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Causation in Acid Rain Litigation: Facilitating Proof with Joint Liability Theories

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I. Introduction

Acid Rain falls throughout the northeastern United States and central Canada.[1] Its harmful effects are most noted in small lakes in granite geologic areas—notably the Adirondacks and the Canadian Shield.[2] Many of the more vulnerable lakes no longer support desirable aquatic life, particularly game fish.[3]

The acid in acid rain is about sixty percent sulfates and thirty percent nitrates.[4] These are the atmospheric byproducts of sulfur and nitrogen oxides released into the air.[5] Ninety percent of the SOx in the northeastern United States is attributable to man.[6] Power plants emit sixty-three percent of the sulfur oxide and thirty-five percent of the nitrogen oxide in the United States;[7] their proportionate share is even greater where acid rain is a major problem.[8]

What remedy landowners or lodge operators injured by this

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1. F. Record, D. Bubenick, R. Kindya, Acid Rain Information Book 127-36, 156-57 (1982) (from a report for the Department of Energy, the footnotes after each section provide references for additional sources) [hereinafter cited as F. Record, Acid Rain]; *see also* J. Fisher, *The Availability of Private Remedies for Acid Rain Damage*, 9 Ecology L. Q. 429, 450-55 (1981) and accompanying notes.

2. F. Record, Acid Rain, *supra* note 1, at 16-32, 156-61.

3. *Id.* at 16-18, 161-65 (pages 156-87 discuss the effects of acid rain).

4. *Id.* at 148.

5. *Id.* at 94-97.

6. *Id.* at 4.

7. *Id.* at 41.

Percentage of 1977 SOx emissions by source:	
Utility Fuel Combustion	63.1%
Industrial Processes	17.9%
(included 8.9% primary metals)	
Industrial Fuel Combustion	12.8%
Transportation	2.7%
Other	3.5%
Percentage of 1977 NOx emissions by source:	
Utility Fuel Combustion	35%
Industrial Processes	4.7%
Industrial Fuel Combustion	12%
Transportation	43.3%
Other	5%

8. *Id.* at 46-59.

lake acidification have against the operators of the power plants

National Distribution of 1977 SOx emissions:

State by Rank	SO_x Emission x 10^6 Tons	% U.S.	SO_x Emissions From Electric Generation x 10^6 Tons	% from Electric Generation
1. Ohio	3.26	10.3	2.67	82
2. Pennsylvania	2.50	7.9	1.40	56
3. Indiana	1.89	6.0	1.46	79
4. Illinois	1.71	5.4	1.34	78
5. Kentucky	1.63	5.2	1.53	94
SUBTOTAL	10.93	34.8	8.40	77
7. Missouri	1.50	4.9	1.25	83
8. Tennessee	1.28	4.1	1.09	85
10. West Virginia	1.23	3.9	1.05	85
11. Michigan	1.23	3.9	.88	72
9 STATE TOTAL	16.22	51.6	12.67	78

National Distribution of 1977 NO_x emissions:

State by Rank	NO_x emission x 10^6 Tons	% U.S.	NO_x emissions From Stationary Sources x 10^6 Tons	% from Stationary Sources
3. Illinoi	1.27	5.9	0.77	61
4. Ohio	1.19	5.5	0.73	61
5. Pennsylvania	1.02	4.7	0.55	54
6. Indiana	.96	4.4	0.55	68
9. Michigan	.74	3.4	0.34	46
11. Missouri	.62	2.9	0.35	56
12. Kentucky	.57	2.6	0.38	67
13. Tennessee	.56	2.6	0.30	54
17. West Virginia	.47	2.2	0.40	79
9 STATE TOTAL	7.40	34.2	4.37	59

Note that the nine states surveyed here are in the Ohio River Valley or contiguous to states in the Valley. Acid rain precursor pollutants are concentrated in this region and most serious acid rain injury is downwind from the region.

SO_x emission in Canada:

Province	SO_x Emissions x 10^6 Tons	% Canada	SO_x Emissions From Stationary Sources x 10^6 Tons	% from Stationary Sources
Canada	6.5	100	5.20	80
Ontario	2.6	40	2.34	90
Quebec	1.5	23	1.07	71

and smelters emitting precursor pollutants is unclear. Legislative relief is unlikely. Private suits for nuisance[9] or trespass[10] could be brought against the principal sources of the pollutants. The plaintiff's greatest burden under either theory would be to prove causation. Expert testimony should be available to establish the causal relationship between acid precipitation and lake acidification.[11] The more difficult aspect of causation is to trace the offending rain to identifiable sources of industrial pollution. Source identification requires extensive flume tracing and elaborate modeling by expert witnesses, but available technology cannot trace pollutants from their source to their deposition as acid rain with certainty.[12] Further, before the emissions from a defendant's power plant reach the clouds above plaintiff's lake they will have mingled with pollutants from many other plants.[13]

This Comment proposes joint liability theories of causation that will support a recovery by the plaintiff, despite unavoidably inconclusive expert testimony.[14] Throughout the Comment, the

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It should be noted that the Sudbury smelting complex is a very significant contributor to SOx emissions in Ontario. Eighty percent of the point source SOx is from the Sudbury complex or the utility industry. Voldner, Shah, Whelpdale, *A Preliminary Canadian Emissions Inventory for Sulfur and Nitrogen Oxides*, 14 ATMOS. ENVIRON. 419-28 (1980).

9. Most private suits to remedy injuries caused by pollution are brought for nuisance. To establish his case, a plaintiff in a nuisance action must show that defendant's unreasonable conduct has substantially interfered with his use and enjoyment interest inland. The determination of reasonability of defendant's conduct includes a balancing of the utility of the conduct against its injury to the plaintiff. Defendant's conduct must be either intentional, negligent or inherently dangerous. Where defendant knows his conduct will effect plaintiff's use and enjoyment interest, his conduct is intentional. When he can reasonably foresee interference, his conduct is negligent. W. PROSSER, HANDBOOK OF THE LAW OF TORTS, 571-612 (4th Ed. 1971) [hereinafter cited as PROSSER, LAW OF TORTS]. The balancing aspect of nuisance law may be an important harrier to acid rain plaintiffs. Electricity generation is unquestionably an important and desirable activity. Perhaps the baiance is best formulated as between operating without available emission reduction devices and the plaintiff's injury.

10. To establish a case in trespass, a plaintiff must demonstrate an interference with his right of possession in land caused by defendant's conduct. The act resulting in the interference must be intentional, but the interference need not be. PROSSER, LAW OF TORTS, *supra* note 9, at 63-75. Trespass is not usually applied to remedy environmental injuries. Several courts bave, however, held that the invasion by microscopic particles—pollutants—constitutes an invasion actionable in trespass. Borland v. Sanders Lead Co., 369 So. 2d 523 (Ala. 1979), Martin v. Reynolds Metals Co., 221 Or. 86, 342 P.2d 790 (1958), *cert. denied*, 362 U.S. 918 (1960).

11. F. RECORD, ACID RAIN, *supra* note 1, 15-18, 156-61.

12. *Id.* at 9-11, 106-22, 147-48; Fisher, *supra* note 1, at 450-55.

13. F. RECORD, ACID RAIN, *supra* note 1, at 137-42; Fieher, *supra* note 1, at 450-55.

14. Acid rain litigation raises questions of forum eelection, choice of law, joinder, and available remedies that are beyond the scope of this comment.

questions of the plaintiff's burden to establish a causal relationship between his injuries and the defendant's conduct—cause in fact—and of the imposition of joint liability are intertwined. This is because imposition of joint liability alters the nature of the causal relationship the plaintiff must establish. The first theory considered, Concurrent Causation, relieves the plaintiff of the obligation to apportion his injuries among several causes but requires him to show that the defendant did in fact contribute to the cause of the injury. The next theory, Concert of Action, allows the plaintiff to recover when he demonstrates that the defendant acted in concert with a group that injured him; that the defendant is demonstrably not the physical cause does not defeat the plaintiff's recovery. Enterprise and Market Share Liability, the final theories examined, are new theories that impose liability as a business risk. The plaintiff must show that the defendant is a member of the industry responsible for his injury.

II. General Principles of Cause in Fact and Joint Liability

A. Cause in Fact

In order to recover in trespass or nuisance, a plaintiff must show, by a preponderance of the evidence, the requisite causal link between his injuries and the defendant's conduct. In most cases, the plaintiff must show that he would not have been injured but for the defendant's conduct.[15] Often the defendant's conduct is not the only cause of the plaintiff's injury. In such cases, the plaintiff can recover by showing that the defendant's conduct was a "substantial factor" in creating the risk or event responsible for plaintiff's injury.[16] The flexible nature of the word "substantial" has allowed the courts to fashion rules of causation to permit recovery in most cases in which the court is convinced a just claim exists.

B. Causation and Joint Liability

The substantial factor test addresses cases in which more than one person's conduct has contributed to the plaintiff's

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15. D. Dobbs, Handbook on the Law of Remedies, 148-49 (1973); Prosser, Law of Torts, *supra* note 9, at 236-39.

16. Dobbs, *supra*, note 15, at 149-50; Prosser, Law of Torts, *supra* note 9, at 239-41.

harm. When the plaintiff cannot apportion his injury among those injuring him or when each defendant can in some way be said to share in the injury inflicted by the others, the courts impose liability for the entire injury on each defendant. Tort law imposes joint liability where: (1) the actors join in the performance of the tortious act or acts (concert); (2) the actors fail to perform a common duty owed to the plaintiff; (3) there is a special relationship between the parties (e.g. master and servant or joint entrepreneurs—enterprise liability relies in part on this category); and (4) although there is no concerted action, nevertheless, the independent acts of several actors concur to produce indivisible harmful consequences (concurrent cause).[17]

Through joint liability the law lightens the plaintiff's burden to prove causation. While ordinary principles of causation would require the plaintiff to show a causal relationship between the injury and an individual wrongdoer, joint liability allows him to establish the causal relationship between his injury and the conduct of a group of wrongdoers.[18] Each member of the group is liable if any member would be. The courts recognize that this imposes liability on persons who did not actually cause the injury. In situations in which joint liability arises, the courts are more concerned that ordinary rules of causation would deny an innocent victim recovery than that joint liability would impose a hardship on wrongdoers.[19] The fact that the group participated in joint hazardous activity is the basis of liability.[20]

III. Concurrent Causation in Acid Rain Litigation

A. Concurrent Causation

Emissions from several sources mingle before causing acid rain. What share the gases from any particular plant had in causing the acid rain is impossible to determine. When two or more actors are responsible for a single indivisible injury in other contexts, most courts hold each liable for the entire in-

17. F. Harper and F. James, Law of Torts § 10.1 at 697-98 (1956).

18. *See* Hall v. E. I. Du Pont De Nemours & Co., 345 F. Supp. 353, 372 (E.D.N.Y. 1972); *see also* Wigmore, *Joint-Tortfeasors and Severance of Damages: Making the Innocent Party Suffer Without Redress*, 17 Ill. L. Rev. 458 (1923).

19. *See* Landers v. East Tex. Salt Water Disposal Co., 151 Tex. 251, 256, 248 S.W.2d 731, 734 (1952); *see also* Wigmore, *supra* note 18.

20. *See* Hall v. E. I. Du Pont De Nemours & Co., 345 F. Supp. 353, 371 (E.D.N.Y. 1972).

jury.[21] Establishing concurrent causation of an indivisible injury relieves the plaintiff of the need to establish a causal relationship between particular damages and the conduct of any one or several defendants injuring him.

The principal vehicle for the formulation of the modern rule on concurrent causation has been the multiple impact automobile negligence case.[22] Though courts express the rule differently, it is applied almost universally to impose joint liability on tort-feasors contributing to indivisible injuries in multiple or subsequent impact automobile accidents.[23] This principle has been applied in many contexts, several analogous to the acid rain case.

1. Air pollution nuisance cases

Two cases have addressed the principles of concurrent causation in the context of industrial air pollution. In *Michie v. Great Lakes Steel Division, National Steel Corp.*[24] the United States Court of Appeals for the Sixth Circuit, applying Michigan law, held that each of three air polluting plants could be liable for nuisance if their fumes traveled across the Detroit River and mingled to generate an indivisible injury. The plaintiffs could recover their entire damages from any defendant if they estab-

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21. RESTATEMENT (SECOND) OF TORTS § 879 (1977); *see also id.* at §§ 433A(2) Illustration 14, 433B(2)(3).

22. The old rule held that absent concert, each tort-feasor was liable for only that part of plaintiff's injuries caused by his own conduct. Apportioning his injuries among defendants with reasonable certainty was part of plaintiff's burden in proving damages. Where concurrent acts caused indivisible injuries, the plaintiff could not recover because he could not apportion his damages.

Criticism of the old rule began with John Wigmore's plea for its abandonment in a two page Comment in the Illinois Law Review. The oft-quoted piece termed the rule a "piece of callous cruelty to innocent parties." Wigmore, *supra* note 18 at 458. In 1937, William Prosser reviewed the law on concurrent liability and found it about the same as had Wigmore. Prosser, *Joint and Several Liability* 25 CAL. L. REV. 413 (1937).

When courts began to face multi-impact automobile accident cases, they shifted away from the old rule—with considerable difficulty—to the modern rule on concurrent causation. *See, e.g.* Maddux v. Donaldson, 362 Mich. 425, 108 N.W.2d 33 (1961).

23. Annot. 100 A.L.R.2d 16 (1965, Later Case Service 1976 & Supp. 1982). The most common formulation of the rule is the "indivisible injury rule" as stated in the text and the RESTATEMENT (SECOND) OF TORTS § 879 (1977). Some courts imply concert among the drivers—an obvious legal fiction. *See* Westerfield v. Shell Petroleum Corp., 161 Miss. 833, 138 So. 561 (1932). Other courts hold the first driver liable for subsequent impacts because his conduct placed the plaintiff in a "zone of danger," Ryan v. Mackolin, 14 Ohio St. 2d 213, 237 N.E.2d 377 (1968) and subsequent drivers on another basis. Many impose joint liability without a discrete explanation.

24. 495 F.2d 213 (6th Cir. 1974).

lished: (1) the defendants' conduct unreasonably polluted the air; (2) fumes from the defendants' plants were carried by the wind or otherwise drifted into the plaintiffs' neighborhood; (3) the defendants' fumes were a significant factor in the deterioration of air quality in the plaintiffs' neighborhood; (4) the levels of air pollution in the neighborhood interfered with the plaintiffs' use and enjoyment interest in their property; and (5) the plaintiffs' damages were indivisible. Further, the court noted that the defendants would not escape liability by showing that other polluters in the area, not named defendants, had contributed to the complained of pollution.[25] The court read Michigan law as shifting to the defendants the burden of showing what part of the injuries suffered were attributable to any particular defendant. If a defendant could apportion plaintiff's damages he would avoid joint liability and be liable only for that portion of plaintiff's damages he individually caused. Absent that showing, each defendant would be liable as a joint tort-feasor.[26] The court relied on Michigan concurrent causation principles developed in automobile negligence cases[27] and on a Texas water pollution case.[28]

A Tennessee Supreme Court decision, *Velsicol Chemical Corp. v. Rowe*,[29] adopted *Michie's* approach and holding.[30] In an action for nuisance and trespass, the court explicitly overruled a previous case[31] which denied the plaintiff's claim because he could not show which of two neighboring copper smelters' fumes had harmed his property. The court held that a right to contribution existed between joint tort-feasors for nuisance or trespass and allowed Velsicol to join the other manufacturers.[32]

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25. *Id.* at 218.

26. *Id.* at 215-18; *see also* RESTATEMENT (SECOND) OF TORTS (1977), § 433A.

27. *Id.* at 216 (citing Maddux v. Donaldson, 362 Mich. 425, 108 N.W.2d 33 (1961) and Watts v. Smith, 375 Mich. 120, 134 N.W.2d 194 (1965)).

28. *Id.* at 216 (citing Landers v. East Tex. Salt Water Disposal Co., 151 Tex. 251, 248 S.W.2d 731 (1952)). That the Sixth Circuit properly predicted Michigan law is confirmed in Oakwood Homeowners Ass'n v. Ford Motor Co., 77 Mich. App. 197, 258 N.W.2d 475 (1977).

29. 543 S.W.2d 337 (Tenn. 1976).

30. Like Michigan, Tennessee had adopted a rule imposing joint liability on drivers whose negligent conduct concurred to injure another. *See* Waller v. Skeleton, 31 Tenn. App. 103, 212 S.W.2d 690, *cert. denied*, 186 Tenn. 433, 211 S.W.2d 445 (1948). The court in *Velsicol* examined its automobile negligence cases, *Michie* and Landers v. East Tex. Salt Water Disposal Co., 151 Tex. 251, 248 S.W.2d 731 (1952) in reaching its decision. 543 S.W.2d at 342.

31. Swain v. Tennessee Copper Co., 111 Tenn. 430, 78 S.W. 93 (1903).

32. 543 S.W.2d at 343-44.

2. Water pollution cases

Two cases involving contamination of lakes or ponds by independent sources illustrate the application of concurrent causation principles in the context of water pollution. In *Landers v. East Texas Salt Water Disposal Co.*,[33] the Supreme Court of Texas held that two pipeline owners, responsible for polluting the plaintiff's lake, were joint tort-feasors. In so doing, it expressly overruled a prior case[34] that had required the plaintiff to apportion his damages among the several polluters or recover nothing.[35]

The Mississippi case *D & W Jones, Inc. v. Collier*[36] addressed the issue of successive concurring causes. The plaintiff's catfish ponds were contaminated by pesticide applied to neighboring farms over a six-week period. The quantity of pesticide applied by a single defendant or at a single time would not have been sufficient to contaminate the ponds. The neighboring farmers nonetheless were held jointly liable for the entire injury.[37]

B. Application to Acid Rain Litigation

The principles of concurrent causation should get an acid rain plaintiff past a motion to dismiss for failure to state a claim, and could justify a recovery on evidence available with today's technology.

For purposes of the motion to dismiss, assume the plaintiff pleads: (1) Defendants, Ohio Power Co., Indiana Power Co-op, Illinois Steel Co., and Michigan Power Corp., discharge large amounts of sulfur and nitrogen oxides into the air in conjunction with the burning of oil and coal; (2) Sulfur and nitrogen oxides discharged by the defendants have been traced to the atmo-

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33. 151 Tex. 251, 248 S.W.2d 731 (1952).

34. *Id.* at 256, 248 S.W.2d at 734 (overruling Sun Oil Co. v. Robicheaux, 23 S.W.2d 713 (1930)).

35. The court cited criticism of the rule requiring plaintiffs to apportion damages in order to recover and continued:

> [O]ur courts seem to have embraced the philosophy, inherent in this class of decisions, that it is better that the injured party lose all damages than that any of several wrongdoers should pay more damages than he individually and separately caused. If such has been the law, from the standpoint of justice it should not have been; if it is the law now, it will not be hereafter.

151 Tex. at 256, 248 S.W.2d at 734.

36. 372 So. 2d 288 (Miss. 1979).

37. In reaching its decision, the court cited *Landers* and Northup v. Eakes, 72 Okla. 66, 178 P. 266 (1919), another water pollution case.

sphere in the vicinity of the plaintiff's property and over the drainage of the adjoining lake; (3) Defendants' emissions so pollute the air in the vicinity of plaintiff's property as to substantially contribute to acid rain; (4) Acid rain falls in the vicinity of plaintiff's property and in the drainage of the adjoining lake; (5) Acid rain has caused the lake to become acidic, killing or inhibiting desirable aquatic and lake shore life, injuring the plaintiff by decreasing his property value, and interfering with plaintiff's use and enjoyment of his property; and (6) Plaintiff's damages are indivisible, that is, incapable of apportionment among the defendants.

On a motion to dismiss for failure to state a claim, defendants would argue that the plaintiff had not alleged an adequate causal relationship between their conduct and his injury. They may argue that the complaint fails to demonstrate what share of plaintiff's injury is attributable to each polluter including those not joined as defendants. A reasonable extension of the principles of concurrent causation, however, would allow the court to find for the plaintiff.

At the outset, the court should conclude that if indeed liable, the defendants are jointly liable. The plaintiff therefore would benefit from the more favorable rules of causation in joint torts. The plaintiff's injuries are clearly indivisible, the heart of the modern rule of concurrent causation. The plaintiff's injury is the result of many acid rain and snow storms, each the result of mingled emissions from many polluters. The defendants in this action are not the only contributors to the acidification of the plaintiff's lake. They are, however, several of the actors responsible. The plaintiff has alleged that the defendants' conduct was a substantial factor in creating the atmospheric conditions that generated acid rain. The plaintiff has not alleged, nor could he show, each defendant's contribution to his injury. That, however, is not required when there are concurrent causes. Finally, were the court to require the plaintiff to apportion his harm among the defendants, it would deny him redress. This would be erroneous because imbedded in the rule of concurrent causation is the principle that courts would rather require a wrongdoer to pay more damages than he individually caused than deny an innocent victim relief.

It is not conceptually difficult to extend the accepted principles of causation from the fact pattern in *Michie* and *Velsicol*, in which the air pollution traveled across a river or a neighbor-

hood, to acid rain, in which it may travel hundreds of miles. Just as the plaintiffs in *Michie* were required to show that the defendants' emissions reached the other side of the Detroit River, the plaintiffs in acid rain cases would have to show that the defendants' emissions reached the atmosphere in the vicinity of their land. The difficulty is a matter of proof, but it does not demand a more flexible rule of causation. The *Michie* court's refusal to accept defendants' defense of other contributory polluters should also apply in an acid rain case. That would allow a plaintiff to establish causation when defendants' group conduct is a substantial factor in creating the atmospheric conditions requisite for acid rain in the vicinity of his property.[38]

Courts in many jurisdictions would have to make the extension to *Michie* before they could extend their rules of concurrent causation to the similar fact pattern of the acid rain case. If the state has existing law on water pollution, the extension should not be too difficult. The extension is more a factual than a legal one. The court need only apply the rule in surface streams to the more complicated air streams.

When the court lacks such precedent within the jurisdiction it may, for example, look to *Landers*. Notably, *Michie* lacked any Michigan precedent touching on pollution and relied on automobile negligence cases. *Velsicol* was decided in direct conflict with existing precedent on air pollution, also relying on automobile cases. This is important because most jurisdictions follow rules of concurrent causation in the automobile context that support the *Michie* rule and therefore the suggested acid rain extension. Each of the theories behind imposing joint liability in multiple impact automobile cases supports the *Michie* rule.

Since acid rain injury develops over time, the court will have to address the issue of successive concurring causes when the plaintiff seeks damages. When the injury is cumulative, as in the case of acid rain, successive acts for the period of time necessary to produce the harm should be considered concurring causes, as in *Collier*.

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38. Just what size of vicinity the court allows the plaintiff to rely on could be very important. The plaintiff would have greater difficulties identifying the source of the pollutants if the court restricted the area to the immediate vicinity of his property. A rule that considered only substantial polluters potential joint tort-feasors would deflate an argument that any polluter, even a motorist, could be liable. Such a rule may be implicit in nuisance, *see supra* note 9, and trespass by microscopic pollutants, *see supra* note 10, Borland v. Sanders Lead Co., 369 So. 2d 523, 529 (Ala. 1979).

Nature's role in acid rain (the transport of pollutants, the transformation of oxides to sulfates and nitrates in acid precipitation, and a minor contribution to sulfur in the air) should not shield defendants from liability. If nature is considered another tort-feasor, the liability of responsible parties contributing to the injury is unaffected. Only by demonstrating that the acid rain would have harmed the plaintiff to the same extent absent their sulfur and nitrogen emissions can defendants be shielded by nature.[39]

For purposes of a recovery, assume the plaintiff can establish the allegation in the complaint by a preponderance of the evidence.[40] He would not be required to trace pollutants from stack to lake with mathematical certainty. Such a requirement would allow science to deny plaintiff recovery where the law would not. The law has never required scientific certainty, but the plaintiff must show that his version of the facts is more likely than not. The law often lightens the plaintiff's burden where science cannot provide an exact answer. For example, when two fires converge and destroy plaintiff's property, he need only show that one of the fires is attributable to defendant, and need trace it only to where the fires merge.[41]

Applying the rules of concurrent causation, the plaintiff

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39. When a tort-feasor's conduct concurs with nature to injure a person or his property, and the injury is indivisible, the tort-feasor is liable for the entire injury. This is generally true even where the tort-feasor can demonstrate that his contribution is minor. Bodick v. Harcliff Mining Co., 208 Pa. Super. 471, 222 A.2d 615 (1966). Inland Power & Light Co. v. Grieger, 91 F.2d 811 (9th Cir. 1937). *But see* Johnson & Johnson v. Dandas [1945] 4 D.L.R. 624 (where the court apportioned damages). Note that 90% of acid rain precursor pollutants in the Northeast and Central Canada, the area suffering from lake acidification, is attributable to man. F. RECORD, ACID RAIN, *supra* note 1, 75 (1982).

40. This may be difficult. For an in depth consideration of the difficulties see F. RECORD, ACID RAIN, *supra* note 1, 87-155 (1982) and Fisher, *supra* note 1, at 450-56 and accompanying notes. The difficulty of proof will vary according to the distance of the sources from the acid rain and availability of studies of acid precipitation in the area. Advances in technology may make proof less difficult in the future. Tracing, an important element of proof, would also be very expensive.

41. The rule allowing a plaintiff to recover for damages caused by co-mingled fires, though he could only identify the cause of one fire and could not apportion damages among the fires, developed before the general rule of concurrent causation. *See* McClellan v. St. Paul, M & M Ry. Co., 58 Minn. 104, 59 N.W. 978 (1894), Kingston v. Chicago & N.W. Ry. Co., 191 Wis. 610, 211 N.W. 913 (1927). The rule developed in response to the range fires set by steam locomotives. Where plaintiff could trace one fire to the railroad, it was liable for the entire indivisible injury. The courts recognized that plaintiff could not trace a particular fire after it had commingled with another fire or fires, so they allowed recovery on a showing that the fire set by the railroad merged with another to form the fire damaging the plaintiff's property.

would establish the requisite causal relationship when he traced defendants' emissions to the vicinity of the plaintiff's land and showed that the emissions of the defendants, as a group, were a substantial factor in creating the atmospheric conditions which caused the acid rain.

Of the causation theories discussed in this Comment, concurrent causation is the most easily applied to acid rain litigation. However, it also requires the most difficult proof.

IV. Applying Concert of Action Joint Liability in Acid Rain Litigation

A. Concert of Action

If the plaintiff cannot trace pollutants from the defendants' stacks to the atmosphere in his area, or is unsure how persuasive his evidence will be in doing so, he will want to urge a concert of action theory to impose liability on the defendants. This category of joint torts requires defendants to "join in the performance of the tortious act or acts."[42]

The rule imposing joint liability was formulated in intentional tort cases such as assault,[43] but has been expanded to include negligent torts.[44] For example: if *A* and *B* agree to drag race and *C* agrees to act as starter, *A*, *B*, and *C* would all be liable for any injuries sustained by *D*, an innocent motorist, when *A*'s car collided with *D*'s car during the race.[45] What would make the theory most valuable to the acid rain plaintiff is that it holds persons liable whose acts are *not* the physical cause of plaintiff's injuries.

Two product liability cases have applied the concept of concert of action to hold each member of an industry jointly liable for injuries only one unidentified member could have physically caused. In the first case, *Hall v. E. I. Du Pont De Nemours & Co.*,[46] the plaintiffs were children injured by exploding blasting caps. The six manufacturers of blasting caps in the United States and their trade association were defendants. The court worded the concert requirement "joint control of risk" and

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42. 1 F. Harper and F. James, Law of Torts § 10.1 at 697-98 (1956).

43. *See* Wigmore, *supra* note 18; *Sir John Heydon's Case* (1613) 11 Coke Rep. 5.

44. *See* Hall v. E. I. Du Pont De Nemours & Co., 345 F. Supp. 353, 371-72 (E.D.N.Y. 1972) and cases cited therein.

45. *See, e.g.*, Hood v. Evans, 106 Ga. App. 360, 126 S.E.2d 898 (1962).

46. 345 F. Supp. 353 (1972).

noted that it would impose joint liability.[47]

Citing cases that imposed joint liability for assault, reckless driving, brush burning, water pollution, and other group omissions or misconduct, the court concluded:

> These diverse cases impose joint liability on groups whose actions create unreasonable hazards or risks of harm, even though only one of the group may have been the "direct" or physical cause of the injury. Where courts perceive a clear joint control of risk . . . the issue of who "caused" the injury is distinctly secondary to the fact that the group engaged in joint hazardous conduct.[48]

The plaintiff could show joint control of risk by showing: (1) the existence of an explicit agreement and joint action with regard to warnings and safety features on blasting caps, (2) evidence of parallel behavior sufficient to support an inference of a tacit agreement, or (3) that defendants, though acting independently, adhered to an industry-wide standard with regard to the safety feature in blasting caps.[49] The adherence to industry-wide standards would support joint liability only where the individual identity of the responsible manufacturer was unknown.[50] When the plaintiff could identify the manufacturer of the cap causing the injury the *Hall* court would not apply joint liability.[51]

Finding joint control of risk shifts the court's examination from the conduct of each individual defendant to the conduct of the defendants as a group.

> The possibility—admitted by the plaintiffs—that the caps may have come from other, unnamed sources, does not affect plaintiff's burden of proof. Plaintiffs must show by a preponderance of the evidence—i.e., that it is more probable than not—that the caps involved in the accidents were the products of the named defendant-manufacturers. Plaintiffs do not bave to identify which one of the defendant-manufacturers made each injury-causing cap.[52]

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47. *Id.* at 371-76.

48. *Id.* at 372.

49. *Id.* at 373-74.

50. *Id.* at 374.

51. *Id.* at 374, 386. The concert of action theory could justify imposition of joint liability on an entire industry even where the identity of the responsible party is known. The *Hall* court limited its application to circumstances where the identity of the responsible party is not known.

52. *Id.* at 379.

The plaintiff's burden of proof in a case in which there is concert of action is to show the necessary causal relationship between his injury and the conduct of the entire group or any member of the group.

Another application of the concert of action theory is found in *Bichler v. Eli Lilly & Co.*[53] The New York Court of Appeals upheld a verdict against Eli Lilly, one of over 150 manufacturers of the drug DES. The plaintiff could not identify which producer sold the drug DES that caused her injury.[54]

The jury verdict relied on an instruction applying the concert of action theory. The instruction allowed a finding of "concerted action" if the jury found (1) joint action based on an express or implied understanding, or (2) independent wrongful acts that encouraged or assisted the independent wrongful acts of other producers of DES in regard to the alleged failure to adequately test the drug.[55]

The case's precedential value is clearly limited by its posture in the court of appeals. The court examined only the question of the sufficiency of the evidence, and did not deal with whether the instruction accurately reflected the law.[56] The court's dictum, however, is encouraging for the acid rain plaintiff. The court noted the apparent barrier to recovery imposed by the plaintiff's inability to identify the particular manufacturer responsible for her injuries and commented that the law could not be expected to stand still where innocent victims face

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53. 55 N.Y.2d 571, 436 N.E.2d 182, 450 N.Y.S.2d 776 (1982).

54. *Id.* at 578, 436 N.E.2d at 184, 450 N.Y.S.2d 778. DES was sold from 1964 through 1971 as a treatment for miscarriage. Many daughters exposed to the drug while in the womb developed cancerous vaginal and cervical growths. The identity of the drug company whose DES tablets caused any particular plaintiff's injuries is usually unknown and impossible to accurately determine. The court explained:

> [t]his is because all DES prescribed for pregnant women was produced under the identical chemical formula . . . and manufactured and prescribed generically. With the passage of the many years needed for DES-caused vaginal tract abnormalities to appear in prenatally exposed offspring, the patient, physician, pharmacist, and drug company records which could have identified the source of the DES have usually disappeared. This same lapse of time has commonly obliterated the individual recollection of those surviving witnesses of any underlying DES transaction.

Id. at 578, 436 N.E.2d at 184, 450 N.Y.S.2d 778.

55. *Id.* at 581-83, 436 N.E.2d at 186-87, 450 N.Y.S.2d at 780-84.

56. The application of the concert of action theory was not challenged by either a motion to dismiss or partial summary judgment. Defendant's lawyer at trial did not take exception to the essential character of the concert instruction given. *Id.* at 581-84, 436 N.E.2d at 186-88, 750 N.Y.S.2d 780-82.

"inordinately difficult problems of proof."[57]

B. Application to Acid Rain Litigation

If the concert of action theory in *Hall* and *Bichler* is extended to acid rain litigation, the plaintiff who established concert of action would be relieved of the difficult task of tracing pollutants to his area. Even when plaintiff has evidence tracing pollutants, he may attempt to establish concert of action as an alternate theory of recovery.

That extension may be difficult. In both *Hall* and *Bichler* defendants' conduct could be demonstrated to be wrongful independent of establishing that it was the cause of the plaintiffs' injuries. If Eli Lilly and other producers of DES inadequately tested the drug, failing to prevent the disasterous results of its use, their actions would be wrongful. The issue whether Eli Lilly's failure to test caused the plaintiff's injuries was clearly secondary to the industry's objectively wrongful conduct. The same in true in the case of *Hall*. Any failure to safeguard children from the dangers of blasting caps can be termed wrongful. If the failure would make a single producer liable, the fact that a cap's detonation masks its identity should not shield producers from liability.

Emitting sulfur and nitrogen oxides into the air is not objectively wrongful. It is permitted and regulated by law. It is a necessary by-product of the burning of fossil fuels—a necessity for our society. Most utilities or smelters assailed by the acid rain plaintiff will be in compliance with laws designed to protect air quality. The defendants in an acid rain case have committed a wrong only if their emissions interfere with a legally protected interest of the plaintiff. So in an acid rain case cause and fault are tied together, while they are not in the product cases that rely on the concert of action theory.

Another distinction between product liability and nuisance or trespass complicates the extension of the concerted action theory to acid rain litigation. One who sells a product assumes obligations as part of the bargain. One of those obligations is that he is liable for injuries caused by that product if it was unreasonably dangerous when it was sold.[58] *Hall* and *Bichler* are

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57. *Id.* at 579-80, 436 N.E.2d at 185, 750 N.Y.S.2d 779. (citing Caprara v. Chrysler Corp., 52 N.Y.2d 114, 123, 417 N.E.2d 545, 549, 436 N.Y.S. 2d 251, 255 (1981)).

58. PROSSER, LAW OF TORTS, *supra* note 9, at 658-61.

built on the foundation of that particular liability. An industry that injures others incidentally through the emission of a by-product of a socially desirable activity should not be exposed to the same liability for the by-product's subsequent mischief as would a merchant for an injury caused because what he sold was defective. This is not to say that the utility operator should not be liable. Rather, those who proceed against him may not be afforded all the assistance that is given those injured by defective products.

There are other reasons why the courts may not find concert for purposes of imposing joint liability on each member of the industry. The California Supreme Court in *Sindell v. Abbott Laboratories*,[59] for example, refused to apply *Hall's* theory of concert because the joint conduct alleged among manufacturers of DES was influenced by pervasive federal regulations. The principal sources of sulfur and nitrogen oxides are also heavily regulated with regard to the specific conduct injuring the plaintiff—emissions. Conduct permitted or mandated by regulation may not be the kind of concert that should be the basis of liability.

Finally, *Hall* and *Bichler* apply the law of a single jurisdiction, New York. They are major extensions of the rules of product liability and the concert of action theory. Courts asked to apply concert to acid rain cases may find it difficult to make concert among industrial polluters the basis for joint liability when they can rely on only assault and reckless driving cases for precedent. Prior to *Hall*, joint control of risk was usually immediate and in relation to an event, rather than an existing and present risk.[60] But when a court perceives that the victim of acid rain damages is barred from recovery by current rules, it may choose to extend the law. If the courts choose to fashion a rule that relieves the acid rain plaintiff of the burden of tracing, concert may provide a starting place.

V. Applying Enterprise Liability to Acid Rain Litigation

A. Enterprise Liability

Drawing on principles of vicarious liability from workers' compensation (employer's liability for injuries caused by fellow

59. 26 Cal. 3d 588, 163 Cal. Rptr. 132, 607 P.2d 924 (1980) *cert. denied* 449 U.S. 912 (1980).

60. *See* Prosser, Law of Torts, *supra* note 9, at 291-93.

workers),[61] respondeat superior,[62] non-delegable duties, and inherently dangerous activities[63] the court in *Hall* fashioned another basis of joint liability—enterprise liability.[64] Enterprise liability also shifts the emphasis and liability from individual offenders to the group of defendants. It is termed "enterprise liability" because it would impose liability on businesses for those risks generated by a business' operation. Whether liability would attach to the individual businesses severally or to the group of businesses jointly under the doctrine would depend on where the risk could best be foreseen and safeguards imposed.[65]

Since the *Hall* court thought that the risk that blasting caps would injure children could best be ascertained and safeguarded by the producers acting as a group or through their trade association, it suggested enterprise liability would apply. The court mentioned water and air pollution as other areas in which the risks could best be foreseen and guarded against on the industry level.[66]

B. Application to Acid Rain Litigation

Acid rain is a risk generated by the operation of power plants and smelters. As such, it is the kind of risk to which *Hall* would apply "enterprise liability." It is also a risk best addressed by the operators of power plants and smelters as a group—so *Hall* would find each operator jointly liable. Enterprise liability would therefore be a powerful aid to the acid rain plaintiff's case.

Establishing joint liability under *Hall* requires a showing that: (1) plaintiff's injury is the result of a business generated risk, (2) the risk is best ascertained by the industry working together or through trade associations; and (3) the risk is best resolved or avoided by the industry working together.[67] Since acid rain is caused by sulfur and nitrogen oxide emissions of businesses, it is clearly a business risk. The utility industry recog-

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61. Leonbruno v. Champlain Silk Mills, 229 N.Y. 470, 128 N.E. 711 (1920).

62. 2 F. HARPER & F. JAMES, THE LAW OF TORTS, § 26.7 (1956); RESTATEMENT (SECOND) AGENCY § 291 (1958).

63. Calabresi, *Some Thoughts on Risk Distribution and the Law of Torts*, 70 YALE L.J. 499 (1961); Benser v. Control Trust Co., 230 N.Y. 357, 130 N.E. 577 (1921).

64. 345 F. Supp. at 376-78.

65. *Id.* at 378.

66. *Id.* at 377-78. Identifying the discrete cause of an injury would probably shift liability away from the industry as a whole and to the responsible party.

67. *Id.* at 376-78.

nizes that the risks generated by large emissions of sulfur and nitrogen oxides are best evaluated through joint action. This is demonstrated by its joint action sponsoring major studies on acid rain, joint and trade association publications on acid rain, and joint lobbying to avoid legislative action curtailing their emissions. (Joint action is less clear among smelters.)

Whether enterprise liability will or should be adopted by courts considering acid rain damages is another question. *Hall* seemingly limited its application of enterprise liability to industries composed of a "small number of units,"[68] and commented that: "What would be fair and feasible with regard to an industry of five or ten producers might be manifestly unreasonable if applied to a decentralized industry composed of thousands of small producers."[69] The *Sindell* court relied on this language to exclude the manufacturer of DES from enterprise liability.[70] Fewer utilities and smelting operations would be implicated in an acid rain case than manufacturers of DES. Though there are more utilities and smelters than manufacturers of blasting caps, the industries are centralized and therefore seem outside the *Hall* court's limitation.

The *Hall* court's reference to air and water pollution as areas where enterprise liability should be applied is reasonable, but the cases it cites for the proposition are not applications of enterprise liability. The first is a concurrent causation case in which several mills polluted a stream and each was held jointly liable.[71] The second citation is to the dissent in a case in which the majority held several defendants who had injured the plaintiff hy damming a stream could be liable only for their divisible share of the damages.[72] In the case of pollution, *Hall* addresses what the law should be rather than what it is.

The principles on which the *Hall* court based its enterprise liability are unlikely sources of a new common law theory of joint liability. An employer's liability for injuries to one worker caused by another in the workplace is statutory. The general principles of law on the risks incurred by business failed to im-

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68. *Id.* at 378.

69. *Id.*

70. 26 Cal. 3d 588, 607-10, 163 Cal. Rptr. 132, 141-43, 607 P.2d 924, 933-35 *cert. denied* 449 U.S. 912 (1980).

71. Moses v. Town of Morgantown, 192 N.C. 102, 133 S.E. 421 (1926).

72. Tackaberry Co. v. Sioux City Serv. Co., 154 Iowa 358, 132 N.W. 945 (1911) (Weaver, J., dissenting).

pose liability until legislatures abrogated the "fellow servant doctrine."[73] Respondeat superior is an ancient basis of liability and arises from a special relationship rather than explicitly from risks of doing business.[74] It is the nature of the activity rather than its purpose that broadens liability in the case of inherently dangerous activities and non-delegable duties.[75] To impose joint liability for enterprise created risks, any court considering an acid rain case would have to be willing to fashion a truly new theory—or at least join *Hall* in doing so.

VI. Applying Market Share Liability to Acid Rain Litigation

A. Market Share Liability

A court unwilling to apply concert or enterprise liability may resort to application of "market share liability" to ease an acid rain plaintiff's access to the courts. To do so, however, may do more to defeat a plaintiff's case than advance it. The theory was fashioned by the California Supreme Court in response to the DES dilemma in *Sindell v. Abbott Laboratories*.[76]

The court considered but refused to apply *Hall*. The *Sindell* court thought it unjust to find concert when industry standards are closely regulated, and applied *Hall's* caution on the type of industry susceptible to enterprise liability, excluding the manufacturers of DES.[77]

The court then proceeded to fashion a new theory of liability. The plaintiff could recover by demonstrating the causal relationship between her injury and the conduct of the defendants' industry if she sued the manufacturers of a substantial amount of the DES sold in California during the necessary period. She could recover from each defendant a percentage of her damages equal to that defendant's share of the market of DES. The court did not specify what it would consider a substantial share of the market or how each defendant's market share would be

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73. Prosser, Law of Torts, *supra* note 9, at 525-34; *see also* 345 F. Supp. at 376 (quoting Judge Cardozo's application of New York's statute in Leonbruno v. Champlain Silk Mills, 229 N.Y. 470, 128 N.E. 711 (1920)).

74. Prosser, Law of Torts, *supra* note 9, at 458-59.

75. *Id.* at 470-74.

76. 26 Cal. 3d 588, 165 Cal. Rptr. 132, 607 P.2d 924, *cert. denied*, 449 U.S. 912 (1980).

77. *Id.* at 608-11, 163 Cal. Rptr. at 142-44, 607 P.2d at 934-36; *see also* text accompanying notes 55 and 66 *infra*.

determined.[78]

It appears, for example, that if plaintiff could join the manufacturers of 65 percent of the DES sold in California for the proper period she would meet the substantial share requirement. If that 65 percent is split among 5 defendants: *A* with a 15 percent share, *B* with 20, *C* with 10, *D* with 10, and *E* with 10, and *B* and *E* are no longer solvent, then plaintiff can collect only 35 percent of her judgment. (Since she joined only 65 percent of the market, that is the ceiling of her recovery, and since *A*, *C*, and *D*'s liability is limited to their market shares, she can recover only 35 percent.)

Sindell abandons the principle of joint liability in its attempt to compromise between denying the plaintiff redress and the defendants' argument that the probability that any one of them sold the DES injuring plaintiff was too small to hold each liable for the entire injury.

B. Application to Acid Rain Litigation

That *Sindell* will ever be applied to acid rain litigation is unlikely. To address the DES dilemma is a novel approach, and should not be expanded beyond the limited context of product liability cases in which establishing the responsible manufacturer is impossible.[79]

Since "market share liability" has never been applied to a final judgment and has no real history, its application is uncertain. What would be the "market" for polluters? How would the shares be determined? The plaintiff should avoid "market share" because of its limiting impact on his recovery. The defendant risks a decision adopting joint liability on the concert theory if it urges the adoption of *Sindell*.

That courts outside of California will choose to apply established theories of liability and allow the trial process to fashion any necessary compromise seems more likely.

VII. Conclusion

Applying Concurrent Causation, Concert, Enterprise, or Market Share Liability shifts the burden of proof to the defen-

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78. *Id.* at 611-14, 103 Cal. Rptr. at 145-46, 607 P.2d at 937-38.

79. Several courts have suggested that it could be applied to asbestos product liability suits. *But see, e.g.*, Starling v. Seaboard Coast Line R.R. Co., 533 F. Supp. 183 (D. Ga. 1982).

dants. It does not necessarily mean that the plaintiff has won his case. Just as the defendant assailed by *res ipsa loquitur* can escape the inference of negligence by affirmatively showing that his conduct was not negligent,[80] an acid rain defendant could escape joint liability by identifying the discrete cause of plaintiff's damages.[81] In practice that will usually not be possible. Defendants will be faced with the same difficulties of proof that would have barred the plaintiff's recovery had the theory of joint liability *not* been applied to assist his case.

Extending joint liability causation to acid rain litigation relies on a recognition that power plants and other defendants are implicated in the acid rain problem.[82] That implication justifies a remedy for those persons particularly injured by acid rain—consistent with the legal system's traditional solicitude for property interests.

Curtis Webb

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80. PROSSER, LAW OF TORTS, *supra* note 9, at 211-35, 2 F. HARPER & F. JAMES, LAW OF TORTS, §§ 19.11-19.12 (1956).

81. *See* text accompanying notes 26, 51, and 67.

82. The plaintiff's evidence justifying application of joint liability implicates the defendants. Under Concurrent Causation, plaintiff must implicate particular defendants; the other theories allow the plaintiff to implicate an entire industry.