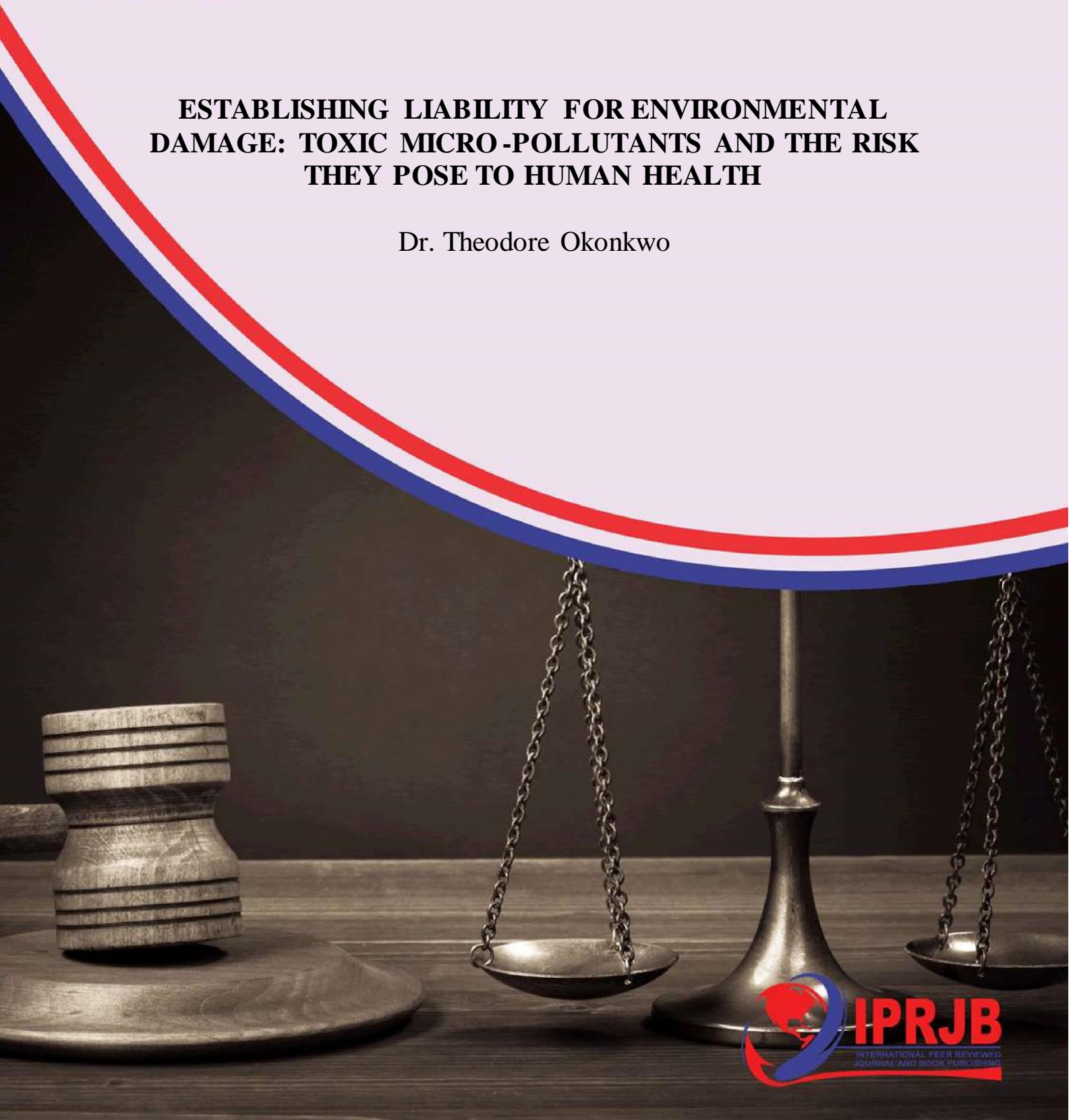


International Journal of Law and Policy (IJLP)

ESTABLISHING LIABILITY FOR ENVIRONMENTAL DAMAGE: TOXIC MICRO-POLLUTANTS AND THE RISK THEY POSE TO HUMAN HEALTH

Dr. Theodore Okonkwo



ESTABLISHING LIABILITY FOR ENVIRONMENTAL DAMAGE: TOXIC MICRO-POLLUTANTS AND THE RISK THEY POSE TO HUMAN HEALTH

Dr. Theodore Okonkwo

**Senior Lecturer and Head of Department, Department of Public Law, Faculty of Law,
University of Port-Harcourt, Port-Harcourt, Nigeria, Ph.D (Environmental Law)
t161962@gmail.com, theodore.okonkwo@uniport.edu.ng.**

Abstract

This article examines the issue of establishing liability for environmental harm in the context of toxic micro-pollutants and the risk they pose to human health. Industrialization has had adverse health and environmental consequences both for the workforce and the general population directly by exposure to safety hazards and harmful agents or indirectly through environmental degradation locally and globally. Environmental health hazards, like occupational health hazards, may be biological, chemical, physical, biomechanical or psychosocial in nature. Environmental health hazards include traditional hazards of poor sanitation and shelter, as well as agricultural and industrial contamination of air, water, food and land. These hazards have resulted in a host of environmental harm and human health impacts which has led to the degradation of the global systems on which the health of the planet depends. In response to these issues, this article pursues the debate and argument on the use of civil liability regime to address some of these problems.

Keywords: *toxic micro-pollutants; human health, environmental harm; civil liability; environmental degradation; pollution*

1. Introduction

Establishing civil liability for environmental damage in the context of toxic micro-pollutants¹ and the risk they pose to human health presents some difficulties, “which currently limits its role to environmental protection”² and “the difficulties of proving causation in such cases confound environmental tort plaintiffs”.³ This poses a still considerable and significant “amorphous and sometimes overlapping categories”⁴. The result is that the plaintiff or claimant in certain cases faces vast procedural challenges of establishing liability on the part of the defendant. To establish liability for environmental harm or damage, the plaintiff must show the link between the defendant’s behaviour and subsequent harm to the plaintiff. This is known as causation and is a very important legal doctrine required to establish fault. The courts have in certain instances interpreted causation in different ways, particularly in environmental cases, even where the harm caused and the “instigating act” are strikingly similar.

Aside, the difficulties of proving causation, this article notes that the use of civil liability in an environmental context also suffers from certain limitation, given the fact that torts are solely concerned with the protection of private interests. Such private interest emanate from the harm or damages caused through deaths, non fatal heart attacks, and hundreds of thousands of asthma, cardiac and respiratory problems resulting daily from thousands of chemical substances that enter our bodies through the air we breathe, the water we drink, the food we eat and the industrial manufactured products and activities. Some of these are harmful with far-reaching unknown and uncertain consequences on human health and the environment.⁵ Therefore, in all likelihood, private interests are involved as individuals most often seek compensation from the facilities that cause the emission of these toxic micro-pollutants. According to Wolters Kluwer⁶, this creates two problems:

...first, the loss suffered by an individual may not reflect the full costs of the damage to the environment; thus compensation awarded to a claimant may not be sufficient to fund, for example, clean-up costs. Second, as torts are closely tied to the protection of individual rights and interests, there is a limited notion of standing. As a result, in the absence of an individual victim, organizations concerned with environmental protection are

¹ The term “micropollutants” means organic or mineral substances whose toxic, persistent and bioaccumulative properties may have a negative effect on the environment and/or organisms. They are present in many products that we consume daily such as, drugs, cosmetics, phytosanitary products, insecticides etc., at home or in industry. They are also present in the aquatic environment and are liable to have potentially direct or indirect effects on ecosystems and even on human health.

² Wilde, M. (2013). *Civil Liability for Environmental Damage. Comparative Analysis of Law and Policy in Europe and the U.S.* (Second Edition). The Netherlands: Kluwer Law International, BV, Wolters Kluwer, p. 73.

³ Lin, A.C. (2005). “Beyond Tort: Compensating Victims of Environmental Toxic Injury”. *Southern California Law Review*. Vol. 78. 1439.

⁴ Note, (2015). “Causation in Environmental Law Lessons from Toxic Torts”. *Harvard Law Review*. June 9, 2015. 128 *Harv. L. Rev.* 2256

⁵ Schneider, C.G. (2004). *Dirty Air, Dirty Power: Mortality and Health Damage Due to Air Pollution from Power Plants*. Boston, MA: Clean Air Task Force, Mount Vernon Printing. See also, Abt. Associates report, “Power Plant Emissions, Particulate Matter – Related Health Damages and the Benefits of Alternative Emission Reduction Scenarios” (June 2004). www.cleartheair.org/dirtypower. ⁶ Kluwer, W. (2013). *Ibid.* p. 73.

generally not in a position to pursue civil claims on behalf of the environment in its own right.

These gaps and difficulties, combined with the uncertainty and huge costs of litigation, result in “the systematic under-compensation of environmental tort victims and the systematic under-deterrence of polluters”⁶. Part II of this Article examines the need to establish liability for environment damage. Part III discusses the causation issues, difficulties in establishing causation for environmental damage particularly in toxic micro-pollutant and public health cases. Part IV focuses on recent developments in toxic micro-pollutant cases. Part V reviews the *locus standi* requirements to pursue an action for environmental damage particularly in addressing or litigating environmental toxic injury. Part VI presents the remedies available for environmental harm which are open to the plaintiff. In Part VII, this article concludes that establishing liability for environmental damage in toxic micro-pollutant cases should look beyond tort system.

II. The Need to Establish Liability for Environmental Damage

The purpose of this section is to consider the main issues which must be addressed in order to attach liability for environmental damage. Principally, the traditional role of tort in an environmental context is still very relevant in this circumstance by reference to common law jurisdictions. The common law systems provide useful and relevant case studies for addressing the main issues associated with the use of tort in an environmental context. According to Wolters Kluwer, this is because the case law is inextricably linked with changing social and economic conditions. To this end, this section identifies the main torts which are relevant in an environmental context with a view to ascertaining in what circumstances a plaintiff may establish *prima facie* cause of action.

Negligence is the only tort in which fault forms the actual basis of the cause of action.⁷ It must however be noted that as a result of “cross contamination between the old forms of action,” fault based liability such as nuisance have now emerged within the tort family.⁸ The principal elements of the tort of negligence were stated by Buller,¹⁰ who offered a definition which is still relevant today:

Every man ought to take reasonable care that he does not injure his neighbour; therefore, wherever a man receives any hurt through the default of another, though the same were not wilful, yet it be so occasioned by negligence or folly, the law gives him an action to recover damages for the injury so sustained.

In the intervening period between the time of Buller and the present, the definition has found acceptance within the case law and now consists of three elements, to wit: a duty to take

⁶ Lin, A.C. (2005). Ibid. See also, Robin, R.L. (1993). “Some Thoughts on the Efficacy of a Mass Toxics Administrative Compensation Scheme”, 52 *MD. L. REV.* 951, 952-954.

⁷ *Walden v. Marshall* (1367) 7 B. 43 Ed. 3, F. 33, pl. 38; *Esso Petroleum v. Southport Corporation* [1956] A.C. 218, 240; *Cambridge Water v. Eastern Counties Leather* [1994] 2 A.C. 264.

⁸ Newark, F.H. (1949). “The Boundaries of Nuisance,” 65 *L.Q. Rev.* 480, 482; *Hunter v. Canary Wharf* [1997] A.C. 655; *Rylands v. Fletcher* (1866) L.R. , Ex. 265 ¹⁰ Buller, F. (1817). *Trials at Nisi Prius*, 25 (6th ed.) Phenery & Sweet.

care, a breach of that duty, and loss sustained by the plaintiff as a result of the breach of duty. In other words, according to Buller, a duty of care is owed to those persons who are at potential risk from an activity. In effect, such person or persons must foresee that their victim or victims are likely to suffer misfeasance. In the celebrated case of *Donoghue v. Stevenson*,⁹ Lord Atkin stated his famous proximity test to assist in ascertaining who the foreseeable victims are likely to be:

You must take reasonable care to avoid acts or omissions which you can reasonably foresee would be likely to injure your neighbour. Who, then, in law is my neighbour? The answer seems to be – persons who are so closely and directly affected by my act that I ought reasonably to have them in contemplation as being so affected when I am directing my mind to the acts or omissions which are called in question.¹⁰

However, from an environmental perspective, the need to establish fault in all cases would place a heavy burden on the plaintiff. In addition to negligence, trespass and nuisance have featured most prominently in litigation arising from pollution. This is so, because most recognized forms of pollution have interfered with neighbouring property. It however, seems that despite some decided cases,¹¹ liability in trespass and nuisance still remain stricter than in negligence. Establishing liability or fault on the part of the defendant is often a herculean task for the plaintiff. In *Esso Petroleum v. Southport Corporation*,¹² negligence was alleged, in addition to the plaintiff's claim in trespass and nuisance. The Court of Appeal's finding that the doctrine of *res ipsa loquitur* could apply was rejected by the House of Lords. This article argues that much controversy surrounds the concept of *res ipsa loquitur* and whether it constitutes a real legal concept at all. Certainly, modern courts are very reluctant to follow it and are very hostile to the notion that it actually reverses the burden of proof on causation.¹³ *Esso Petroleum v. Southport Corporation*,¹⁴ continues to be one of the most significant cases as it concerned maritime oil pollution damage. It was held that the mere fact that the steering mechanism had developed a fault was not in itself sufficient to raise *res ipsa loquitur*. According to Earl Jowitt in that case, it would be necessary to adduce evidence of faulty maintenance or installation and this the plaintiff had failed to do.¹⁵ The assertion that the master of the vessel should not have proceeded to navigate a narrow channel knowing that the steering mechanism had developed a fault was also rejected by their Lordships.

This article notes that just a few years after this litigation an international agreement was reached to the effect that the need to establish fault is an unacceptable obstacle to

⁹ [1932] A.C. 562.

¹⁰ [1932] A.C. 562, 580.

¹¹ *Cambridge Water v. Eastern Countries Leather* [1994] 2 A.C. 264.

¹² [1956] A.C. 218, 240.

¹³ *Carroll v. Fearon* [1999] CA; *Barclay v. Dunlop Ltd.* [1999] E.C.C. 73 (15) (Judge L.J.); *Blake v. Galloway*, [2004] CA.

¹⁴ [1956] A. C. 218.

¹⁵ [1956] A. C. 218, 237.

establishing liability.¹⁶ In *Cambridge Water v. Eastern Countries Leather*,¹⁷ the issue of negligence was easily dealt with by the High court, *moreso*, since PCE in relatively small concentrations was not recognized as being harmful at the material time, the defendant Eastern Countries Leather was not expected to have taken steps to prevent any spillages from occurring.¹⁸ The case of *Graham and Graham v. Re-Chem International*,¹⁹ centered on whether the problems suffered by the Graham's dairy herd had been caused by a toxin allegedly emitted from the Rechem incinerator in Scotland. More than 80 witnesses of fact were called and 21 experts gave evidence on wide ranging and technical issues as meteorology, toxicology, incinerator operation and environmental monitoring. One of the distinguishing features of such environmental pollution cases, is the difficulty a plaintiff has in establishing the basis of liability and causation. The plaintiff will argue that all he is required to show is that the defendant's activities were capable of causing the harm suffered, whereas, the defendant will argue that the plaintiff must prove the problems were caused by the defendant's activities. The Grahams submitted that the pertinent issue on causation was whether the symptoms exhibited by the Grahams herd were indicative of poly-halogenated aromatic hydrocarbon (PHAH) toxicity. It was further submitted that the standard of proof that would be required by the scientific community was far greater than that required to prove the proposition in a civil action and that the Grahams were only required to show on the balance of probabilities that PHAH toxicosis was a reasonable or probable cause of their problems. The case involved a vast huge of cutting edge scientific evidence.²⁰ The Grahams argued that it was not necessary to show that the alleged emissions from the incinerator were the sole or dominant cause of damage but it was sufficient to show that they had "materially contributed" to their problems. While this submission was accepted by the court, the judge found that the Grahams had failed to establish that Rechem had in any way been responsible for the damage. The issue of negligence was not an important aspect of this case, as the matter was settled on the basis of causation. However, the point must be made that the case strengthens the fact that in spite of the *Cambridge Water*²³ case, it is still very difficult to establish liability in negligence than in nuisance due to the requirement to establish breach of the duty of care in addition to foreseeability of damage.

Notwithstanding the above case, on occasion successful actions have been maintained in negligence in respect of environmentally harmful activities. A classic example is the case of *Tutton v. A.D. Walter Ltd.*²¹²² The defendant grew oil seed rap which when in full flower he sprayed it with insecticide to get rid of bugs. He did not tell his neighbour. The neighbour had a beehive and the insecticide killed his bees. The defendant claimed that the bees were

¹⁶ This gave rise to a new international oil pollution compensation scheme, the 1969 Civil Liability Convention 9 ILM (1970) 45. This established strict liability for oil pollution damage, subject to certain defences and harmonized the types of damage claim and clean-up costs which could be met.

¹⁷ [1993] Env. L.R. 116.

¹⁸ *Ibid.*, 142 (Kennedy, J.).

¹⁹ [1996] Env. L.R. 158, (believed to have been the longest civil trial in English history).

²⁰ The scientific literature referred to at trial filled 25 lever arch files. The lawyers had to have a detailed understanding of the scientific issues before legal arguments could be made. Furthermore, the importance of particular issues changed during the 14-month trial as the lawyers' understanding of science increased.²³ *Ibid.*

²¹ [1985] 3 W.L.R. 797.

²² F. Supp. 670 (D.S.C. 1992), affirmed in relevant part, 996 F. 2d 121 (4th Cir. 1993).

trespassing. The defendant was held liable for not warning his neighbours. The harmful nature of the chemical was well known to the defendant who had the benefit of the Agricultural and Advisory Service (ADAS) advice and the manufacturer's instructions issued with the product. The advice and instructions recommended that in order to reduce the risk of harming bees, the chemical should be used on cool days or at dusk and never when the crop was in bloom. With these facts within the knowledge of the defendant, it was held that the defendant ought reasonably to have had the plaintiffs in contemplation whilst spraying the crops, thus, a failure to observe the instructions was a clear breach of the duty of care owed to the beekeepers. In like manner, in the US case of *Shockey v. Hoechst Celenese Corporation*,²⁵ the defendant had delivered drums of waste chemicals to a former employee who operated a chemical reclamation facility across the street from the defendant's property. During his reclamation operations the independent contractor spilled chemicals, which contaminated the groundwater under that property. The court held the defendant Hoechst Celenese Corporation liable. The plaintiff had filed claims in strict liability, negligence, and nuisance, in addition to trespass, and the court was of the opinion that the defendant's knowledge of the "abnormally dangerous nature of the chemicals" was sufficient to establish that the defendant knew or ought to have known of the consequences of the act.²³

The tort of negligence is also gaining prominence in an environmental context of personal injuries as scientific advances have recently established links between illnesses and certain pollutants.²⁴ Thus, there has been an increase in the U.K. and the U.S. particularly of personal injury litigation arising from pollution. In *Margereson & Hancock v. J.W. Roberts Ltd.*,²⁵ the plaintiffs sued the defendants, owners of a factory where the plaintiffs had lived and played as children. They contracted mesothelima due to their exposure to asbestos. The defendant was held liable to the plaintiffs because they knew or ought to have known that asbestos dust was escaping from the factories into the surrounding street and could cause harm to people who were exposed to it. Risk of harm of allowing asbestos dust to escape from the factory was foreseeable. As stated by Lord Lloyd in *Page v. Smith*,²⁶ "the test in every case ought to be whether the defendant can reasonably foresee that his conduct will expose the claimant to risk." The plaintiff won. The case is important as it was the first of such claim in which duty of care was extended beyond factory employees, so as to include those who are outside the scope of the factory work place.

As soon as pollutants escape into the environment, "affecting local inhabitants and passers-by," the case becomes a matter of environmental exposure, thus, leading to a class of potential litigants who may want to sue. Environmental exposure of toxic compounds has been

²³ Ibid. See, Simons, R. A. (2006). "When Bad Things Happen To Good Property". (Environmental Law Institute).

²⁴ A 2004 study, Schneider, C.G. (2004), *Clean Air Task Force, Dirty Air, Dirty Power; Mortality and Health Damage Due to Air Pollution from Power Plants*, *ibid.*, estimated that fine particle pollution released by United States power plants causes nearly, 24,000 deaths, 38,200 non fatal heart attacks and hundreds of thousands of asthma, cardiac, and respiratory problems each year.

²⁵ [1996] C.A. Env. L. R. (4) 304.

²⁶ [1995] UKHL 7 is a decision of the House of Lords. It is part of the common law of England and Wales.

held to have caused environmental harm. The *Corby toxic waste case*²⁷ stems from the reclamation of a Corby Steelworks in the town of Corby, Northamptonshire, between 1985 and 1997. The Corby Borough Council undertook the demolition, excavation and redevelopment of the site as part of a program of urban regeneration. This involved transporting the waste through populated areas to a quarry north of the site, utilizing up to 200 vehicle movements daily. The toxic waste was carried in open lorries, spilling sludge over the roads and releasing huge amounts of dust into the air. Then, between the late 1980s and 1990s, the rates of upper-limb defects in babies born in Corby were found to be almost three times higher than those of children born in the surrounding area and ten times higher than a town with a population of 60,000 should expect. In all cases initially referred to the courts there were no previous family histories of limb defect. In November 2005, expert evidence was submitted to the High Court in London by the mother of thirty children who claimed that during their pregnancies they were exposed to contamination from the waste removal operations and who sought to bring a legal action to try to prove a link between the mismanagement of the toxic waste and the birth defects suffered by their children.²⁸ After reviewing the evidence presented by all parties to the case, permission was given for the parents to pursue the claim against Corby Borough Council as a class action involving children born between 1985 and 1999. The case was heard in 2009 and the plaintiffs alleged that toxic waste dumped by Corby Borough Council between 1984 and 1999 was the cause of their deformities. All had serious disabilities, including missing or underdeveloped fingers and deformities of their feet. They alleged that their mothers ingested or inhaled the toxic substances that affected the development of their limbs while they were still in the womb. All of their mothers either lived in or regularly visited Corby between 1984 and 1999 when the work was carried out across the town. In his judgment, the judge found Corby Borough Council liable in negligence, public nuisance and a breach of statutory duty. In his judgment, Mr. Justice Akenhead said it was clear that the Council had permitted toxic waste to disperse into the atmosphere. According to the learned judge, there was a “statistically significant” cluster of birth defects between 1989 and 1999, and that, “toxicologically, there were present on and from the Corby Borough Council sites, over the whole period from 1985 (and possibly before) until 1997, the types of contaminants which could cause the birth defects complained of.” The plaintiffs argued that *res ipsa loquitur* applies, but the court did not pronounce on the applicability of *res ipsa*, which this article argues may likely be due to the fact that the legal doctrine is not sacrosanct and “is of debatable legal consequence.” The fact that the Judge took time to examine the expert evidence presented before the court suggests that he was not persuaded by the argument on *res ipsa*. Therefore, such negligent acts by the defendant were foreseeable and could have been prevented by the council. The judge said this much when he stated that the:

...Corby Borough Council was extensively negligent in its control and management of the sites which they acquired from British Steel and otherwise used. That negligence and, as from April 1, 1992 breach of

²⁷ The Corby toxic waste case was a court case decided by the Hon. Mr. Justice Akenhead at the High Court of Justice, London on 29 July 2009 in the case of *Corby Group Litigation v. Corby Borough Council* [2009] EWHC 1944 (JCC).

²⁸ Verkaik, R. (2005-11-29). “Parents of 30 Children Sue Over Birth Defects They Blame on Clean-up of Toxic Waste Dumps.” *The Independent*.

statutory duty on the part of CBC permitted and led to the extensive dispersal of contaminated mud and dust over public homes, with the result that the contaminants could realistically have caused the types of birth defects of which complaint has been made by the claimants... Corby Borough Council is liable in public nuisance, negligence and breach of statutory duty...²⁹

Akenhead, J. described the defendant, Corby Borough Council as “extensively negligent in its control and management of the sites.” Thus, the judge found that the defendant should have known that toxic dust would pose a health hazard to humans – the unborn child. In this respect, the foreseeability of harm that resulted should not be too restrictively defined “and it would not be necessary to shout that the defendant could have anticipated the precise type of harm,”³⁰ part of been “extensively negligent” on the part of the defendant, include the fact of allowing toxic waste to disperse into the atmosphere. Evidence put forward described how the vehicles that conveyed the toxic waste materials were uncovered, and there was no adherence to procedures such as the wheel washing of the vehicles.³¹ The Judge ruled that the defendant’s submission that the main fault lay with the independent contractors contracted by the Corby Borough Council could not be sustained. Defendants further argued that they could not be held vicariously liable for the torts committed by an independent contractor. The judge disagreed with this submission as the activities complained of are inherently of “special danger” to another and “hazardous to health.” During the trial, an internal report prepared by Corby Borough Council was uncovered which had raised the prospect of residents being exposed to high levels of zinc, arsenic, boron and nickel as a result of the reclamation works, and a separate report, from the council’s auditor, complained of incompetence and negligence by the council and said there was a “cavalier approach” to the operation.³² In this respect, this article argues that Corby Borough Council knew or ought to have known that the substances being transported around the town in the negligent manner which they did could have been hazardous to health as the toxic waste was carried in open lorries, spilling sludge over the roads and releasing huge amounts of dust into the air. Some of the open-backed lorries transported so-called ‘wet waste,’ containing dioxins and heavy metals such as cadmium, lead and chromium.³³ Sadly enough, the judgment did not discuss or pronounce on the all important issue of causation, which on the basis of the expert scientific evidence, the judge could have found “a causal link between the birth defects and the exposure to toxic dust.”³⁴ The defendant later agreed to settle the matter and dropped intended Appeal. The financial settlement involved 19 families and also encompassed three children not covered by the original ruling. Since the issue of causation was

²⁹ Ibid. *Corby* [2009] EWHC 1944 (TCC); [2010] Env. L.R. D2.

³⁰ Kluwer, W. (2013). Ibid., p. 65. Also, *Corby case*, ibid., p. 683.

³¹ “Corby toxic waste case: Court is told of an atmospheric ‘toxic soup.’” (2009-02-17). *Northamptonshire Evening Telegraph*.

³² Nick, B. (30-07-2009). “Corby Birth Defect: Ten-year Struggle Ends in Victory that Echoes Erin Brockovich.” *The Daily Telegraph*, (London).

³³ Andy, D., Allen, V. (30-07-2009). “Victory for Children of Toxic Town: Families Win Ten-year Battle Over Clean-up of Steelworks.” *Daily Mail*.

³⁴ *Corby case*, Ibid., 885.

not pursued, the court did not pronounce on it, but if the plaintiffs had been faced with the issue of establishing causation, they would have been trapped, as “it is often extremely difficult” to establish causation, in situations where the pollutant is dispersed into the “wider environment” and exposure to human health resulting from high levels of zinc, arsenic, boron and nickel are claimed.³⁵

The judgment has implications for industry. Any industry involved in any activity with possibility of releasing environmentally harmful substances into the environment, must adopt measures to assess the likely adverse and harmful effects that might result. They must employ all necessary best available scientific technology and research to deal with the matter. The principles contained in the judgment do not only apply to redevelopment or reclamation cases, but extends to any activity which has potential for exposure into the atmosphere. Where there is foreseeability for such exposure, then all necessary precaution and safeguards should be put in place to protect not just the “site workforce” and the persons living and working within the area of the activity, but also the natural environment. Unfortunately, the case centered on personal injuries suffered by the defendants and did not canvass the issue of damage caused to the natural environment.

III. Establishing Causation for Environmental Damage

The judicial system has struggled to address the issue of establishing causation for environmental harm, as persons injured by environmental pollution often have difficulty identifying a causal link of their injuries to an identifiable defendant. The difficulty of proving causation is a crippling barrier to environmental law suits.³⁶ This is underscored by the testimony of Robert Gerard before a Select Committee, where he stated: I might explain that the reason why I have not myself brought actions against the alkali manufacturers at St. Helens has been simply this: I am assured by my solicitor that it is impossible to bring an action with any chance of success unless I can put my finger upon the right man, with all the assistance I can get, when there are a dozen or 20 works all emitting vapours at the same time.³⁷

This was in 1862, when scientific knowledge was limited or not available with no means of tracing and isolating respective sources of pollution. Michael Garvey, in his evidence before the same Select Committee asserted that it was near impossible to establish liability on the grounds of:

The difficulty of selecting any one of those effluvia and tracing it up to its source, so as to bring it home to the manufacturer by legal evidence. We have always been defeated on this point.³⁸

The point made by Michael Garvey 154 years ago was a situation where there were several industries in a neighbourhood or locality, each manufacturing “different substances

³⁵ In the U.S. case of *Sterling v. Velsicol Chemical Corporation*, 855 F2d 1188 (6th Cir. 1988), the plaintiffs could not prove to the satisfaction of the court that certain illnesses had been caused by drinking water contaminated by pollutants leaching from a waste burial site.

³⁶ See, Dewees, D.N., Duff, D., and Trebilcock, M. (1996). *Exploring The Domain of Accident Law: Taking the Facts Seriously*, Oxford University Press.

³⁷ The House of Lords Select Committee Report on Inquiry of Noxious Vapours (HL 1862, 486-IX), Minutes of Evidence 17, 161. This record is held by Greater Manchester County Record Office (with Manchester Archives), Reference E17/194/1. Hansard, 9 May 1862.

³⁸ *Ibid.*, 189, 2027.

which mixed together.” At that time, scientific knowledge was not available to isolate the individual elements and trace them to their respective sources. But today, scientific techniques could be employed to trace pollutants to their source. However, it is still often very difficult to establish causation, because the plaintiff typically must establish two types of causation. First, a plaintiff must prove general causation, which means that a substance is capable of causing the injury at issue. Second, a plaintiff must prove specific causation, that is, that exposure to the substance in fact caused that plaintiff’s injury.³⁹ The scientific uncertainty that surrounds causation can make these burdens insurmountable.⁴⁰ As scientific knowledge has increased, the complex links between latent toxins and various types of harm have been discovered. Nevertheless, it is one thing to discover a potential link, and quite another to establish sufficient proof of the link for the purposes of establishing liability for environmentally harmful activities that causes health problems. This “sufficient proof” in most cases is not easy to discharge in that a toxin is often not the only possible cause for a particular illness. In this respect, it becomes the onus of the plaintiff to prove, on a balance of probabilities, that the defendant caused or made a “material contribution” to the loss.⁴¹ In certain cases such as diseases as asbestosis which are far more prevalent in persons exposed to a particular substance,⁴² illnesses can be traced to exposure to a specific substance. However, illness involving toxic micro-pollutants exposure can often result from multiple causes.⁴³ For example, a case of lung cancer may be linked to exposure to tobacco smoke, exposure to pollutants from a nearby factory, or exposure to pollutants from traffic on a local highway.⁴⁴ This is true, because many forms of cancer associated with pollution are also associated with other factors. In a decided case,⁴⁵ James McGhee was employed to clean out brick kilns and developed dermatitis from the accumulation of coal dust on his skin. Because there were no shower facilities at his workplace, he would cycle home each day, increasing the risk he would contract dermatitis. Had his employer provided shower facilities, the coal dust could have been washed off before cycling, reducing the risk of contracting dermatitis. Due to the limits of scientific knowledge, it was impossible to rule out the possibility that he had not contracted dermatitis during the non-wrongful exposure to brick dust while working in the kiln. He sued his employer for negligence for breaching its duty to provide proper washing facilities. The issue before the House of Lords was whether the failure to provide the washing facilities had caused the rash. The House of Lords held that the risk of harm had been materially increased by the prolonged exposure to the

³⁹ See, Farber, D. A. (1987). “Toxic Causation”, 71 *Minn. L. Rev.* 1219, 1227-28.

⁴⁰ Elliot, E.D. (1988). “The Future of Toxic Torts: of Chemophobia, Risk as a Compensable injury and hybrid Compensation Systems, 25 *Hous. L. Rev.* 781, 786.

⁴¹ *Bonnington v. National Coal Board* [1956] A.C. 613.

⁴² Menell, P. S. (1991). “The Limitations of Legal Institutions for Addressing Environmental Risks.” *S. J. ECON PERSP.* Summer.

⁴³ Rosenberg, D. (1984). “The Causal Connection in Mass Exposure Cases: A “Public Law” Vision of the Tort System,” 97 *Harv. L. Rev.* 849, 919.

⁴⁴ Menell, P. S. (1991), *ibid.*

⁴⁵ *McGhee v. National Coal Board*, [1972] 3 All E.R. 1008, 1 W.L.R. 1, is a leading tort case decided by the House of Lords. The Lords held that where a breach of duty has a material effect on the likelihood of injury then the subsequent injury will be said to have been caused by the breach.

dust. Lord Reid stated: The medical evidence is to the effect that the fact that the man had to cycle home caked with grime and sweat added materially to the risk.

The House of Lords treated the material increase in risk as equivalent to a material contribution to damage. The implication of the case was significant as it meant that a plaintiff need not demonstrate that the defendant's actions were the "but for" cause of the injury, but instead that the defendant's actions materially increased the risk of injury, and thus damage, to the plaintiff. However, this article argues that this House of Lord's principle is now limited to cases where there is no doubt concerning the nature or source of the "casual agent" and the only issue is which of the defendant's act caused the exposure leading to the loss or injury.

Thus, in *Wilsher v. Essex Area Health Authority*,⁴⁶ an English tort law case concerning the "material increase of risk" test for causation, the House of Lords found that there can be no presumption of causation where there are alternative candidates for the loss unrelated to the defendant's activities. According to the House of Lords, it was impossible to say that the defendant's negligence had caused, or materially contributed, to the injury and the claim was dismissed. It also stated that the *McGhee* case articulated no new rule of law, but was rather based upon a robust inference of fact. This understanding of *McGhee* was rejected in the case of *Fairchild v. Glenhaven Funeral Services Ltd.*⁴⁷ *Fairchild v. Glenhaven Funeral Services Ltd.*,⁴⁸ is a leading case on causation in English tort law. It concerned malignant mesothelioma, a deadly disease caused by breathing asbestos fibers. The House of Lords approved the test of "materially increasing risk" of harm, as a deviation in some circumstances from the ordinary "balance of probabilities" under the "but for" standard. Mr. Fairchild had worked for a number of different employers, each of whom negligently exposed him to asbestos fibers. Mr. Fairchild contracted pleural mesothelioma. He died, and his wife sued the employers on his behalf for negligence. The problem was, a single asbestos fibre, inhaled at any time, can trigger mesothelioma. The risk of contracting an asbestos related disease increases depending on the amount of exposure to it. However, because of long latency periods⁴⁹ it becomes impossible to know when the crucial moment was. It was impossible therefore for Mr. Fairchild to point to any single employer and say "it was him."

Moreover, because the traditional test of causation is to show that "on the balance of probabilities" X has caused Y harm, it was impossible to say that any single employer was the cause at all. While it was possible to say "it was one of them" it was impossible to say which. Under the normal causation test, none of them would be found, on the balance of probabilities to have caused the harm.

In this context, another asbestos related case came before the House of Lords in 2006.⁵⁰ This time the question was whether, if one of the employers that was responsible for the materially increasing the risk of harm had gone insolvent, should the solvent employers pick up the proportion for which that insolvent employer was responsible? The House of Lords

⁴⁶ [1988] A.C. 1074.

⁴⁷ [2002] UKHL 22, [2003], A.C. 32, [2002] 3 WLR 89, [2002] 3 All E.R. 305, [2002] 1 CR 798, [2002] 1 RLR 533.

⁴⁸ Ibid.

⁴⁹ It takes 25 to 50 years before symptoms of disease become evident.

⁵⁰ *Barker v. Corus* [2006] UKHL 20.

accepted the argument that the solvent employer should not. This outcome is not equitable. This article argues that the solvent employer would only have to pay one third of the full compensation for the plaintiff's disease, in other words, the solvent employer has only "proportionate liability" for that part which he materially increased the risk of the plaintiff's harm. This position as advocated by certain writers.⁵¹ Patrick Atiyah argues that law of torts should be abolished, especially as relates to the law on personal injuries, and should be replaced with a no fault state compensation system. The arguments are in tune with the establishment in the 1870s of such a system in New Zealand. One of Atiyah's main point is his "stinging criticism" of the fault principle. This is the principle that finds the party that is to blame before compensating the victim in personal injury cases. This then implies that if fault cannot be attributed, there can be no attribution of liability, and thus, a victim of an accident may not receive compensation. Atiyah proposed six major criticisms of the system, which suggest that liability in personal injury claims should not focus on the relationship between the plaintiff and defendant, but between the parties and society. However, Atiyah's examples were primarily concerned with road accidents. After the decision in *Baker*⁵² there was "a swift and fierce political backlash", as numerous individuals, workers, families, trade unions and Members of Parliament called for reversal of the judgment. The agitations were on the basis that it would undermine full compensation for working people and their families. Following this outcry, Parliament responded in 2006 and enacted the Compensation Act 2006⁵³, which was introduced to specifically reverse the decision in *Baker*⁵⁴. The Act, however, applies only to cases of mesothelioma. The Act brought in specific changes to the law of liability and damages in negligence and breach of statutory duty.⁵⁴ In *Brett v. University of Reading*,⁵⁵ Lord Justice Sedley in concluding his judgment stated:

It follows that, while the evidence was sufficient to enable the Court to infer that Mr. Brett came into contact with asbestos in the course of his work at Reading University, it was not sufficient to show, or to support an inference, that the University had failed to take necessary steps to protect him from inhaling it. The tragic fact that he eventually developed mesothelioma cannot fill the gap, because for most of his working life he had been in jobs which were equally capable of bringing him into contact with airborne asbestos. If there had been adequate evidence of breach of duty on the part of the University, Mr. Brett's estate and defendants would have recovered the agreed damages in full notwithstanding the possible responsibility of other employers. But without such evidence the action against the University had to fail.⁵⁶

⁵¹ Cane, P. (2006). *Atiyah's Accidents, Compensation and the Law*. Cambridge University Press.⁵⁵
Ibid.

⁵² The citation of this Act by this short title is authorized by Section 18 of the Act.

⁵³ Ibid.

⁵⁴ See, *Brett v University of Reading* [2007] EWCA Civ. 88.

⁵⁵ Ibid.

⁵⁶ For these reasons, the appeal was dismissed.

Brett case, significantly shows that in most cases of environmental exposure there “are usually far more uncertainties regarding the nature and source of the harmful element”. The problem with environmental exposure cases is that there may be no linkage between the potential sources and the harm may not be directly associated with the substance in issue. Interestingly, until recently, most tort cases which have raised the issue of causation were concerned with industrial diseases or medical negligence and not cases concerning environmental damage. The problem with environmental harm is that a pollutant may mix with other substances already present in the environment with the effect “that the damage pathways become obscured”, thus making it difficult to separate the effects of the pollutant from the effect of other possible causes. In such situation, it becomes impossible to establish causation and liability to the accepted standard required by the courts, due to the requirement to establish that the activity of which the plaintiff complain of actually is responsible or materially contributed to the harm alleged. The difficulty is more pronounced in cases involving personal injury allegedly resulting from environmental harm. This is so, because several explanations can be preferred for a certain cause.

In *Sienkiewicz v. Greif (UK) Ltd.*,⁵⁷ the UK Supreme Court considered appeals where defendants challenged the factual basis of findings that they had contributed to the causes of the claimant’s mesothelioma, and in particular to what extent a court can satisfactorily base conclusions of fact on epidemiological evidence. The defendants in each case argued that the Fairchild exception should not have been applied so as to make them liable, since there was only one defendant in each case. The UK Supreme Court held that both appeals failed.⁵⁸ The decision in *Fairchild* case left open what should happen in cases such as these. The *Fairchild* exception applies in mesothelioma cases where only a single defendant was identified. There is no rule requiring a plaintiff to establish that the defendant’s breach of duty doubled the risk of developing the disease. Lord Phillips said this much in his judgment:

I see no scope for the application of the ‘doubles the risk’ test in cases where two agents have operated cumulatively and simultaneously in causing the onset of a disease. In such a case the rule in *Bonnington* applies. Where the disease is indivisible, such as lung cancer, a defendant who has tortuously contributed to the cause of the disease will be liable in full. Where the disease is divisible, such as asbestosis, the tortfeasor will be liable in respect of the share of the disease for which he is responsible.⁵⁹

It is now evident that causation is often determined by judges as a matter of law. Causation however, is treated quite differently in environmental cases compared to tort cases, particularly in those cases where a judge finds that causation does not exist as a matter of law. This article argues that causation in environmental law cases has been forced into “jurisdictional standing analysis”. To resolve this problem, courts should adopt tort law principle’s distinction between

⁵⁷ (2011) 2 WLR 523, (2011) ICR 391, UKSC 2009/0219, (2011) UKSC 10, (2011) 2 AC 229.

⁵⁸ *Willmore v. Knowsley Metropolitan Borough Council* (2009) EWCA Civ. 1211, (2010) ELR 227.

⁵⁹ This case cited Compensation Act 2006. This case was cited by *AXA General Insurance Ltd & Others v.*

Lord Advocate & Others, (2011) UKSC 46; *Employers’ Liability Insurance “Trigger” Litigation: BAI (Run Off) Ltd. v. Durham & Others*; (2012) UKSC 14; *Zurich Insurance Plc. UK Branch v. International Energy Group Ltd.* (2013) UKSC 33. This case cited: *Fairchild case*; *Baker case*; *Willmove case*; *Norvatis Grimsby Ltd. v. Cookson* (2007) EWCA Civ. 1261; *Rolls Royce Industrial Power (India) Ltd. v. Cox* (2007) EWCA Civ. 1189.

general and specific causation to differentiate causation issues best applicable for standing analysis from causation “questions better left to a fact finder”.

IV. Recent Developments in Toxic Micro-Pollutant Cases

Toxic micro-pollutants emanating from pesticides, radioactive materials, genetically modified organisms, pest control chemicals, nuclear energy, and bio-technology substances are pervasive in modern industrial society. They constitute human health risks and cause ecological and socio-economic disequilibrium. These pose “greater challenge for established legal reasoning”. It is therefore very clear that the production, use, management, transportation and disposal of such products poses risk to the environment, public health and safety. The extent of harm and risk caused by these elements to the environment and human health are extremely difficult to quantify and still remains subject to debate, but the prevalence of risk is undeniable. Recent environmental disasters have shown that the risks are real rather than speculative. These events shows that the continuing public concern about these challenges and risks cannot be ignored, glossed over or discounted with slick assurances of scientific expertise or knowledge. The Supreme Court of Canada as far back as 1995 captured this in the case of *R. v. Canadian Pacific Ltd.*⁶⁰:

Recent environmental disasters, such as the Love Canal, the Mississauga train derailment, the Chemical spill at Bhopal, the Chernobyl nuclear accident, and the Exxon Valdez oil spill, have served as lightening rods for public attention and concern. Acid rain, ozone depletion, global warming and air quality issues have been highly publicized as more general environmental issues. Aside from high-profile environment issues with a national or international scope, local environmental issues have been raised and debated widely in Canada. Everyone is aware that, individually and collectively, we are responsible for preserving the natural environment.⁶¹

As a result, when potential risks transmits into real or threatening harm, aggrieved persons may turn to the courts for compensation, injunctive relief, punitive damages, or other appropriate remedies. It must however be noted that in the 1800s and early 1900s, these toxic micro-pollutants and the risk they pose to human health were unknown to, and unforeseen by the common law courts. These periods were concerned with traditional tort systems, such as “snails in beverage bottles”,⁶² or “imposed water flooding upon adjoining properties”⁶³ and never the complex issues of the effects of toxic micro-pollutants and the risk they pose for human health and the challenges of proving causation in these circumstances.

Generally, the cause of action developed by the common law courts still remain relevant today and a ready remedy to the plaintiff who may suffer injury, loss or damages arising from the effects of these pollutants. Thus, when combined with statutory causes of action created by parliament, these common law causes of action provide the plaintiff with “wide-range theories of liability” to plead and prove against the defendant allegedly responsible for the harm. The question, however, is whether these existing causes of action are capable of obtaining judicial

⁶⁰ (1995), 17 C.E.L.R. (N.S.) 10 (SCC).

⁶¹ Ibid.

⁶² *Donoghue v. Stevenson* (1932) A.C. 562 (HL).

⁶³ *Rylands v. Fletcher* (1868) L. R. 3 H.L. 330.

remedy for the plaintiff embroiled in environmental litigation who allege personal injury, property damage or pecuniary loss resulting from exposure to chemical, biological or radiological activities. From a public interest perspective, it is extremely difficult, if not impossible, to establish a definite biological link between the pollutant and the harm in an individual case. An illustration of the problems associated with establishing causation and liability in these circumstances is provided by litigation arising out of claims for loss alleged to have been caused by radiation from nuclear facilities, or where the plaintiff seeks to enjoin future activities which, if undertaken, will expose the plaintiff to contaminants; or the plaintiff seeks compensation for present injury, such as cancer where causation is difficult to establish in the light of prolonged latency periods and/or the existence of other intervening factors; or the plaintiff lacks present injury, but sues in relation to contaminant exposure which increases the risk of incurring disease, future medical expenses, or property value depreciation.⁶⁴

Given the above circumstances, one may be wooed into recommending as Atiyah⁶⁵ has done that the law of torts should be abolished particularly as it relates to personal injuries⁶⁶ or that new causes of action be developed to ensure access to justice for victims of environmental harm. This article argues that the possibility of sweeping or radical changes, mostly along the line suggested by Atiyah appear somewhat unlikely, except in rare cases.⁶⁷ This is so because while the common law does evolve over time, judicial developments and statutory changes tend to occur “in a careful, incremental manner”. Therefore, prospective plaintiffs should not base all their expectations on urging the courts to immediately adopt revolutionary theories of liability, instead, litigants’ lawyers should consider taking the existing causes of action and tailoring them to fit the particular circumstances of their clients.

In a case concerned with alleged breach of statutory duty under the Nuclear Installations Act of 1965⁶⁸, *Merlin v. British Nuclear Fuels, Plc.*,⁶⁹ the plaintiffs claimed that their house had been damaged by radioactive material that had been discharged into the Irish Sea from Sellafield which had subsequently become deposited in their house as dust. The Court held that the 1965 Act required them to establish that there had been damage to property, meaning tangible property. The Court rejected the plaintiffs’ claim that the house included the air space within the walls, ceilings and floors and that it had been damaged by the presence of radioactive material which had resulted in the house being rendered less valuable. All that had happened was that the house had been contaminated and that did not amount to damage to property which was the type of damage for which the Act provided compensation. The fact that the house was less valuable was the economic result of the presence of radioactive material, not the result of

⁶⁴ Hughes E.L., Lucas, A.R., Tilleman, W.A. (1998) *Environmental Law and Policy*, (2nd ed.), Toronto: Emond Montgomery Publications.

⁶⁵ Cane, P. (2006) *Ibid*.

⁶⁶ *Ibid*.

⁶⁷ The Compensation Act 2006 (UK), which brought in specific changes to the law of liability and damages in negligence and breach of statutory duty.

⁶⁸ Sections 7, 8, 9, 10, 11, 12.

⁶⁹ (1990) 2 Q.B. 557, (1991) CLY 2662, (1990) 3 WLR 383.

damage to the house from the radioactive properties of the material⁷⁰. The strict interpretation of “property damage” has been criticized and subsequent cases have widened its scope.

In *Blue Circle Industries Plc v. Ministry of Defence*⁷¹, plutonium escaped from the Atomic Weapons Establishment at Aldermaston when storm waters caused ponds on that site to overflow and contaminate a neighbour’s marshland. Once the contamination came to light, the claimant had to spend considerable sums of money in decontaminating the soil and the vegetation. The defendant argued that, following *Merlin*, there had been no change to the molecular structure of the land and therefore no damage had been caused pursuant to the statutory tort. The Court of Appeal did not accept the defendant’s arguments. Instead, it accepted that there had been physical damage to the soil as it had become radioactive waste and was therefore less valuable. *Merlin* was distinguished as being a pure economic loss case concerning the devaluation of the house. There is some dispute as to whether *Merlin* was truly a case of pure economic loss. Nevertheless, the Court of Appeal’s decision has widened the category of physical damage that is recoverable and now includes the costs incurred in decontamination.

*Magnohard Ltd. & Others v. UKAEA & Another*⁷², is a case heard in the Court of Session. This case confirmed *Blue Circle* definition of property damage. The claimant owned a private beach that was being polluted by radioactive material from the defendant’s nuclear power station. The claimant sought a declaration that the United Kingdom Atomic Energy Authority (UKAEA) was in breach of its statutory duty. It also wanted the court to order the implementation of a more stringent monitoring programme for the presence of radioactive particles on the beach. It reserved the right to claim damages and pursue a claim under the Human Rights Act 1998 at a later stage. The Court granted the declaration that there had been a breach of duty and, applying the *Blue Circle* definition, held that this breach had resulted in property damage to the claimant’s property. However, because the 1965 Act did not precisely describe the nature of the duty, the court did not grant an order for the performance of a new monitoring programme. This judgment allowed the claimant to return to court with its claim for damages, and also with its Human Rights Act claim.

In respect of attempting to overcome the problems associated with establishing a biological link in an individual case, an attempt was made to rely on epidemiological evidence in the joined cases of *Reay and Hope v. British Nuclear Fuels, Plc.*⁷³. This case of *Reay* demonstrates the difficulty in proving causation despite the strict statutory liability imposed by the 1965 Act. The claimants alleged that paternal pre-conception irradiation had mutated the fathers’ sperm and was a material contributory cause of their daughters’ leukaemia and non-Hodgkin’s lymphoma. The claimants relied on epidemiological research showing pockets of the illness in the locality of the plant. However, the judge was critical of the survey and found it difficult to isolate the effects and exposure to radioactivity from the other potential causes of cancer in the environment. He held that the claimants had failed to prove the necessary causal link on the balance of probabilities. This article argues that claims for personal injury of this sort brought

⁷⁰ This case is cited by *Transco Plc. v. Stock-port Metropolitan Borough Council*, (HL) [2003] UKHL 61, [2004] 1 ALL ER 589, [2004] 2 AC 1.

⁷¹ [1999] Ch 289.

⁷² [2004] Env. LR 19.

⁷³ [1994] Env. LR 320.

pursuant to this statutory tort may be difficult as the causes of illness such as leukaemia are not easy to prove. The cancers may have been caused by independent causes notwithstanding the pre-natal exposure. All that the epidemiological evidence⁷⁴ showed was that the pre-natal exposure had materially increased the risk of the harm, and the Courts are only prepared to determine liability on the basis of a material increase in risk where there is no doubt regarding the substance which caused the harm. There is therefore the need for proof of causation in such cases.⁷⁵⁷⁶ For the causation prong, courts generally find causation when the injury is “fairly traceable” to the defendant’s conduct. In other words, there must be a causal connection, that is, the alleged injury must be seen to be a direct result of the defendant’s action. In such cases, the court has to consider whether the defendant’s conduct has made a “meaningful contribution” to the pollution or activity. In the US case of *Connecticut v. American Electric Power Co.*⁸⁰, the second circuit concluded that the five defendants’ emissions sufficiently contributed to the plaintiff’s injuries, noting that they were the largest utility emitters of carbon dioxide in the United States.

Studies have shown that asbestos particles in the air can cause mesothelioma, lung cancer, and lung disease asbestosis. To establish liability in such cases, the lawyers representing the plaintiffs must carefully consider other important legal, evidentiary and strategic issues, such as, costs; causation, limitations, expert witness, epidemiological studies, class proceedings, and concurrent liability in contract amongst others. The plaintiff also must convince the judge that his evidence substantiates what it purports to prove. When epidemiology convincingly establishes causation, courts have generally accepted epidemiologic evidence, though not always explicitly⁷⁷. For Dove⁷⁸, although epidemiology has played an obvious role in tort law, its exact legal status remains the subject of debates. Dove argues that statistical reasoning cannot apply to an individual plaintiff and that epidemiologic evidence therefore is insufficient, by itself to sustain a plaintiff’s verdict.⁷⁹ Others have argued that epidemiology is far more than statistics and that good epidemiology evidence ought to suffice when measured against the preponderance of the evidence rule. When a single factor and a single disease are at issue, epidemiologic evidence dovetails very well the standard preponderance of the evidence rule. In more complex cases involving multiple chemicals and perhaps several diseases, continued evolution can be expected in both epidemiology and the law.⁸⁰ The bottom line in all these cases is whether the epidemiological evidence submitted by

⁷⁴ See, Gardner, M.J. et al (1990). “Results of a Case-Control Study of Leukaemia and Lymphoma Among Young People near Sellafield Nuclear Plant in West Cumbria”, 300 *Brit. Med. J.* 423; Morris, J. A. (1990). “Leukaemia and Lymphoma among Young People near Sellafield”. 300 *Brit. Med. J.* 676.

⁷⁵ *Hamilton v. Miller*, 2014 NY Slip Op 04230, Ct. App.; *Giles v. A.G.*; *Y: 2013, 105 AD 3d 1313*.

⁷⁶ U.S (2011).

⁷⁷ Soskolone, C. L. , Lilienfeld, D. E., Black, B. (1985). *Epidemiology in Legal Proceedings in the United States*. Based on the proceedings of a symposium, “The Epidemiologist in Court”, Fourth Annual Meeting, American College of Epidemiology, Santa Monica, California.

⁷⁸ Dove, M. (1983). “A Commentary on the Use of Epidemiological Evidence in Demonstrating Cause-in-Fact.” *Harvard Environmental Law Review*, 7: 429-440.

⁷⁹ Dove, M. (1982). *Ibid.*

⁸⁰ Black, B., Lilienfeld, D.E. (1984). “Epidemiologic Proof in Toxic Tort Litigation,” *Fordham Law Review* 52: 732-785.

the plaintiff clearly proves the causal relationship between the pollution or activity and disease as required by civil law. Proving causation as stated earlier, in environmental damage cases is difficult because factors other than environmental pollution or activity are involved in the development of a disease, and also because of the lapse of time between the environmental harm or activity and the manifestation of the disease.⁸¹ The reason the plaintiff would usually attempt to prove causation with epidemiological evidence is because the types of evidence presented in other tort lawsuits are not useful in proving the causal relationship in environmental lawsuits. Proving the casual relationship in micropollutant or pollution cases in environmental context is much more complicated. The plaintiff can develop a disease 20 to 30 years after the exposure to the harm or activity and during this 20 to 30 year period, various factors, including, among others, an unhealthy lifestyle, workplace stress and environmental factors, may all play a part in the development of the disease. It is in an effort to overcome these difficulties in proving causation, that plaintiffs in environmental lawsuits have been actively utilizing epidemiological research results to demonstrate a causal relationship between a risk factor and a disease by showing that there is a substantial probability of a certain disease developing in a certain group of people exposed to a risk factor, and that the plaintiffs themselves belong to that group and have developed the disease after being exposed to the risk factor.⁸²

V. *Locus Standi* Requirement to Pursue an Action for Environmental Damage

The doctrine of *locus standi*, or standing, determines the competence of a plaintiff to assert the matter of his complaint before the court. *Locus standi* to pursue an action for environmental damage or harm is generally limited to the plaintiffs who have suffered some form of loss such as personal injury, property damage, or an interference with the rights and benefits which result from an interest in land. There are however, exceptions where class actions are maintainable.⁸³ Traditionally, only a plaintiff whose own right is in jeopardy is entitled to seek a remedy. When extended to environmental lawsuits, this meant that a plaintiff asserting an environmental right or interest has to show that he or she has suffered some special injury over and above what members of the public has generally suffered. Thus, diffuse environmental harms, such as air pollution affecting a large number of persons or community were difficult to redress. This traditional view or rule on standing, constituted a major problem in that it became a draw-back in the bid to protect the environment in its own right, and thus, raises major issues relating to access to justice. In certain cases, pollution may result in a multitude of similar personal injury claims, but the plaintiffs may likely in an environmental context be denied standing.⁸⁴

This article however, argues that there is seldom a direct connection between environmental harm and “widespread” personal injury. Several pollution incidents are “of an

⁸¹ See, Lee, S. G. (2016). “Proving Causation with Epidemiological Evidence in Tobacco Lawsuits.” *Journal of Prevention Medicine, and Public Health*, 49(2) ; 80-96. The Korean Society for Preventive Medicine, Korea.

⁸² Gordis, L. (2009). *Epidemiology*, 4th ed., Philadelphia: Elsevier/Saunders.

⁸³ *R. v. Inspectorate of Pollution, exp. Greenpeace No. 2*. [1994] 4 All E.R. 329, where Greenpeace was awarded standing in part because it had members living in the neighbourhood of the Thorp re-processing plant.

⁸⁴ But see, *Ganga Pollution (Municipalities) Case (M.C. Mehta v. Union of India)*, A.I.R. 1988, S.C. 111C) where the Supreme Court of India upheld the standing of Sri M.C. Mehta, a Delhi resident to sue the government agencies whose prolonged neglect had resulted in severe pollution of the river.

on-going and chronic nature” which damages the environment in an “insidious manner.” Damage of this type generally, comprises negligence, “property torts,” trespass, nuisance and *Rylands v. Fletcher*.⁸⁵ In this respect, it is a notorious fact, that in common law there is no procedure for allowing environmental interest groups, such as environmental Nongovernmental Organizations (NGOs), to acquire standing and bring claims where the damage does not correlate with interference with property rights or where the plaintiff in question lacks the financial resources to institute lawsuit. However, this position in common law sharply contrasts with developments in the field of public law, of which environmental law domain belongs. Here, environmental NGOs have made remarkable input in establishing *locus standi* in judicial review proceedings. In the case of *R. v. Pollution Inspectorate exp.*

Greenpeace (No. 2),⁸⁶ the court introduced the concept of “associational standing” in which Greenpeace was allowed to issue claim on behalf of its local members who might be affected by the commissioning of a new nuclear reprocessing facility. In this case, Greenpeace objected to the authorization given by the Inspectorate of Pollution to discharge nuclear waste from the Thorp site in Cumbria. The issue arose as to whether Greenpeace has sufficient standing to bring the action. The court held, that it had, but the claim failed. Greenpeace was granted standing, because unlike in the *Rose Theatre Trust Case*,⁸⁷ its individual members would be affected by the decision, and Greenpeace also had legal expertise on the matter. The action did fail as the decision was in fact not unlawful on its merits. In *R. v. Secretary of State for Foreign and Commonwealth Affairs, ex parte World Development Movement Ltd.*,⁸⁸ standing was further extended to include considerations of public interest.

The requirement for *locus standi* and the need to act promptly in a case, for judicial review featured prominently in the case of *Residents Against Waste Site Ltd. v. Lancashire County Council*.⁸⁹ Lancashire County Council (LCC) granted planning permission to itself for a large waste facility that would divert municipal waste from landfill. The proposal gave rise to considerable local opposition. Residents Against Waste Site Ltd. (RAWS), a company limited by guarantee, was incorporated on 14 February 2007 to represent the interests of the objectors. Its officers and members are local residents and borough councilors who had previously acted together in the same respect through an unincorporated association with a similar name. Irwin J., held that RAWS had the necessary standing to sue.

There are several reasons why courts draw distinction between private damages lawsuits and lawsuits for judicial review. This is also reflected in ascertaining standing requirements in the purview of public and private law, on the basis that public interest is usually the hallmark of judicial review proceedings, thus it becomes logical to grant standing to those associations which are concerned with the protection of such interests. It has however, been argued that, in an environmental context, this distinction between public and private law remains a mirage, as Betlem has argued:

⁸⁵ Ibid.

⁸⁶ [1994] 4 All E.R. 329.

⁸⁷ *Regina v. Secretary of State for the Environment, Ex parte Rose Theatre Trust Co.* [1990] 2 WLR 186; [1990] 1 All E.R. 754; [1990] 2 QB 504.

⁸⁸ [1995] 1 WLR 386.

⁸⁹ [2007] EWHC 2558 (Admin).

[M]ost legal systems purport to allocate general interests to the field of public law and limit private law to concrete, individual interest. However, this distinction breaks down in environmental law in that diffuse environmental damage is closely related to individual health interests, which are, of course, typical concrete private interest. Accordingly, private law remedies should be available alongside public law remedies such as judicial review.⁹⁰

There are circumstances in which an association is entitled to bring lawsuits on behalf of members.⁹¹ This is so where its members would otherwise themselves have standing to sue or the interests it seeks to protect are germane to the organization's purpose or neither the claim asserted nor the relief requested requires the participation of individual members in the lawsuit. This article argues that the courts should recognize that in environmental lawsuits, a *bona fide* plaintiff with an arguable case which is not vexatious, frivolous nor an abuse of the process of the court ought not to be denied standing if they are sufficiently informed to mount an effective challenge within the adversarial system.

VI. Judicial Remedies for Environmental Damage

The remedies available for the plaintiff in environmental lawsuits comprise of statutory as well as common law remedies. The common law remedies available for environmental damage are, nuisance, trespass, negligence and *Rylands v. Fletcher*.⁹² Every plaintiff who files a lawsuit seeks a remedy. As defined in Black's Law Dictionary, a remedy is "the means by which a right is enforced or the violation of a right is prevented, redressed, or compensated."⁹³ The word "remedy" in a legal context has virtually the same meaning in a medical context, namely, to cure. In a legal context, a remedy cures the violation of a legal right. Generally, in the common law system, there are two types of remedies, legal remedies and equitable remedies. The plaintiff will therefore, only proceed to file a lawsuit if he considers that apart from having a cause of action, that an appropriate remedy is available.

A few words about the development of law and equity. As is well-known, England and most of her former colonies operate under a common law system, and this means that in the absence of a statute or other legislation or regulation, judges have the power to decide what the law is on a particular issue, thus, the evolution of common law remedies which seek to compensate for any loss sustained, prevent future infringements of proprietary interests or rectify damage which has already occurred as a result of such infringements. The courts do this by means of award of damages, the granting of various types of injunction, or the award of damages in lieu of injunction. From an environmental context, it is necessary to consider the extent to which these remedies coincide with environmental protection.

⁹⁰ Betlem, G., (1995). "Standing for Ecosystems-Going Dutch." 54(1) *Cambridge Law Journal* 153, 154.

⁹¹ *R. v. Pollution Inspectorate, exp. Greenpeace* [1994] 4 All E.R. 329; *Residents Against Waste Site Ltd. v. L.C.C.* (2007) EWHC

⁹² *United Food and Commercial Workers Union Local 7511 v. Brown Group Inc.*, United States Supreme Court, (May 13th 1996) No. 95-340 U.S.L.W. 4330; *Royal College of Nursing of the UK v. DHS* [1981] AC 800. Note, that one ground on which Greenpeace succeeded was the potential harm suffered by its members living near Thorp re-processing plant.

⁹³ *Black's Law Dictionary* (the d. 2009). Westlaw Publishing.

i. Damages

The purpose of damages in environmental lawsuits is to compensate the victim for the loss suffered, thus, we can say that like tort, environmental damages are compensatory in nature, though it may in certain situations also punish a defendant for his actions. Generally, the quantum of damages awarded must be proportionate to the capacity and magnitude of the defendant to pay.⁹⁴ However, this position is not sacrosanct as courts in appropriate cases have deviated from this test.⁹⁵ The rule is restoration to original condition, which is one of the primary guiding principles behind the awarding of damages in common law negligence claims. This principle is usually expressed in Latin term *restitutio ad integrum*. The general rule, as the principle implies, is that the amount of compensation awarded should put the successful plaintiff in the position he or she would have been had the tortious action not been committed.⁹⁶ In a decided case,⁹⁷ where the operator of a gas works had discharged poisonous effluent into a river over which the plaintiff had fishing rights, the compensation received equaled the cost of restocking the river in addition to an amount for the loss of food supply for the other stocks.

The first ever UK High Court case on environmental damage under the Environmental Liability Directive⁹⁸ is *R. (on the application of Seiont, Gwyrfaï and Llyfni Anglers' Society) v. Natural Resources Wales*.⁹⁹ This case has a more general application than to Wales only, as the 2009 Welsh ED Regulations are very similar to the Environmental Damage (Prevention and Remediation) (England) Regulations 2015 currently in force in England. The case was a judicial review challenge by Seiont, Gwyrfaï and Llyfni Anglers' Society (Claimant) to a decision by Natural Resources Wales (NRW) regarding whether there had been any "environmental damage" at Llyn Padam, a lake designated as SSSI in Snowdonia. This case has clarified some key definitional areas of the regime, in particular the restriction of environmental damage to a deterioration or worsening of the existing state, and has dealt with some important practical points on the notification process. It will however, be interesting in future, as cases come forward in Wales or in England, how the courts deal with the test for environmental damage to EU protected species or natural habitats which are within SSSI.

Damages may be exemplary or punitive,¹⁰⁰ or intangible environmental values,¹⁰¹ or for pure economic loss.¹⁰²

⁹⁴ *M.C. Mehta v. Union of India* (1987) SCR (1) 819, which laid down the principle of absolute liability and the concept of deep pockets.

⁹⁵ *Union Carbide Corporation v. Union of India & Ors.* JT 1989(1) 296; 1989 SCALE(1) 380. The Bhopal Gas Leak Tragedy occurred at midnight of 2nd December, 1984, by the escape of deadly chemical fumes from Union Carbide's factory.

⁹⁶ *Livingstone v. Rawyards Coal Co.* (1880) 5 App.Cas. 25, 39.

⁹⁷ *Marquis of Granby v. Bakewell U.D.C.* (1923) 87 J.P. 105.

⁹⁸ 2004 (ELD 2004) and the Environmental Damage (Prevention and Remediation) (Wales) Regulations 2009 (2009 Welsh ED Regulations).

⁹⁹ [2015] EWHC 3578 (Admin), 17 December, 2015.

¹⁰⁰ *Gibbons v. South West Water Services Ltd.* [1992] 4 All E.R. 574.

¹⁰¹ See, Hanley, N., Shogren, J.F. and White, B. (1997), *Environmental Economics in Theory and Practice*, 384-401. Macmillan.

¹⁰² *Sparton Steels and Alloys Ltd. v. Martin & Co. (Contractors) Ltd.* [1973] Q.B. 27; *Hedley, Byrne v. Heller* [1964] A.C. 465; *Muirhead v. Industrial Tank Specialists* [1986] Q.B. 507; *Simaan General Contractors Co.*

ii. Nuisance

Nuisance means the act which creates hindrance to the enjoyment of the person in form of smell, air, noise, etc. Nuisance is anything done in tort to hurt or annoyance of lands, tenements of another and not amounting to trespass. Nuisance can be divided into two categories private nuisance, which is a substantial and unreasonable interference with the use and enjoyment of one's land; and public nuisance which is an unreasonable interference with a general right of the public. Actions in public nuisance may be brought on behalf of the community by the Attorney-General, or by a person who has suffered damage over and above that suffered by the public in general. Under both private and public nuisance, the plaintiff must prove that the defendant's activity unreasonably interfered with the use and enjoyment of a protected interest and caused the plaintiff substantial harm.¹⁰³ The most significant UK nuisance case of 2012, was the Court of Appeal's decision in *Barr v. Biffa*.¹⁰⁸ The judgment marked a new chapter in the story on quantum of damage awards in nuisance by providing for a range of awards assessed according to odour modeling which had been done to establish the likely odour impact on a range of claimant.¹⁰⁹

iii. Trespass

Trespass is distinguished from nuisance in that trespass is interference with the possession of property, whereas nuisance is interference with the use and enjoyment of property. Trespass to land is the type of trespass action that is generally used in pollution control cases. In the case of *Martin v. Reynolds Metal Co.*¹¹⁰ the deposit on Martin's property of microscopic fluoride compounds, which were emitted in vapour form from the Reynolds' plant, was held to be an invasion of this property, and so, a trespass. The line between trespass and nuisance is thin and sometimes difficult to determine.

iv. Negligence

"Negligence" is "the omission to do something which a reasonable man, guided by those ordinary considerations which ordinarily regulate human affairs, would not do". Negligence is that part of the law of torts which deals with acts not intended to inflict injury. The standard of care required by law is that degree which would be exercised by a person of ordinary prudence under the same circumstances. This is often defined as the "reasonable man" rule, what a reasonably man or person would do under all the circumstances. In order to ground liability, the defendant's act must be the proximate cause of injury. Proximate cause is that which in the natural and continuous process, if unbroken by an efficient intervening act, produces injury and without which the result would not have happened. *Nissan Motor Corp.*

v. Maryland Shipbuilding and Drydock Company,¹¹¹ shows a negligence action in an environmental case. The shipbuilding company's employees failed to follow company regulations when painting ships, allowing spray paint to be carried by the wind onto Nissan cars. The shipbuilders had knowledge of the likely danger of spray painting, yet failed to exercise due care in conducting the painting operations in question. This failure to exercise due care was held as amounting to negligence.

v. Pilkington Glass Ltd. (No. 2) [1988] Q. B. 758; *Blue Circle Industries, Plc. v. Ministry of Defence* [1998] 3 All ER 385 (CA).

¹⁰³ In *Boomer et al. v. Atlantic Cement Company*, 257 N. E. 2d 870 (N.Y. 1970), the property owners were awarded permanent damages in lieu of an injunction or closing. The court weighed the economic effect of closing the cement plant that cause the dirt, smoke and vibrations against the harm to the individual plaintiff's land, and concluded that the cement company could pay permanent damages in lieu of an injunction or closing.

Persons who suffer damage as a result of careless and improper disposal or handling of hazardous waste can recover for their losses under negligence cause of action. Where negligence is established, it is not open for the defendant to argue that he has complied with all government regulations and permit conditions. Negligence can therefore, be used as a cause of action to address environmental harm. To plead negligence, the plaintiff must be able to prove that: the defendant owed the plaintiff a ‘duty of care’; the defendant breached this duty; and the breach of duty caused damage to the plaintiff. A defendant’s liability in negligence will be reduced if he can establish or prove that the plaintiff contributed to the loss in some manner.

¹⁰⁸ [2012] EWCA Civ. 312.

¹⁰⁹ See, *Anslow v. Norton* [2012] EWHC 2610; *R. (Fullers Farming Limited) v. Milton Keynes Council* [2012] Env. L. R. 17; *Bentley-Thomas v. Winkfield Parish Council* [2013] EWHC 356; *Lawrence v. Fen Tigers* [2014] UKSC 13; *Manchester Ship Canal Company Ltd. v. United Utilities Water Plc.* [2014] UKSC 40; *Austin v. Miller Argent (South Wales) Ltd.* [2014] ECWA Civ. 1012.

¹¹⁰ 224, F. Supp. 978 (D. Or. 1963), 86, 342 p. 2d 790.

¹¹¹ 544 F. Supp. 1104.

The case of *Dodson v. Environment Agency*,¹⁰⁴ turned on the issue whether the Agency owed a duty of care to those affected by particular operational responsibilities in relation to an otter enhancement programme and is of interest given the wide-ranging role of the Agency. The plaintiff owned a fishery that stocked carp, which all disappeared between 2004-2008. The fishery was adjacent to the River Ceign. The plaintiff alleged that the fish disappeared because of the predatory action of otters and that the Environment Agency’s otter enhancement programme in the area was to blame. The plaintiff’s case was that the Agency owed him a duty of care to advise him and that its otter habitat enhancement activities gave rise to harm to his property/financial interests. The judge held that the Agency did not owe a duty of care in the circumstances of the case and the nature of its role.¹⁰⁵

v. *Rylands v. Fletcher doctrine*

The Court handed down a *locus classicus* judgment in the case of *Rylands v. Fletcher*,¹⁰⁶ which has been applied to cases involving the escape of fire. The case of *Mark Stannard (Ha Wyvern Tyres) v. Gore*,¹⁰⁷ provides further confirmation that the *Rylands v. Fletcher* doctrine is now very limited. The court cited the House of Lords decision in *Transco Plc. v. Stockpork*,¹⁰⁸ as the seminal authority for the test to be applied in a classic case of *Rylands v. Fletcher*, including fire and citing the “proper approach” as being that “the defendant must bring, keep, or collect an exceptionally dangerous or mischievous thing onto his land” and “there is an exceptionally high risk of danger or mischief if that thing should escape.” In appropriate case,

¹⁰⁴ [2013] EWHC 396.

¹⁰⁵ The judgment contains a useful assessment of why the judge came to that conclusion.

¹⁰⁶ (1866) L. R. Ex. 265.

¹⁰⁷ [2012] EWCA Civ. 1248.

¹⁰⁸ [2003] UKHL 61.

damage caused by fire emanating from an adjoining property could fall within the doctrine, but the appropriate case is likely to be rare. This is because fire itself is unlikely to be an exceptionally dangerous thing on land, unless perhaps it is started intentionally and escapes.

The doctrine has been adopted by courts on frequent occasions on cases involving the apportionment of liability for environmental damage. In *State v. Ventron Corp.*,¹⁰⁹ the State of New Jersey sought to recover clean up and removal costs from several chemical companies in respect of contamination of a tidal estuary by mercury emanating from land upon which the companies had carried on operations. The land beneath the site was described as being “saturated” by 268 tons of toxic waste the bulk of which consisted of mercury. The interaction of the mercury with other elements created a highly toxic compound known as ethylmercury which had wiped out all fish in the creek and deoxygenated the water. Pollock, J., in the Supreme Court of New Jersey held the defendants strictly liable for the clean-up costs under the rule in *Rylands v. Fletcher*.¹¹⁰

vi. Injunctions

The purpose of injunction is to prevent continuous wrong. Injunctions are discretionary remedies of the court compelling a person to do or stop doing a particular act.

The plaintiff must prove that he will suffer harm from the defendant’s actions and in such cases, the court can order an injunction even if the plaintiff has not yet suffered the harm. Injunctions can be awarded to restrain an environmental damage from occurring or at the conclusion of the case if damages will not adequately compensate the plaintiff for the loss that they have suffered. Injunctions may be prohibitory,¹¹¹ *quia timet*,¹¹² mandatory,¹¹³ and there may be damages awarded to the plaintiff in lieu of an injunction.¹¹⁴

Before a court issues an interlocutory injunction, it usually requests that the plaintiff give the court an undertaking that the plaintiff can pay for the losses which the defendant will suffer if the interlocutory injunction is granted but the plaintiff does not eventually succeed in the case.

VII. Conclusions

The tort system has to a very large extent proven inadequate to appropriately address the problem of environmental toxic injury, despite overwhelming and compelling evidence that exposure to common pollutants causes significant numbers of fatalities and human diseases.

¹⁰⁹ [1983] 94 N.J. 473, 468 A. 2d 150.

¹¹⁰ Ibid.

¹¹¹ *Shelfer v. City of London Electric Lighting Co.* [1895] 1 Ch. 287, 315-316; *St. Helens Smelting v. Tipping* (1865) 11 H.L.C. 642; *Goldsmith v. Turnbridge Wells Improvement Commissions* [1866] 1 Ch. App. 349; *Farmworth v. Manchester Corp.* [1930] AC 171.

¹¹² *Szabo v. Esat Digifone Ltd.* Unreported, 6th February 1998, Case note in 51) 1. P. E. L. J. 35 (1998).

¹¹³ *Redland Bricks Ltd. v. Morris* [1970] A.C. 652; *Jordon v. Norfolk County Council & Anor.* (1994) 1 W.L.R. 1353.

¹¹⁴ *Shelfer v. City of London Electric Lighting Co.* *ibid*; *Jaggard v. Sayer* [1995] 1 W.L.R. 269; *Miller v. Jackson* [1977] 1 Q.B. 966; *Anchor Brewhouse Developments Ltd. v. Berkley House (Docklands Developments) Ltd.* [1987] 38 B.L.R. 87.

The difficulties that plaintiffs face in establishing liability for environmental damage in toxic micro-pollutant cases, harshly restricts the place of civil liability in an environmental context. The requirements by the courts that the plaintiff in an action based on negligence establish fault on the part of the defendant in order to ground liability for environmental damage is a very difficult one, in that this entails proving that, not only was the defendant aware of the danger or risk created by his activity, but that he also failed to take adequate steps to make ineffective or nullify the danger or risk. The complicated and intricate nature of modern industrial operations which have the potential to cause pollution, makes it a herculean task for the plaintiff to prove that the defendant failed to act as required by law. Whatever the situation, the plaintiff is further required to prove a causal link between the defendant's activity and the damage caused. This poses two problems first, once pollution spreads into the environment it becomes very complex in tracing the polluters and the source of pollution. The second problem is the difficult issue of the plaintiff having to lead scientific evidence. These difficulties become much more complicated in the case of micro-pollutants "where the harmful substances are invisible and their effects insidious."

The tort system, however, seems inadequate to correct these problems and its failure to compensate the injured plaintiff in an action for environmental damage. The existing common law principles and requirements for establishing causation have failed to keep pace with modern scientific methods for pinpointing links between micro-pollutants and the risk they pose to human health. Therefore, the requirement to prove "fault" and causation" places a heavy financial burden on the plaintiff and it is unlikely that the tort system will one day help internalize these costs of litigation and the costs to human health of these environmental toxic injuries.

There is yet another issue, using tort to address environmental damage claims suffers from a serious defect. Torts focuses on the loss or harm suffered by the plaintiff rather than the loss suffered by the environment. Environmental restoration issues are hardly addressed by the tort system. This being the case, although the plaintiff is compensated for personal injuries suffered in terms of award of monetary damages, no adequate funds or process is made available for ecological or environmental remediation of a damaged resource.

Another difficulty in seeking to establish liability for environmental damage is the limitation placed on the civil society groups and environmental Non-governmental organizations to have access to the courts to seek remedies on behalf of the damaged environment. Lack of legal personality will be a conclusive bar to standing of the group or organization. However, a public interest group such as an environmental group could sue in its own right if it possessed the "special interest" requirement through its own legal personality. Thus, upon such situations, it becomes necessary for the plaintiff to rely on environmental statutes and regulations to establish liability for injury due to environmental damage.

The establishment of liability for environmental damage in toxic micro-pollutant cases will continue to be a source of discomfort to researchers and practitioners as the proof and estimation of damages remains subject to large legal, scientific and economic uncertainties. The administrative compensation system and risk-based system are hereby proposed as a more effective approach. They can provide the proper signals that can enable the plaintiff to respond to or mitigate risks and it can promote corrective justice. This article therefore, concludes that the use of tort system in protecting the environment remains limited and requires a foundational change from the focus on the loss suffered by the plaintiff to the need to restore the natural

environment adversely polluted and damaged by the activity of the defendant. This is the only practical way forward and must be implemented.