. Wills, 509 N.E.2d 850, 852 (holding that manufacturer of liquid bleach was not engaged in an ADA because reasonable care would prevent the chlorine exposure) (Ind. Ct. App. 1987); Avemco Insurance Co., Inc. v. Rooto Corp. 967 F.2d 1105, 1108 (deciding that plant owner's emissions of hydrochloric and sulfuric acid fumes which occurred after former employee unlawfully entered plant and intentionally opened acid storage tanks did not constitute an abnormally dangerous activity) (6th Cir. 1992); Richmond Fredericksburg & Potomac R.R. Co. v. Davis Industries, Inc., 787 F.Supp. 572, 575 (ruling that the manufacture, storage and disposal of air conditioners containing PCBs was not an abnormally dangerous or ultrahazardous activity) (E.D. Va. 1992).

[55] "The actor's negligent conduct is a legal cause of harm to another if...his conduct is a substantial factor in bringing about the harm." See Restatement (Second) of Torts, section 421(1965). Such a substantial factor is distinguished from a negligible factor. Id. at comment b.

[56] For example, the court in Daubert v. Merrell Dow Pharmaceuticals, Inc., 43 F. 3d 1311 (9th Cir. 1995) states, "In the current state of scientific knowledge...we are ignorant...[However,] causation can be proved even when we don't know precisely how the damage occurred, if there is sufficiently compelling proof that the agent must have caused the damage somehow." Id. at 1314.

[57] 35 F.3d 717 (3d Cir. 1994).

[58] Id. at 752.

[59] See, e.g. Daigle v. Shell Oil Co. 972 F.2d 1527, 1532 (10th Cir. 1992); Elam v. Alcolac, Inc., 765 S.W. 2d 42 765 S.W. 2d 42 (Mo. App. 1988).

[60] See, generally, Harr, *supra* note 2.

[61] See Paoli, at 771.

[62] Id. at 778.

[63] See Renaud v. Martin Marietta Corp., Inc., 972 F.2d 304, 307 (affirming district court's grant of defendant's summary judgment motion on grounds that plaintiff's exposure model would not support a finding of exposure at sufficient concentration levels) (10th Cir. 1992).

[64] See Allen v. Penn. Engineering Corp., 102 F.3d 194, 199 (stating that "[s]cientific knowledge of the harmful level of exposure to a chemical, plus knowledge that the plaintiff was exposed to such quantities, are minimal facts necessary to sustain the plaintiffs' burden in a toxic tort case.") (5th Cir. 1996). See also Yeater v. Allied Chem. Co., 755 F.Supp. 1330, 1337-38 (holding that proof of intensity of exposure and concentration of hazardous substance were necessary to show probability of injury) (N.D. W.Va.1991). See, generally, Harr, supra note 2. The Woburn defendants needed to establish when they first became exposed. Id.

[65]

509 U.S. 579 (1993). The test requires the judge to consider (1) whether the evidence can be, and has been, tested; (2) whether the evidence has been subjected to peer review and publication; (3) to the extent that the evidence involves a particular scientific technique, the known or potential rate of error of the technique and the existence and maintenance of standards controlling the technique's operation; and (4) the degree of acceptance by the scientific community. Id. at 592-94.

[66] See Fed. R. Evid. 702.

[67] See, e.g. Renaud (affirming district court's grant of defendant's summary judgment motion on grounds that plaintiff's exposure model would not support a finding of exposure at sufficient concentration levels). But See Curtis v. M&S Petroleum, 174 F.2d 661, 672 (applying Daubert to allow plaintiff's expert to testify without being able to calculate the precise benzene exposure level) (5th Cir. 1999).

[68] See, generally Harr, supra note 2.

[69] Id.

[70] 1995 WL 56862 (4th Cir. Feb. 1, 1995).

[71] Id. at *2.

[72] 846 F. Supp. 1382 (W.D. Mo. 1994).

[73] See, e.g. Turpin v. Merrell Dow Pharmaceuticals, 959 F.2d 1349 (6th Cir. 1992); Roehling v. National Gypsum Co. Gold Bond Bldg. Prods., 786 F.2d 1225, 1227 (4th Cir. 1986).

[74] See Elam, *supra* note 58, at 59.

[75] Such bifurcation occurred in the Woburn case, a result which plaintiff's counsel Charles Nesson believed to have benefited the defendants. See Harr, supra note 2, at 286-7. In this case, Schlictmann wanted the parents to testify about the extent of their children's injuries and deaths. Such testimony would have given jurors a more thorough background into the controversy, and also provided circumstantial evidence that an external environmental force was affecting the community's health. Id.

[76] See L. Neal Ellis Jr. and Charles D. Case, Toxic Tort and Hazardous Substance Litigation,108 (Michie Butterworth 1995).

[77] Id.

[78] See, e.g. Environmental Defense Fund v. Environmental Protection Agency, 636 F.2d 1267, 1271 (noting that the special attention accorded to PCBs in TSCA reflects that PCBs pose a serious threat to human health.) (D.C.Cir. 1980); Curtis, supra note 66, at 669 (allowing plaintiffs' expert to show general causation by referring to the toxicological profile for benzene, which was published by the U.S. Dept. of Health and Human Services and the ATSDR).

[79] See, e.g. Paoli, supra note 56, at 780 (stating "in the absence of epidemiologic proof in humans we must drop to our second tier in the understanding of human carcinogenic prediction: Animal testing."); In re "Agent Orange" Prod. Liability Lit., 611 F.Supp. 1223,1241 (excluding animal studies of Agent Orange based partly on the court's conclusion that there was significant contrary epidemiological data)(E.D.N.Y. 1985).

[80] See Colin Hugh Buckley, A Suggested Remedy for Toxic Injury: Class Actions, Epidemiology, and Economic Efficiency, 26 Wm. & Mary L. Rev. 497, 517 (1985).

[81] In one case, the plaintiff's expert exposed pregnant female animals to Bendectin, a suspected

teratogen. In excluding the testimony, the court criticized the extrapolation process, stating, "different species of animals react differently to the same stimuli for reasons not entirely understood...[thus] the analytical gap between the evidence presented and the inferences to be drawn is too wide." See Turpin, supra note 72, at 1359-60. See also Foster, A Case Study in Toxic Tort Causation: Scientific and Legal Standards Work Against Recovery for Victims, 19 Envtl. L. 141, 156 (1988).

[82] See Paoli, supra note 56 at 780.

[83] Id.

[84] Kenneth J. Rothman, Modern Epidemiology 57-62 (1989).

[85] See *infra* note 102.

[86] See Rothman, at 37. The formula is generally stated as: (exposed persons with disease)exposed persons without disease))(unexposed persons with disease)unexposed persons without disease).

[87] See Daubert, *supra* note 55, at 1321 (stating that "a relative risk less than 2 may suggest teratogenicity"); Deluca v. Merrell Dow Pharmaceuticals, Inc. 911 F.2d 941, 947 (3d Cir. 1990).

[88] In fact, over the course of a season, O'Neal averages only 50%.

[89] See 45 Fed. Reg. 5,040 (1980).

[90] Probabilistic techniques often predict such risks in the form of a symmetric bell-shaped curve. Thus, the confidence interval ranges from 1.5 to 2.5, the expected value lies at 2, the midpoint of the curve.

[91] For example, one court hearing a Bendectin products liability case, describes, "the predominating choice of a 95% confidence levelY" See Deluca v. Merrell Dow Pharmaceuticals, Inc., 911 F.2d 941, 948 (3d Cir. 1990). See also Ambrosini v. Labarraque, 101 F.3d 129, 136 (validating plaintiff's epidemiological study based on a 95% confidence interval) (D.C. Cir. 1996).

[92] See Paoli, *supra* note 56, at 736.

[93] Id. at 756.

[94] Id. at 760. The court analogized plaintiff=s evaluation to a scenario where a patient with a broken arm complains about a biking accident. Id.

[95] Id. at 765.

[96] See, e.g. O=Conner, v. Commonwealth Edison Co., 13 F.3d 1090, 1106-07 (holding expert=s proof insufficient to show that exposure to radiation specifically caused plaintiff=s cataract because expert had not considered alternate causes) (7th Cir. 1994); Conde v. Velsicol Chemical Corp., 24 F.3d 809, 814 (ruling against plaintiffs causation allegations partially because experts failed to rule out causes other than insecticide exposure to explain plaintiffs= headaches, nausea, and diarrhea) (6th Cir. 1994).

[97] 174 F.3d 661 (5th Cir. 1999)

[98] Id. at 671.

[99] See Carroll, *supra* note 69, at *5 (holding that because physicians= specific causation opinions rested on inadmissible exposure concentration and duration testimony, such opinions were likewise inadmissible).

[100] See *supra* note 85 (description of relative risk formula).

[101] The formula is:(risk ratio B 1)_(risk ratio). Thus a risk ratio of 2.0 would yield an ARP of .50.

[102] See, e.g. Marder v. G.D. Searle & Co., 630 F.Supp. 1087, 1092 (ruling that an ARP greater than .50 satisfies Athe required legal burden of proofCa showing of causation by the preponderance of the evidence) (D.Md. 1986); Manko v. United States, 830 F.2d 831 (holding that ARP greater than .50 translated into Amore likely than not@ causation proof) (8th Cir. 1987).

[103] See Daubert, *supra* note 55, at 1320 (explaining that California tort law requires proof that the exposure doubled the relative risk).

[104] See, e.g. Shelly Brinker, *Opening the Door to the Indeterminate Plaintiff: An Analysis of the Causation Barriers Facing Environmental Toxic Tort Plaintiffs*, 46 UCLA L. Rev. 1289 (calling for a "substantial-factor" approach to allow for recovery when evidence of causation is less than 50%)(1999); John S. Forstrom, *Victim Without a Cause: The Missing Link Between Compensation and Deterrence in Toxic Tort Litigation,* 18 Envtl. L. 151 (calling for the creation of an administrative compensation scheme funded by industry or general taxpayers because proof requirements are so burdensome for the plaintiff) (1987); Glen O. Robinson, *Probabilistic Causation and Compensation for Tortious Risk,* 14 J. Legal Stud. 779 (noting the causation problems the toxic tort plaintiff faces, author suggests an approach in which the plaintiff may seek compensation for bearing an unreasonable risk) (1985).

[105] See Harr, *supra* note 2, at 453.

[106] To pay the bills, Schlictmann's car was repossessed, partners lost deeds to their homes, and the law firm liquidated its retirement plan. Id.

[107] After the jury verdict came in, the firm decided a fair settlement with W.R. Grace would be $35 million. The firm ended up settling for $8 million. Id. at 407-8.

[108] See Forstrom *supra* note 103, at 156.

[109] Id. at 71.

[110] See Brinker, *supra* note 103 at 1293-4 (citing Council on Environmental Quality report).

[111] See Forstrom, at 155. One of the main justifications a statute of limitations generally is the increased difficulty of gathering relevant and accurate evidence as time elapses between the trial and the event. Id.

[112] See, generally, Harr, *supra* note 2.

[113] Id. at 460.

[114] Robinson, *supra* note 103, at 784.

[115] See, generally, 2 A Legislative History of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (Superfund) Pub. L. 96-510.

[116] See 42 U.S.C.A. 9651(e)(1)("In order to determine the adequacy of existing common law and statutory remedies in providing legal redress for harm to man and the environment caused by the release of hazardous substances into the environment, there shall be submitted to the Congress a study within twelve months of December 11, 1980.)(West. 1995)

[117] See Senate Committee on Environment and Public Works, Injuries and Damages from Hazardous

Wastes - Analysis and Improvement of Legal Remedies: A Report to Congress in Compliance with Section 301(e) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, Comm. Print No. 97-12, part 1, 97th Cong. 2d Sess. 26 [hereinafter "CERCLA Study"], at 4.

[118] See CERCLA Study, at 197-8. See also Id. at 234.

[119] Id. at 245.

[120] Id. at 213-14. In particular, if the claimant could prove that (1) a "source" produced, disposed or transported hazardous waste, (2) the claimant was exposed to this waste, and (3) the claimant suffered the kind of disease known to result from the exposure, the adjudicative body would grant the claimant the rebuttable presumption that (a) the exposure contributed to the disease and (b) the "source" was responsible for the harm. Id.

[121] See, e.g. Forstrom, *supra* note 103, at 180; Soble, A Proposal for the Administrative Compensation of Victims of Toxic Substance Pollution: A Model Act, 14 Harv. J. on Legis. 683 (1977).

[122] See CERCLA Study, *supra* note 116, at 193.

[123] See Forstrom, at 161 (arguing that since the victim does not care who compensates him, only that he is in fact compensated, an administrative compensation scheme would satisfy the needs of the victim).

[124] See CERCLA Study at 211.

[125] Id. at 200 (noting that the proposed system could unclog the court dockets).

[126] Though the study directs these types of plaintiffs to the common law, the common law has been criticized for its high causation barriers.

[127] See Theodore L. Garrett, *Compensating Victims of Toxic Substances: Issues Concerning Proposed Federal Legislation*, 13 Envtl. L. Reporter 10172 (1983).

[128] Such a right is necessary because the federal courts have not allowed private rights of action to be implied from federal control legislation. See Middlesex County Sewerage Authority v. Nat'l Sea Clammers Ass'n, 453 U.S. 1 (1981).

[129] See H.R. 2330, 98th Congress (1983).

[130] See Garrett, at 10176.

[131] The court would grant the plaintiff a presumption upon proof that (1) plaintiff was exposed to hazardous waste partially caused by defendant, (2) exposure to this waste can cause injury of the type suffered, and (3) exposure level would be reasonably likely to contribute to that class of injury.

[132] Superfund Amendments and Reauthorization Act of 1986 (SARA) Pub. L. No. 99-499, sections 1-531, 100 Stat. 1613-1782 (1986)(codified at 42 U.S.C. sections 9601-9675 (1988)).

[133] See H.R. 3852, 99th Cong., 1st Sess.,(1985). Frank's amendment was defeated by those who felt that the current remedies were sufficient, that such a cause of action would greatly increase insurance premiums, and that the amendment would create excessive federal litigation. See Rory A. Valas, *Toxic Palsgraf: Proving Causation When the Link Between Conduct and Injury Appears Highly Extraordinary*, 18 B.C. Envtl. Aff. L. Rev. 773, 777 n. 28 (1991).

[134] See N.D. Cent. Code section 32-40-06 (Lexis 1999).

[135] Pa. Stat. Ann. tit. 35 section 6018.611 (West 1993). The Pennsylvania courts have interpreted the statute to apply only to violations of the Storage Tank and Spill Prevention Act. See Centolanza v. Lehigh Valley Dairies, Inc., 658 A.2d 336 (Pa. 1995)

[136] See N.H. Rev. Stat. Ann. section 147:58 (Lexis 1999).

[137] See Minn. Stat. Ann. section 115B.05(1)(b)(West 1997).

[138] The court may not direct a verdict against a plaintiff on the issue on causation if the plaintiff produces evidence sufficient to enable a reasonable person to find that (a) defendant is the person responsible for the release, (b) plaintiff was exposed to a hazardous substance, (c) the release could reasonably have resulted in plaintiff's exposure to the substance in the amount and duration experienced by the plaintiff, and (d) the type of injury is caused or significantly caused by exposure to the hazardous substance in an amount and duration experienced by the plaintiff. Additionally, evidence to a reasonable medical certainty that the exposure caused or significantly contributed to the injury is not required for the issue to go to the jury. See 1983 Minn. Laws ch. 121, section 7. One commentator believes the statute amounts to a substantial factor test. See Prince, *Compensation for Victims*, 11 Wm. Mitchell L. Rev. 657,691 (1985). However, it is clear that the legislature intended to lower the causation hurdle for the plaintiff.

[139] Clayton Act, section 4 states, "any person who shall be injured...by reason of anything forbidden in the antitrust laws...shall recover threefold the damages by him sustained." See 15 U.S.C.A section 15 (1997).

[140] See Blue Shield v. McCready, 457 U.S. 465 (stating, "Congress sought to create a private enforcement mechanism that would deter violators and deprive them of the fruits of their illegal actions, and would provide ample compensation to the victims of antitrust violations.") (1982).

[141] 588 F. Supp. 247 (D. Utah 1984).

[142] Id. at 415.

[143] Id.

[144] See Brinker, supra note 103, at 1322.

[145] The plaintiffs' argument was rejected in Renaud v. Martin Marietta Corp. 749 F. Supp. 1545, 1552 (D. Colo. 1990).

[146] 65 S.W. 2d 42 (Mo. App. 1988).

[147] Id. at 176.

[148] Id. at 177.

[149] 154 P.2d 687 (Cal. 1944).

[150] Id.

[151] Id. at 689.

[152] 478 P.2d 465 (Cal. 1970)

[153] Id. at 472.

[154] Id. at 474.

[155] See *supra* notes 127-132.

[156] See *supra* note 132.

[157] See Garrett, *supra* note 126, at 10175.

[158] Between 1,500 and 3,500 of the sites covered by the Resource Conservation and Recovery Act ("RCRA") require corrective action. There are an estimated 40,000 to 440,000 uncontrolled hazardous sites in the U.S., whereas CERCLA only authorizes cleanup for 1,296 of these sites. See, generally, *supra* notes 17-20.

[159] The Antitrust Division and the Federal Trade Commission have limited resources, allowing them to bring perhaps 100 to 150 cases even in well-funded years. See Handler, Milton et al., Trade Regulation: Cases and Materials (4th ed.) (Foundation Press 1997) However, because the Clayton Act enables private citizens to receive treble damages for injuries resulting from for antitrust violations, private citizens have filled the void. For example, the ratio of private actions to public actions was 20 to 1 in the 1970's. In the 1980's, the ratio was 10 to 1. See Commentary by Salop & White, in White (ed.), Private Antitrust Litigation: New Evidence, New Learning 3 (1988).

[160] For example, the Clayton Act section 4 lets the plaintiff sue under the section for violations of the Sherman Act, Clayton Act, section 2 of the Robinson-Patman Act, and part of the Wilson Tariff Act. See American Bar Association Section of Antitrust Law, Antitrust Law Developments (4th Ed. 1997) 759. Additionally, the Pennsylvania courts have interpreted its strict liability hazardous waste statute to apply only to violations of the Storage Tank and Spill Prevention Act. See *supra* note 134.

[161] See *supra* note 136.

[162] See U.S. Dept. of Justice, *Civil Jury Cases and Verdicts in Large Counties* (1995) <http://www.ncjrs.org/txtfiles/cjcavilc.txt>.

[163] Id.

[164] Trebuhs Realty Co., Inc. v. News Syndicate Co., Inc. 107 F. Supp. 595, 599 (S.D.N.Y. 1952).

[165] E. Compton Timberlake, *Federal Treble Damage Antitrust Actions* (Callaghan 1965) 10.