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ARTICLE

RISKS OF ASSUMPTIONS: IMPACTS OF REGULATORY LABEL WARNINGS UPON INDUSTRIAL PRODUCTS LIABILITY

*James T. O'Reilly**

When should the manufacturer of an industrial chemical product such as a paint, solvent, or complex mixture be liable in tort to an injured worker for failure of the product label to warn of the chemical's health related risks? The answer to that modest question has become more volatile than paint, more explosive than some solvents, and as complex as many chemical mixtures. Recently, the imposition of federal chemical safety, training, and labeling requirements has further clouded the picture. This Article addresses the long-term consequences of that federal activity upon the parallel tort law system of industrial products liability.

The RAND Corporation and other federal and private studies have documented the increase of products liability litigation.¹ Conventional consumer use of products liability litigation has grown even as reform legislation debates continue. The use of liability principles in industry workplace settings, however, has most often involved capital equipment, such as presses and bulldozers, rather than chemical products.² Workers' compensation coverage has lessened workers' urgency to pursue third-party tort actions against

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1. M. PETERSON, S. SARMA, M. SHANLEY, PUNITIVE DAMAGES: EMPIRICAL FINDINGS (RAND Institute for Civil Justice 1987); *see also, e.g.*, U.S. DEP'T OF JUSTICE, REPORT OF THE TORT POLICY WORKING GROUP ON THE CAUSES, EXTENT AND POLICY IMPLICATIONS OF THE CURRENT CRISIS IN INSURANCE AVAILABILITY AND AFFORDABILITY 2 (1986) [hereinafter TORT POLICY WORKING GROUP REPORT].

2. Machinery injury cases, such as *Hopkins v. Chip-In-Saw Inc.*, 630 F.2d 616 (8th Cir. 1980), are far more common than chemical injury cases such as *Ward v. Desachem Co.*, 771 F.2d 663 (2d Cir. 1985), and *Bryant v. Technical Research Co.*, 654 F.2d 1337 (9th Cir. 1981).

capital equipment manufacturers except in serious cases where the employee sustained acute physical injuries.

While the effects of worker's compensation may have restrained the worker-plaintiff's use of tort remedies in the past,³ this is changing in the segment of industry manufacturing chemicals and chemical-derived products. Although the change may be too recent for scholars to notice it, the insurance industry has recognized it in the insurance rates for many producers of industrial products.⁴ Thus, litigation between manufacturers and the employees or former employees of distant customers increasingly addresses the long-term illness situations formerly handled by disability or workers' compensation coverage.

Chronic illness cases alleging industrial products liability will increase geometrically for at least three reasons. First, asbestos litigation has trained many plaintiffs' lawyers to consider industrial exposure patterns as a causal factor in chronic illnesses.⁵ Second, significant liability judgments awarded

3. M. SHAPO, *THE LAW OF PRODUCTS LIABILITY* ch. 15 (1987), exhaustively treats the interaction of workers' compensation with the tort system. Part of the difficulty has been the reluctance of workers' compensation systems to treat as a compensable "accident" a condition that develops over a number of years as a result of exposure. See W. PROSSER & W. KEETON, *THE LAW OF TORTS* 575 (5th ed. 1984). See generally Note, *Workmen's Compensation: The Cumulative Injury Doctrine*, 81 W. VA. L. REV. 435 (1981).

4. Priest, *Modern Tort Law and the Current Insurability Crisis* (Yale Law School Civic Liability Program Working Paper No. 44, 1986), *abstracted at* 24 HOUS. L. REV. 65 (1987), best reviews this issue.

5. Industrial liability cases attracting the most intense debate in the past decade allege that manufacturers knew that fibers emitted from structural insulation installed in ships or structures caused asbestosis. See generally J. ARTABANE & C. BAUMER, *DEFUSING THE ASBESTOS LITIGATION CRISIS: THE RESPONSIBILITY OF THE U.S. GOVERNMENT* (1986). However, asbestosis fails as a metaphor for the typical chemical exposure case addressed in this Article because its causation is more clear than that of internal organ cancers or reproductive problems allegedly related to chemical exposure. See, e.g., *Lohrmann v. Pittsburgh Corning Corp.*, 782 F.2d 1156, 1164-65 (4th Cir. 1986); *Borel v. Fibreboard Paper Prods. Corp.*, 493 F.2d 1076, 1083 (5th Cir. 1973), *cert. denied*, 419 U.S. 869 (1974); *Beshada v. Johns-Manville Prods. Corp.*, 90 N.J. 191, 194, 447 A.2d 539, 543 (1982). Asbestos manufacturers' alleged knowledge of asbestosis causation raises an evidentiary issue shown to strongly affect the trial jury. See *Borel*, 493 F.2d at 1081. Asbestos litigation frequently asks: "What did they know and when did they know it?" *Id.* Asbestos cases have had a major impact upon civil litigation practice. See, e.g., M. SELVIN & L. PINCUS, *THE DEBATE OVER JURY PERFORMANCE: OBSERVATIONS FROM A RECENT ASBESTOS CASE* 12 (RAND Institute for Civil Justice 1987). The questions of causation, research, statistical incidence, and epidemiology in the typical chemical exposure case differ significantly. The unpredictability of disease causation causes this trouble. *CAUSATION AND FINANCIAL COMPENSATION FOR CLAIMS OF PERSONAL INJURY FROM TOXIC CHEMICAL EXPOSURE* 14-18 (L. Novey ed. 1986) (Georgetown Univ. Med. Ctr. Inst. Health Policy Analysis, Conference Proceedings) [hereinafter L. Novey]. The rarity of the particular exposure effect aids in proving neurological damage from workplace chemical exposure, however. The rarity of the effect and the fact that it occurs more frequently among

by courts in recent years have encouraged the filing of liability actions.⁶ Third, publicity about toxic tort cases has led to a revolution in information flow,⁷ leading in turn to a revelation of risk information and prompting increased litigation. Federal regulatory intervention in the realm of workplace information will produce additional claims as long-term users of unlabeled chemicals learn of harmful exposures.

The current approach to handling industrial employee illness and accident tort cases disdains the use of assumption of the risk defenses because physical injuries from capital equipment rarely involve fair opportunities for real choice of risk-avoidance conduct by individual workers. This Article suggests that personal injury due to chemical exposure is increasingly avoidable as federally mandated dissemination of information to employees begins to provide increased opportunities for workers, individually or collectively, to avoid chemical safety risks. Increased awareness of risks and use of assumption of the risk defenses will make tort law relatively obsolete in future industrial toxic illness cases.

I. TORT LAW ISSUES

A. *The Tort Deterrence Principle*

Prior to the strict liability revolution in product warning litigation, the tort law system did not deter significantly the distribution of hazardous products by chemical manufacturers. Disability or workers' compensation programs compensated for most chronic diseases allegedly resulting from chemical exposures providing manufacturers of those products little tort law incentive to provide adequate warning labels.⁸ The only external forces upon the chemical manufacturer who chose to develop a product label were customers' desires, the need to provide consumers with enough information to ensure effective product use, shareholders' need for returns on investments through improved sales, and a desire to keep pace with customary warnings provided by competitors. Thus, the adequacy of chemical warnings depended upon employer education and safety practices which may not have been sufficient to safeguard workers from risk.

Today, failure to provide adequate warning against unreasonable danger

exposed workers than among others, eases admission of epidemiology and supportive testimony. See *Grenier v. Dow Chem. Co.*, 628 F. Supp. 1529, 1531 (D. Me. 1986).

6. See generally Brief for Insurance Company of North America, *Insurance Co. of N. Am. v. Forty-Eight Insulations*, 454 U.S. 1109 (1981) (No. 81-198) (petition for writ of certiorari).

7. See L. Novey, *supra* note 5, at 14-18.

8. These no-fault compensation systems and the availability of a safety net of disability payments have lessened the pressure for a compensation system.

may result in strict liability for manufacturers of industrial, noncapital goods.⁹ As a result, the insurer's desire to avoid product liability exposure has added an important external factor to labeling decisions by chemical manufacturers.¹⁰ Tort law has delivered a significant benefit to industry workers by forcing producers of chemical products to become more warning conscious, thereby making products putatively safer.

At one time, avoidance of strict liability dominated the consideration of a manufacturer faced with a warning label decision. However, strict liability is no longer the key determinant. Systematic penalties of a national regulatory system accomplish deterrence, supplanting the former logic of deterrence in the law of torts. Congress and administrative agencies promote safety in ways that make it less necessary for the tort process to assure safe workplaces.¹¹

Tort law continues to serve other values such as compensation for uninjured injuries. However, even the compensation value of tort law has diminished significantly because industrial or governmental insurance programs frequently compensate for workplace injuries. Thus, the recent federal developments replace the common law deterrent with a federal standard of care, a federalized¹² rationale for action, and a new assumption of risk defense premised upon the federal requirements.¹³

B. *Strict Liability and Its "Unreasonableness" Requirement*

The manufacturer's obligation to communicate risk information to users remains a constant in tort law, even as theories change and evolve. A worker alleging that a chemical product manufacturer caused harm through workplace chemical exposure has available three principal causes of action: negligence, strict liability, and breach of warranty.¹⁴

9. See *infra* notes 20-29 and accompanying text.

10. This factor has received increased attention from chemical products manufacturers as liability continues to increase and insurability continues to decrease in the mid-1980's. See TORT POLICY WORKING GROUP REPORT, *supra* note 1.

11. See AMERICAN LAW INSTITUTE, COMPENSATION AND LIABILITY FOR PRODUCT AND PROCESS INJURIES 15 (1987) (draft progress report) [hereinafter ALI REPORT].

12. The term "federalized" does not require statutory preemption, for such preemption is a relatively rare effect of regulation as the *Silkwood v. Kerr-McGee*, 464 U.S. 238, 248 (1984), decision suggests. Rather, it is the pragmatic persuasiveness that nontort stimuli have more efficiently accomplished what a lawsuit would have done in the past that has preempted the field.

13. The comprehensive federal response has had at least these impacts. We eventually will see the full impact on both worker torts and workers' compensation claims, though it is too early for empirical data at this time.

14. See generally Priest, *The Invention of Enterprise Liability: A Critical History of the Intellectual Foundations of Modern Tort Law*, 14 J. LEGAL STUD. 461 (1985) (discussing the

Traditional doctrines of tort recovery focused on negligent conduct of the person responsible for labeling the chemical's container. Negligence looks to a duty to warn, breach of that duty, proximate cause, and injury.¹⁵ This traditional action offers limited relief to the worker who develops a chronic disease after a long latency period.¹⁶ Additionally, complex relationships between exposure levels and incidences of illness make it difficult to prove a specific breach of duty.¹⁷

Warranty actions assert the existence of an explicit or implied obligation to deliver cautionary information to the contracting customer.¹⁸ The third party nonpurchaser, such as the factory worker who has no economic relationship with the chemical manufacturer, rarely asserts a warranty claim. Preconditions to assertion of an implied warranty may prove insurmountable.¹⁹

Although a relatively new theory in tort law, strict liability dominates chemical products liability actions today.²⁰ Elements in a strict liability action include proximate cause, defect, an "unreasonably dangerous" condition of the product, and evidence that the dangerous condition existed when the product left the manufacturer's plant.²¹ Advocates often most bitterly contest whether the product's claimed deficiency of design or warning was "unreasonably dangerous."²²

For instance, in a suit by a worker burned by developing chemical assume that the chemical supplier conceded inclusion of a powerful acid in a developing solution and use of a warning covering some, but not all, potential

three alternative systems as they coexist today). For historical reasons, their interrelationship in modern tort theory is not entirely satisfactory. For an overview of the systems, see J. O'REILLY, *PRODUCT DEFECTS AND HAZARDS: LITIGATION AND REGULATORY STRATEGIES* ch. 2 (1987).

15. See generally W. PROSSER & W. KEETON, *supra* note 3.

16. This question has arisen where a party asserts a statute of limitations defense. See *Insurance Co. of N. Am. v. Forty-Eight Insulations*, 633 F.2d 1212, 1220 n.13 (6th Cir. 1980).

17. 1 *AMERICAN LAW OF PRODUCTS LIABILITY* 3D § 1:68 (1987) [hereinafter *ALPL* 3D].

18. See J. DOOLEY, *MODERN TORT LAW* § 32.23 (1983).

19. *Id.*

20. See generally Prosser, *The Fall of the Citadel (Strict Liability to the Consumer)*, 50 *MINN. L. REV.* 791 (1966) (the theory of strict liability dominates the products liability field as a whole).

21. *RESTATEMENT OF TORTS* § 402A (1965).

22. The term of art "unreasonably dangerous" most often appears in cases arising under *RESTATEMENT OF TORTS* § 402A (1965). See, e.g., *Bryant v. Technical Research Co.*, 654 F.2d 1337, 1343-45 (9th Cir. 1981). It remains a hotly debated, hard to define term, especially in warnings cases. See, e.g., Hubbard, *Efficiency, Expectation and Justice: A Jurisdictional Analysis of the Concept of Unreasonably Dangerous Product Defect*, 28 *S.C.L. REV.* 587, 604-21 (1977); Wade, *On the Nature of Strict Tort Liability for Products*, 44 *MISS. L.J.* 825, 832-33 (1973). See generally J. BEASLEY, *PRODUCTS LIABILITY AND THE UNREASONABLY DANGEROUS REQUIREMENT* (1981).

harms of the solution.²³ In most states, workers' compensation bars a suit against the employer even if exposure occurred under unusual working conditions. If the employee sues the chemical supplier, he must establish the element of "unreasonableness" of the warnings. Unreasonableness is measured by several key factors: the incidence of harm, the likelihood of the occurrence of harm, the severity of the injury likely to occur, and the foreseeability of injury.²⁴ The worker establishes these points to prove that the chemical mixture was "defective" because of its inadequate warnings and/or its unreasonably dangerous design features for workers handling the mixture.²⁵

Although an entire jurisprudence of strict liability has developed around three categories of "defects"—design, warnings, and manufacturing—courts analyze the strict liability "warning defect" cases in a manner much like the analysis of duty in negligence cases.²⁶ The standard applied considers foreseeability and duty.²⁷ The courts examine the choices involved in making the label decision, although a conduct-oriented evaluation is inappropriate in "pure" strict liability.²⁸ Thus, deficient warning litigation weighs more of the subjective manufacturer choice matters than the typical "design defect" case considers.²⁹

C. *How Tort Law Defines Standards of Care in Labeling*

The context and method of warning is relevant to the standard of care for product warning labels. Although labeling of chemical products intends to

23. Defendants concede the danger in many strict liability cases. They often contest the reasonableness of the warning given (if any) concerning that particular danger. Thus, prescription drugs may have side effects known to the manufacturer. The reasonableness of the manufacturer's failure to warn prescribing physicians of these side effects may then become the issue. See, e.g., *Wooderson v. Ortho Pharmaceutical Corp.*, 235 Kan. 387, 400, 681 P.2d 1038, 1049 (1984), cert. denied, 469 U.S. 965 (1985); see also *Wade*, supra note 22, at 845-46.

24. *J. O'REILLY*, supra note 14, at ch. 6; see also *Whitehead v. St. Joe Lead Co.*, 729 F.2d 238, 244-46 (3d Cir. 1984).

25. Parties typically take into account Dean Wade's well articulated criteria and other factors in their assessment of the unreasonableness standard. See *Wade*, supra note 22, at 837-38.

26. See *Woodill v. Parke Davis & Co.*, 79 Ill. 2d 26, 33-37, 402 N.E.2d 194, 198-99 (1980); *Bilotta v. Kelley Co.*, 346 N.W.2d 616, 621 (Minn. 1984); WASH. REV. CODE ANN. § 7.72.030(1)(b) (Supp. 1987) (establishing a negligence analysis in warnings cases); *J. O'REILLY*, supra note 14, § 6.2.

27. See, e.g., *Moran v. Faberge*, 273 Md. 538, 552-54, 332 A.2d 11, 20-21 (1975).

28. *Woodill*, 79 Ill. 2d at 38, 402 N.E.2d at 200 (Moran, J., concurring in part and dissenting in part).

29. Reasonableness of the product warnings chosen by the manufacturer is the central theme in "duty to warn" cases. See *Smith v. E.R. Squibb & Sons, Inc.*, 405 Mich. 79, 273 N.W.2d 476 (1979); RESTATEMENT OF TORTS § 402A comment j (1965); 3 ALPL 3D, supra note 17, § 34:28.

communicate risk information to the product user, different users receive the labeling in different contexts depending upon the product form at the time of delivery. Bulk chemicals move in rail car or tank truck shipments, and their safety labeling typically takes the form of an accompanying set of standardized documents explaining the chemical's risks.³⁰ Labels of chemicals moving into the plant by truck shipment often appear on the drums. Most industrial containers bear labels supplied by the manufacturer. However, some plants actually use chemicals placed in casually assembled containers refilled by the individual user, such as a janitor's pint of floor wax taken from a large drum.³¹ In standard practice, the manufacturer labels the drum to meet its own norms of voluntary industry label standards, while no labels appear on the more casual workplace containers.

Today, the law of warnings is unsettled. The courts imprecisely define the standard of care of adequate labeling applicable in negligence actions and in strict liability "warning defect" cases. Like most legal standards, the standard of care in workplace labeling has developed primarily through appellate review of jury instructions in serious injury cases.³² These trial court instructions are premised upon a narrow jury comparison of actual labels in the worker-plaintiff's location and testimony about industry knowledge and industry practices.³³

Subjective "norms" of labeling thrive in such an unsettled environment, and, predictably, experts will disagree about the adequacy of a label.³⁴ For example, plaintiff's experts typically testify about deficiencies in worker awareness of risks of a brand-named compound that omitted risk warnings of the illness the plaintiff contracted. This process results in haphazard and unsatisfactory liability judgments that undermine effective business planning. The chemical industry, an area of rapid, competitive change and high capital costs, demands predictable overhead costs for insurance on products and facilities.³⁵

30. Bulk shipments pose a problem in warning methods, particularly where the chemical shipped may have a variety of possible uses. *Pennwalt Corp. v. Superior Court*, 171 Cal. App. 3d 923, 925, 218 Cal. Rptr. 675, 677 (1985).

31. 29 C.F.R. § 1910.1200(f) (1987) (OSHA requirements for the labeling of workplace containers).

32. The large size of some awards and the potential precedential effect of the ruling make appellate review of the jury instructions in these serious injury cases more intense. *See, e.g., Lohrmann v. Pittsburgh Corning Corp.*, 782 F.2d 1156, 1164-65 (4th Cir. 1986).

33. *See* L. FRUMER & M. FRIEDMAN, *PRODUCTS LIABILITY* § 8.05[3]A (1986).

34. A new text book dealing with the law of warnings discusses an illustration of the testing that goes into the expert process. *See* W. VISCUSI & W. MAGAT, *LEARNING ABOUT RISK: CONSUMER AND WORKER RESPONSES TO HAZARD INFORMATION* app. (1987).

35. To a certain extent, chemical industry insurance problems result from uncertainties about products liability exposure. The exposure to products liability verdicts has increased

D. Intersection of Tort and Regulatory Warning Incentives

Regulations and product liability concerns interact to stimulate safety efforts in areas other than the workplace. Outside of the workplace contexts discussed above, a plaintiff injured in a nonworkplace setting looks to retail or transporter practices for a tort standard of care, and to the federal standards of transport labeling or of consumer product warning labels. Federal systems of transport and consumer product warning, in place for decades, afford a basis for comparison more objective than that of the "battle of experts" in a typical tort action.³⁶

The objective regulatory standard serves as a minimum, rather than a maximum, level of compliance.³⁷ Although defendants have attempted to equate regulatory compliance with satisfaction of a tort standard of care, a few controversial cases such as *Ferrebee v. Chevron Chemical Co.*³⁸ and *MacDonald v. Ortho Pharmaceutical Corp.*³⁹ have rejected such efforts. Jury-oriented tort law typically looks to the jury for a decision on "adequacy" of label warnings. Hence, tort law hesitates to accept dictation of the duty of care by government regulators. However, when courts do accept federal standards as some evidence of due care, the standards typically help to determine the adequacy of the warning.⁴⁰

Use of a federal standard as a minimum duty of care in a tort action may help the manufacturer-defendant, but it does not assure nonliability.⁴¹ Federal standards can cut against a defendant who clearly violates them. The worker-plaintiff then becomes an enforcer of the standard by asserting that

significantly in recent years. Long, *Product Liability Suits: Growing Concern to Chemical Firms*, 65 CHEMICAL & ENGINEERING NEWS, April 27, 1987, at 19.

36. Hazardous materials transportation legislation dates back to the early 1970's, but the Hazardous Materials Transportation Act of 1975, Pub. L. No. 93-633, 88 Stat. 2156 (codified as amended at 49 U.S.C. §§ 1801-1813 (1982 & Supp. III 1985)) implemented the first potent control system. The Federal Hazardous Substances Act of 1960, Pub. L. No. 86-613, 74 Stat. 372 (codified as amended at 15 U.S.C. §§ 1261-1276 (1982)), was the first major consumer product labeling law, modeled in part upon the Food, Drug, and Cosmetic Act of 1938, 21 U.S.C. §§ 301-392 (1982), which dates back to the Food and Drug Act of June 3, 1906, ch. 3915, 34 Stat. 768, *repealed by* Food, Drug, and Cosmetic Act of 1938, ch. 675, 52 Stat. 1040, 1059.

37. Federal standards usually set a minimum duty, but compliance evidence can help. *See, e.g., Smith v. Firestone Tire & Rubber Co.*, 755 F.2d 129, 132-34 (8th Cir. 1985). As to Occupational Safety and Health Administration compliance as evidence of care, see *Loznicka v. Flexitallic Gasket Co.*, 489 So. 2d 1229, 1230 (Fla. Dist. Ct. App. 1986).

38. 736 F.2d 1529 (D.C. Cir.), *cert. denied*, 469 U.S. 1062 (1984).

39. 394 Mass. 131, 475 N.E.2d 65, *cert. denied*, 474 U.S. 920 (1985).

40. *See* 3 ALPL 3D, *supra* note 17, § 34:34.

41. In *Ferrebee*, compliance with a mandatory label requirement met a minimum duty of care, but did not excuse the manufacturer from liability for nonlabeling of "known" risks. 736 F.2d at 1542.

inadequacy of the label constitutes negligence per se.⁴² While these theories establish liability from violation of the law or regulation itself, they do not prove breach of a duty to an individual user.⁴³ Thus, in cases with vague standards, a plaintiff might find it easier to prove negligent label design than to prove a clear violation of vague federal labeling standards. Before federal requirements for workplace hazard communication went into effect in 1986,⁴⁴ the utility of labeling regulations for offensive or defensive use was uncertain.

E. Defenses

When a worker challenges the label of a workplace chemical as giving inadequate warning, the challenge implicitly asserts that the manufacturer deprived the worker of a means of self-protection. The key defenses in industrial products liability cases include lack of proof of causation, intervening causation defeating the proximate cause assertion, and assumption of risk.⁴⁵

Causation is often difficult to prove in chronic disease cases where a worker asserts that chemical exposure resulted in cancer, reproductive problems, or serious disease.⁴⁶ The manufacturer can assert plausible, alternative medical causation arguments in most cases. For example, establishing the smoking habits of a chemical handling worker-plaintiff who later developed a lung condition undermines causation.⁴⁷ The scientific controversies played out in tort trials include the effects of natural carcinogens, the impact of lifestyle factors such as diet and smoking, and the predilection or heredity factors in development of some cancers.⁴⁸

When debating causation, the worker-plaintiff asserts that illness would

42. To use a violation of an OSHA rule as negligence per se in a tort action, the plaintiff first must show an independent cause of action "established by either state or federal law which establishes the right of an employee to be free from negligence, the duty of the employer to take reasonable precautions, and the liability of the employer for injuries caused by the failure to take reasonable precautions." *Pratico v. Portland Terminal Co.*, 783 F.2d 255, 265 (1st Cir. 1985).

43. Labels for drugs and other closely regulated products could be subject to such eager policing of the regulatory norms. See O'Reilly, *Deregulation and Private Causes of Action: Second Bites of the Apple*, 28 WM. & MARY L. REV. 235, 238 (1987); Walsh & Klein, *The Conflicting Objectives of Federal and State Tort Law Drug Regulation*, 41 FOOD DRUG COSM. L.J. 171 (1986).

44. 29 C.F.R. § 1910.1200 (1987); see also *infra* notes 84-95 and accompanying text.

45. J. O'REILLY, *supra* note 14, §§ 8.3, 7.5, 7.7.

46. L. Novey, *supra* note 5, at 101; see also *Technical Chem. Co. v. Jacobs*, 480 S.W.2d 602, 606 (Tex. 1972); RESTATEMENT OF TORTS § 402A comment j (1965); 3 ALPL 3D, *supra* note 17, § 34:32.

47. L. Novey, *supra* note 5, at 101, 117.

48. Cancer causation is probably the most frequently disputed issue. *Id.* at 29-33.

not have occurred if warnings had appeared on containers because the worker would have implemented self-protection.⁴⁹ The defense to such an allegation raises alternative causation issues and argues that exposure levels to particular workplace chemicals vary with factors such as methods of use, ventilation, purity of the chemical, and percentage of the mixture comprising the toxic material.⁵⁰ The proximate causation of the injury by the omissions of warnings from the label poses a debate over the permissibility of alternative inferences.⁵¹

Many industrial tort cases involve the conduct of an employer who is not a defendant because of workers' compensation barriers. A defense may be raised that the manufacturer tried to send information to the workers, but the employer failed to deliver it.⁵² If the intervening cause defense works, and the forum state does not require apportionment of liability in tort cases,⁵³ the worker will collect no more than his or her workers' compensation payments for that disabling illness.⁵⁴ Cases that assert the chronic-disease inadequacies of workers compensation systems may resolve debate over whether to allow actions for intentional torts, beyond workers' compensation.⁵⁵

Assumption of risk defenses by manufacturers typically have not succeeded. Workers benefit from tort law's presumption that if a product had been adequately labeled, the worker would have heeded the warning and prevented injury.⁵⁶ However, even in cases where the manufacturer estab-

49. See RESTATEMENT OF TORTS § 402A comment j (1965); 3 ALPL 3D, *supra* note 17, § 34:32; see also *Technical Chem. Co.*, 480 S.W.2d at 606.

50. For example, the manufacturer of a basic chemical may present the alternative causation assertion that repackaging of the product by an intermediate supplier removed the original firm's duty. See *Nigh v. Dow Chem. Co.*, 634 F. Supp. 1513, 1518 (W.D. Wisc. 1986); see also R. EPSTEIN, *MODERN PRODUCTS LIABILITY LAW* 98 (1980).

51. J. O'REILLY, *supra* note 14, §§ 7.5, 7.6; see also *Lohrmann v. Pittsburgh Corning Corp.*, 782 F.2d 1156, 1161-64 (4th Cir. 1986); *Marder v. G.D. Seale & Co.*, 630 F. Supp. 1087 (D. Md. 1986), *aff'd sub nom. Wheelahan v. G.D. Seale & Co.*, 814 F.2d 655 (4th Cir. 1987).

52. *Bryant v. Technical Research Co.*, 654 F.2d 1337, 1348 (9th Cir. 1981); *Hopkins v. Chip-In-Saw Inc.*, 630 F.2d 616, 621 (8th Cir. 1980); *Martinez v. Dixie Carriers Inc.*, 529 F.2d 457, 463 (5th Cir. 1976).

53. See V. SCHWARTZ, *COMPARATIVE NEGLIGENCE* 209 (2d ed. 1986).

54. For an example of a state that does require apportionment, see N.Y. CIV. PRAC. L. & R. 1402 (McKinney 1982). State legislation may require the apportionment of liability among defendants, see, e.g., *Forsythe v. Coats Co.*, 230 Kan. 553, 558, 639 P.2d 43, 46 (1982), or common law may do so. See, e.g., *Safeway Stores v. Nest-Kart*, 21 Cal. 3d 322, 327, 579 P.2d 441, 446, 146 Cal. Rptr. 550, 555 (1978); *Dole v. Dow Chem. Co.*, 30 N.Y.2d 143, 150, 282 N.E.2d 288, 295, 331 N.Y.S.2d 382, 391 (1972).

55. See ALI REPORT, *supra* note 11, at 17.

56. RESTATEMENT OF TORTS § 402A comment j (1965); see also, *Technical Chem. Co. v. Jacobs*, 480 S.W.2d 602, 606 (Tex. 1972); Sales, *The Duty to Warn and Instruct for Safe Use in Strict Tort Liability*, 1982 DEF. L.J. 267, 307.

lishes adequate labeling, courts hesitate to penalize workers for their failure to avoid risks associated with capital equipment, even if the identical defense would be successful in a consumer suit to recover for exposure to the same properly labeled product.⁵⁷ Fear of loss of employment and the employee's duty to comply with the employer's workplace commands intervene when the manufacturer argues that the worker-plaintiff's improper use assumed the risk of injury.⁵⁸

The 1987 case of *Sprinkle v. Bower Ammonia & Chemical Co.*⁵⁹ may indicate a shift in acceptance of the assumption of risk defense in chemical liability actions. In *Sprinkle*, the president of the local chemical workers' union at a chemical plant received written material about the dangers of ammonia and refused to clean an ammonia tank because "he knew what he was getting in to."⁶⁰ Finding proper for the jury questions regarding adequacy of the warning and existence of a "probable cause" connection between ammonia warning information deficiencies and plaintiff's injury, the court affirmed the judgment in favor of the defendant company on both strict liability and negligence grounds.⁶¹ In future cases, especially in light of increased information flow to workers that results from federal regulation, similar warnings may bar recovery by workers who assume risks of exposure after receipt of safety data.

II. FEDERAL STANDARDS

A. *The Regulatory System of OSHA*

The Occupational Safety and Health Act of 1970 (the OSH Act)⁶² authorizes federal safety regulators of the Occupational Safety and Health Administration (OSHA) to adopt safety standards to deal with specific chemicals that pose "significant" health risks.⁶³ Additionally, the OSH Act gives OSHA broad residual power to enforce certain standards against employers who breach the general duty to make the workplace free of hazards.⁶⁴

57. See *McCracken v. Westinghouse Air Brake Co.*, 103 Ill. App. 3d 26, 29-30, 430 N.E.2d 539, 542 (1982); *Coty v. U.S. Slicing Machine Co.*, 58 Ill. App. 3d 237, 245-46, 373 N.E.2d 1371, 1377-78 (1978).

58. See *McCracken*, 103 Ill. App. 3d at 26, 430 N.E.2d at 539; *Reed v. Pennwalt Corp.*, 22 Wash. App. 748, 751, 591 P.2d 478, 481 (1979); *Shell Oil Co. v. Gutierrez*, 119 Ariz. 426, 433, 581 P.2d 271, 278 (1978).

59. 824 F.2d 409, 416 (5th Cir. 1987).

60. *Id.* at 412.

61. *Id.* at 414, 416.

62. 29 U.S.C. §§ 651-675 (1982 & Supp. III 1985).

63. *Industrial Union Dep't, AFL-CIO v. American Petroleum Inst.*, 448 U.S. 607, 615 (1980) (interpreting 29 U.S.C. § 655(b)).

64. 29 U.S.C. § 654(a)(1).

A chemical plant must meet both requirements in the typical course of production: it must conform to the "general duty" clause by keeping the workplace safe; and it must monitor for lead, benzene, and other specifically regulated chemicals under a specific regulatory standard.⁶⁵ The former involves general safety measures protecting workers from excessive accumulation of noxious fumes,⁶⁶ while the latter allows workers to understand the potential problems that would be created if workplace air became laden with a dust or an airborne contaminant at a level greater than the maximum OSHA deems to be safe.⁶⁷ For example, OSHA subjected benzene, a petroleum-based chemical widely used in the American workplace, to a mandatory workplace safety standard after extensive litigation.⁶⁸ The United States Supreme Court and lower appellate courts⁶⁹ have interpreted frequently the power of OSHA to set standards for specific chemical products.⁷⁰ The OSHA standards on lead, benzene, and cotton dust have presented the federal courts with interesting issues of scientific proof and regulatory procedure.⁷¹

Typically, an OSHA standard requires application of certain protective controls to the handling and use of the standard's named toxic chemicals. For example, OSHA may require application of a label with a prescribed warning to the containers of a specific chemical in the workplace,⁷² regular monitoring for workplace exposure to determine that exposure does not ex-

65. 29 C.F.R. § 1910(Z) (1987). In 1987, the Occupational Safety and Health Administration (OSHA) finally issued its standard for benzene. See 52 Fed. Reg. 34,460 (1987).

66. See *United Automobile, Aerospace and Agricultural Implement Workers v. General Dynamics*, 815 F.2d 1570, 1573 (D.C. Cir. 1987). Congress adopted these specific standards under 29 U.S.C. § 655(b)(7), which encourages labeling and other forms of communication of risks to the employees.

67. See *Industrial Union Dep't, AFL-CIO*, 448 U.S. at 627.

68. *Id.* at 630; see also *American Textile Mfrs. Inst. v. Donovan*, 452 U.S. 490, 540 (1981).

69. See, e.g., *AFL-CIO v. Marshall*, 617 F.2d 636, 654-55 (D.C. Cir. 1979), *aff'd in part, vacated in part, remanded sub nom.* *American Textile Mfrs. Inst. v. Donovan*, 452 U.S. 490, 540 (1981); *American Petroleum Inst. v. OSHA*, 581 F.2d 493, 503 (5th Cir. 1970), *aff'd on other grounds, sub nom.* *Industrial Union Dep't, AFL-CIO v. American Petroleum Inst.*, 448 U.S. 607, 613 (1980).

70. Hadley & Richman, *The Impact of Benzene and Cotton Dust: Restraints on the Regulation of Toxic Substances*, 34 ADMIN. L. REV. 59, 70 (1982).

71. *Id.*; see also *United Steelworkers of Am. v. Marshall*, 647 F.2d 1189, 1193 (D.C. Cir. 1980), *cert. denied*, 453 U.S. 913 (1981); Rothstein, *Substantive and Procedural Obstacles to OSHA Rulemaking: Reproductive Hazards as an Example*, 12 B.C. ENVTL. AFF. L. REV. 627, 694 (1985).

72. The label required by the standard on benzidine for containers in the workplace, for example, requires display of the words "CANCER SUSPECT AGENT" immediately under or adjacent to the identification of the container's contents. 29 C.F.R. § 1910.1010(e)(1) (1987).

ceed the OSHA threshold level,⁷³ or training and examination of workers including in some cases health screening of lung functions or blood levels to lessen the adverse health effects of working with the chemicals.⁷⁴ If an employer monitors workplace or individual health, workers have an absolute right to see the collected data.⁷⁵ Complaints to OSHA may result in inspections, monitoring, and civil penalty fines with abatement orders against the employer.⁷⁶

Design of the total package of controls in an OSHA standard for a specific chemical addresses that chemical's probable uses. Communication to workers covers a chemical's use in typical workplaces by taking into consideration use patterns, restrictions, and other relevant factors. Even where a specific chemical safety standard does not apply to a workplace situation, or the workplace meets the minimum level standard, the worker may have additional protection against inadequate communication of risks. For example, in *Auto Workers v. General Dynamics*,⁷⁷ the United States Court of Appeals for the District of Columbia Circuit held that if an employer knows from reasonable experience that a danger exists beyond the terms of the OSHA standard, the employer must meet the OSH Act's "general duty" clause as well as the terms of the specific standard.⁷⁸ The court's interpretation of the "general duty" clause as an umbrella as well as a floor on chemical regulation is clearly significant. Notably, Judge James Buckley, a former Senator who had been critical of OSHA as a legislator, authored *General Dynamics*.⁷⁹

Because of the labor-intensive effort that goes into each regulatory standard, the creation of a workplace standard for exposure to specific chemicals is only feasible for a narrow set of substances.⁸⁰ In contrast, the "general duty" clause covers the wider set of "knowingly" unsafe workplace conditions, which require communication of warnings when the employer has

73. See, e.g., 29 C.F.R. § 1910.1018(e) (1987) (workplace testing required for inorganic arsenic).

74. See, e.g., Special Provisions for Workers Exposed to Lead, 29 C.F.R. § 1910.1025(d), (j), (l) (1987).

75. 29 C.F.R. § 1910.20(e)(2) (1987).

76. See, e.g., *Whirlpool Corp. v. Marshall*, 445 U.S. 1, 4 (1980); *Marshall v. Barlow's Inc.*, 436 U.S. 307, 309 (1978).

77. 815 F.2d 1570, 1576 (D.C. Cir. 1987).

78. 29 U.S.C. § 654(a)(1). "Each employer—(1) shall furnish to each of his employees employment and a place of employment which are free from recognized hazards that are causing or are likely to cause death or serious physical harm to his employees" *Id.*

79. 815 F.2d at 1571.

80. OSHA spends a tremendous amount of effort on each chemical-specific standard. Some scholars have criticized this procedural cost. See S. BREYER, REGULATION AND ITS REFORM 180-81 (1982); Rothstein, *supra* note 71, at 662-63.

knowledge of the hazardous working condition.⁸¹ "Scienter is the key," the court emphasized in *General Dynamics*.⁸² That proverb is relevant to the next level of federal interposition into label warnings—the performance-oriented hazard communication standard, which became effective in May 1986.⁸³

B. *The Hazard Communication Standard*

OSHA published the hazard communication standard as a final rule in November 1983, allowing a phase-in period for industrial concerns to achieve compliance with minimal disruption.⁸⁴ A mandatory federal program of chemical hazard communication took effect in May 1986 for all manufacturing establishments regulated by OSHA and its state counterparts.⁸⁵ In 1987, after extensive litigation, the United States Court of Appeals for the Third Circuit ordered OSHA to expand the regulatory requirements to reach all employers.⁸⁶ Thus, the hazard communication standard now applies, with very limited exceptions, to every OSHA-regulated workplace, whether manufacturing or nonmanufacturing.⁸⁷

A key aspect of the hazard communication standard is that it is a performance-oriented standard that directs an end result, not a specific set of words. Under the performance orientation standard, nonexempt employers must implement labeling and training programs but are free to choose the method and manner of implementation. The chemical manufacturer-employer must transmit required information to its employees and to the employees of "downstream" purchasers. The standard permits employers to design their own training and labeling programs, utilizing communications

81. 29 U.S.C. § 654(a)(1).

82. 815 F.2d at 1576.

83. 29 C.F.R. § 1910.1200 (1987), amended by 52 Fed. Reg. 31,852, 31,877 (1987). Courts generally willingly consider OSHA standards as part of workplace tort actions. See, e.g., *Rabon v. Automatic Fasteners Inc.*, 672 F.2d 1231, 1238 (5th Cir. 1982). However, the stronger of two competing lines of case precedent absolves a civil tort defendant of "negligence per se" liability for downstream recipients of its product and other nonemployees of the company itself. For example, *X* company may violate an OSHA regulation intended to protect *X*'s employees, and if so may be liable for negligence per se if other jurisdictional requirements are met. However, employees of *Y* company, a recipient purchaser of *X*'s packaged chemicals, cannot invoke the negligence per se argument against *X* because no OSHA "employer" status applies. See *Melerine v. Avondale Shipyards Inc.*, 659 F.2d 706, 711 (5th Cir. 1981).

84. 48 Fed. Reg. 53,331 (1983). OSHA intended that the phase-in period would allow sufficient time for the implementation of the standard without maximum costs to the regulated firms, as the preamble to the regulation explained. *Id.* OSHA imposed a much briefer period for the later expanded version of the standard. 52 Fed. Reg. 31,867 (1987).

85. 29 C.F.R. § 1910.1200 (1987).

86. *United Steelworkers of Am. v. Auchter*, 763 F.2d 728, 739 (3d Cir. 1985).

87. 52 Fed. Reg. 31,852 (1987).

such as employer-designed labels and material safety data sheet design, to meet the standard.⁸⁸ Flexibility in the methods chosen for performance, however, reduces predictability that the warning will forestall liability challenges asserted against that manufacturer. An ironclad regulatory requirement might ease in-court proof of the adequacy of labeling as compared with proof under the self-determined manufacturer and customer systems of administering individualized training programs.⁸⁹

Compliance with a performance orientation standard enhances the preparation of a defendant's claim that the government standard had been met. OSHA is more particular about some aspects of performance; for example, it requires chemical labeling and material safety data sheets to identify target organs that a chemical may harm.⁹⁰ OSHA issued a standard data sheet format as a model, but individualized sheets remain adequate if they supply at least the minimum safety data required by OSHA.⁹¹ More sophisticated manufacturing firms will have more elaborate data sheets available, but the performance standard does not command uniformity in the OSHA regulation.⁹² Each nonexempt employer may develop its own sheets or rely on the original manufacturing company's sheet. If an employer fails to meet the requirements of the hazard communication standard, OSHA may impose a civil penalty and demand corrective action within a reasonable abatement

88. OSHA intended this standard to be "stated largely in performance language," according to the preamble to the final standard. 48 Fed. Reg. 53,321 (1983); see also *Auchter*, 763 F.2d at 728.

89. The performance orientation "will require more interpretation from employers and compliance officers" because of a "lack of understanding of the broad scope of the standard," according to the deputy director of field operations for OSHA. Minter, *OSHA's 1986 Agenda*, OCCUPATIONAL HAZARDS, Dec. 1985, at 61-63. The field instructions for OSHA inspections became more important as the agency moved to the performance approach. See, e.g., *H.C. Standard Enforcement Added to Field Operations Manual*, RIGHT-TO-KNOW NEWS, Nov. 1, 1986, at 5. However, the field inspector and administrative judge have greater difficulty producing consistent results with such a rule than with an explicit command. See O'Reilly, *The Impact of Performance-Oriented Rules on Administrative Enforcement: The Case of OSHA Hazard Communication Rules*, 2 LAB. LAW. 695, 722 (1986).

90. Target organs are parts of the body to which a specific chemical apparently migrates after it is ingested, inhaled, or absorbed through the skin. OSHA expects manufacturers to list the organ on the data sheet and label so that the worker will pay more attention to the warning than to a mere "do not inhale" statement. See 52 Fed. Reg. 31,864 (1987).

91. OSHA chose not to make its form mandatory, and, indeed, it recognized the appropriateness in some plants of an alternative to the material safety data sheet, such as a written manual. 48 Fed. Reg. 53,337 (1983).

92. Indeed, even regulators have difficulty adapting to a flexible approach. An attitude adjustment problem may exist in the field inspection process. Government inspectors familiar with more rigid precision in regulation, and hearing officers who review their penalty citation charges, need to be reoriented to allow varieties of performance under the same standard without faulting the employers who meet the standard in creative new ways. See O'Reilly, *supra* note 89, at 707.

period.⁹³ A posted federal notice alerts workers that OSHA has issued a charge of violation.⁹⁴

The hazard communication standard has produced tremendous expansion in workplace safety communications, with emphasis on acquisition of safety data and training of workers. Due to the regulation's economic incentive for employers to "tell all" about hazardous chemicals and to create training records of specific workers for specific chemicals during specific time periods, seminars, films, educational materials, and other means of compliance have increased dramatically.⁹⁵ Participation in such activities strengthens the tort defense of chemical manufacturers.

The communication benefit of the hazard communication standard favorably compares with state worker "right-to-know" legislation because states frequently have insufficient funds to enforce their laws.⁹⁶ Apart from the State of New York, the most publicity-conscious enforcer of chemical disclosure law, states have not aggressively enforced their requirements for risk communication.⁹⁷ By effectively preempting state and local workplace labeling laws,⁹⁸ the OSHA hazard communication standard has delivered a more effective enforcement mechanism for assuring uniform workplace communications from coast to coast.

Early litigation regarding OSHA's hazard communication standard challenged its adoption and preemptive effects. However, the courts have upheld OSHA's legal authority to enact the standard and have affirmed most of the

93. 29 U.S.C. § 658. The functions of charging and determining liability are separate; OSHA cites the employer for violation and the independent Occupational Safety and Health Review Commission adjudicates the charges. 29 U.S.C. §§ 659, 661. See generally Johnson, *The Split-Enforcement Model: Some Conclusions From the OSHA and MSHA Experiences*, 39 ADMIN. L. REV. 315 (1987).

94. The Bhopal, India disaster in 1984 has emphasized the need for visibility of enforcement and in-depth inspection of chemical facilities. OSHA, SYSTEMS SAFETY EVALUATIONS OF OPERATIONS WITH CATASTROPHIC POTENTIAL, CPL 2-2 (1987). OSHA has imposed large fines on violators of the hazard communications and recordkeeping rules, such as the \$480,840 proposed penalty for a Connecticut fabric coating company. See *OSHA Fines Uretex, Inc.*, RIGHT-TO-KNOW NEWS, Aug. 15, 1987, at 9.

95. OSHA requires recordkeeping regarding employee training as part of the written hazard communication program. 29 C.F.R. § 1910.1200(e), (h) (1987). However, the standard does not literally require that the employer record which employee received training at which time.

96. Funding of such laws is usually part of the appropriations for the state labor department. In states that adopted their own OSHA plans, as permitted by 29 U.S.C. § 667(b), the state must fund its own safety communication program.

97. See *New York Enforces R-T-K for Office Workers*, RIGHT-TO-KNOW NEWS, Jan. 15, 1987, at 6 (when office workers complained of exposure to methylene chloride, hexane, and trichloroethane, employer paid \$5,000 in fines and was forced to give training courses and instructions).

98. 29 C.F.R. § 1910.1200(a)(2) (1987).

provisions of the standard while clarifying the trade secret definition and ordering expansion of the types of employers covered.⁹⁹ OSHA added hospitals, transportation, warehousing, and retail sectors of the economy to the mandatory category of employers required to train workers about cautionary labels, the need for protection, and potential harms of exposure to chemicals.¹⁰⁰

The hazard communication standard has the potential to bring the least sophisticated firms up to a reasonable level of safety communication and to improve the safety labeling practices of even the most cautious firms.¹⁰¹ While it may be 1989 before the OSHA inspectional process reaches the smallest regulated firms to compel compliance, the enforcement process began with such vigor and publicity that the standard is generally regarded as a success.¹⁰²

Violations charged by OSHA inspectors may lead to a proposed civil penalty case. The independent Occupational Safety & Health Review Commission (the Commission), whose decisions eventually reach the federal appellate courts, may settle or adjudicate such cases.¹⁰³ Early enforcement decisions by the Commission suggest that the standard receives strong enforcement support through the penalty hearings process.¹⁰⁴ Apparently, even in cases where the manufacturer did not anticipate the activities of the

99. See *Manufacturers Ass'n of Tri-County v. Knepper*, 801 F.2d 130, 140-42 (3d Cir. 1986) (sections of Pennsylvania statute preempted by OSHA Act), *cert. denied*, 56 U.S.L.W. 3242 (U.S. Oct. 6, 1987) (No. 86-1102); *Ohio Mfrs. Ass'n v. City of Akron*, 801 F.2d 824, 831-34 (6th Cir. 1986) (city ordinance preempted by OSHA Act), *cert. denied*, 56 U.S.L.W. 3240 (U.S. Oct. 6, 1987) (No. 86-1242); *New Jersey State Chamber of Commerce v. Hughey*, 774 F.2d 587, 595 (3d Cir. 1985) (sections of New Jersey statute preempted by OSHA Act); *United Steelworkers of Am. v. Auchter*, 763 F.2d 728, 739-42 (3d Cir. 1985) (clarifying definition of trade secret).

100. Addition of other categories of employees covered by the standard, into the standard industrial classification categories, was delayed pending reconsideration. 52 Fed. Reg. 31,852 (1987) (codified at 29 C.F.R. § 1910.1200 (1987)).

101. While it is too soon after adoption to have empirical evidence, it is generally believed that enforcement of a minimum standard of safety-related communications against small firms will motivate all other firms to improve their practices.

102. Enforcement of the standard is discussed in O'Reilly, *supra* note 89, at 728.

103. Section 661 of the OSHA Act established the Commission, 29 U.S.C. § 661, and review of its adjudicatory final orders is available in the federal courts of appeals, 29 U.S.C. § 660(a)-(b). The independence of the enforcement adjudication process has both positive and negative effects. See Johnson, *supra* note 93, at 347; O'Reilly, *supra* note 89, at 729.

104. See, e.g., *Secretary of Labor v. Hilton-Davis Chem. Co.*, 14 O.S.H. Rep. (BNA) (13 O.S.H. Cas.) 1182 (Apr. 2, 1987) (Burrroughs, ALJ) (first significant enforcement decision upholding "target organ" label requirements); see also *Failure to Label, Complete Data Sheets Results in Majority of 156 OSHA Citations*, Daily Lab. Rep. (BNA) No. 60, at A-3 (Mar. 28, 1986) (if OSHA could "link the lack of a label on a chemical drum to an injury, the employer could receive a serious citation").

downstream customer-employer, ambiguities in the performance standard are being resolved in favor of expanded risk communications.¹⁰⁵ OSHA inspectors actively police the communication chain between label design, employee training, and worker use.¹⁰⁶ It can be predicted that enforcement will compel the use of comprehensive workplace warnings, which workers will understand and follow.

C. SARA Reinforcement of Hazard Communications

By the end of 1988, new reporting requirements pertaining to industrial chemical risks will become operative. The "community right to know" provisions of the 1986 Superfund Amendments and Reauthorization Act (SARA)¹⁰⁷ go into effect in four phases. Each phase will increase the ability of persons outside the factory, as well as workers inside, to learn about potential chronic illness risks posed by the chemical facility.¹⁰⁸ SARA requires factories that handle in excess of a certain quantity of chemicals to report to local and state officials: (1) the presence of any of the several hundred chemicals designated to be extremely hazardous;¹⁰⁹ (2) detailed figures relating to the release, spill, or emission of any of several hundred toxic chemicals;¹¹⁰ (3) an inventory of location, quantity, and conditions of use of any OSHA-regulated chemical subject to the hazard communication standard;¹¹¹ and (4) material safety data sheets for all of these "OSHA-hazardous" chemicals.¹¹²

By mid-1988, a resident of the community, a worker, or a prospective applicant for a job will be able to review detailed chemical data to reach independent conclusions about the safety of working at or living near a factory. The local fire department, the local emergency response committee

105. *Hilton-Davis Chem. Co.*, 14 O.S.H. Rep. (13 O.S.H. Cas.) at 1182, involved an OSHA charge that the manufacturer had a duty to anticipate and warn against misuse. The manufacturer's label reflected its recommended use of the chemical, but the administrative law judge ruled that labels also should consider other possible uses. *Id.* at 1195-96.

106. See O'Reilly, *supra* note 89, at 725.

107. 42 U.S.C. §§ 11001-11049 (Supp. V 1987) [hereinafter SARA].

108. The first phase of reporting under SARA is to identify, for state governments, every facility in which an extremely hazardous chemical is present. See 52 Fed. Reg. 2836 (1987) (to be codified at 40 C.F.R. pt. 370) (proposed Jan. 27, 1987). Next, EPA makes public material safety data sheets for chemicals present at a level above a threshold, which EPA has set at 10,000 pounds. *Id.* Inventories of "hazardous" chemicals must be reported in March of 1988 and successive years. *Id.* The final stage is a complex, annual report of discharges of hazardous materials into the environment from a facility under § 313 of SARA. 52 Fed. Reg. 21,152 (1987) (to be codified at 40 C.F.R. pt. 372) (proposed June 4, 1987).

109. 42 U.S.C. § 11023.

110. *Id.* § 11004.

111. *Id.* § 11022.

112. *Id.* § 11021.

(usually an arm of civil defense), and the state government will make sets of documents available.¹¹³ A site-specific computer data base, maintained by the Environmental Protection Agency (EPA), will contain portions of this reported data.¹¹⁴ These new sources of data will provide workers and the public with previously unavailable safety information.¹¹⁵ Due to the availability of this information, public sector officials and private persons can make much more accurate decisions regarding plant safety.

From a tort liability perspective, the SARA information is a road map to the fulfillment of a tort plaintiff's burden of proof. As an example, a worker-plaintiff, employed in three different chemical facilities for ten-year intervals at each plant, who knows the trade names of the primary chemicals used at each of those sites will be able to check the adverse health effect warnings for each of those chemicals. A worker-plaintiff with liver cancer will be able to check the cancer warnings on a chemical that the worker used without gloves over ten years ago.¹¹⁶ Plant emissions and disposal figures will permit a worker-plaintiff to attempt to learn more about the particular types of occupational exposures that may have caused ill effects that would give rise to a cause of action.¹¹⁷ If the worker hauled trash or made contract repairs, he or she may be able to use SARA data as the primary source of information about exposures alleged to have caused his or her illness.¹¹⁸ At a minimum,

113. These are available to the public at each of the reporting locations to which that plant is required to send its reporting forms. *Id.* § 11044(a).

114. The Environmental Protection Agency (EPA) has a statutory duty to automate this data for public access. *Id.* § 11231 (Supp. IV 1987).

115. No alternative public source was available for this data prior to the adoption of the 1986 legislation, though portions could have been compiled from industry data by soliciting material safety data sheets from "downstream" customers pursuant to 29 C.F.R. § 1910.1200(f)(2) (1987), or perhaps by using other local sources of information. Access to detailed process or ingredient information by workers during training under the hazard communication standard, *id.* § 1910.1200(h)(1)(ii), did not automatically make the information public because many workers have express or implied confidentiality obligations.

116. Although evidentiary rules generally prohibit the admission of post-accident redesign to show defectiveness as of the time of the accident, FED. R. EVID. 407, a defense asserting lack of feasibility could open the way for such evidence. *See Jacobson v. Manfredi*, 100 Nev. 226, 231, 679 P.2d 251, 254 (1984). Alternatively, a plaintiff might argue that remedial measures, such as warnings, were implemented before the cause of action accrued. Typically, cancer may have a long latency period so knowledge of the cancer might come after the warning. This will be a novel debate when the proper case occurs.

117. The data available to the public as a result of SARA "discharge" reporting under 42 U.S.C. § 11023 will be useful to an injured worker or former employee whose illness was caused by one of the "toxic" chemicals to which such release reports relate. A plaintiff can obtain more specific data about volumes of releases from the plant and can tie such information into the in-plant location data to estimate exposure histories. *See Id.* § 11022.

118. These workers are on the site but are not eligible for the same qualitative treatment as employees. They have rights under the hazard communication standard from their respective employers. 29 C.F.R. § 1910.1200 (1987). However, because these workers operate on a cas-

SARA delivers to the chronically ill worker-plaintiff information with which he or she may build a more complete causal connection between exposure and illness, thereby providing a foundation for further analysis by his or her medical experts.¹¹⁹

Requiring each local committee to advertise the availability of the public data file once per year assures workers awareness of the availability of SARA safety information.¹²⁰ Public access to mandatory "hazard analysis" documents probably will result in news reports by the local media on the findings of hazard analyses of facilities in the community. Furthermore, groups such as the League of Women Voters and the Sierra Club will, in all likelihood, make extensive efforts to educate residents about the data.¹²¹

D. *The EPA Reinforcement of Hazard Communications*

In addition to the SARA and OSHA provisions, the EPA has begun development of a hazard communications program for workers who are exposed to certain "new" chemicals not previously marketed in this country. The Toxic Substances Control Act (TSCA)¹²² authorizes the EPA to place limitations on a worker's exposure to certain chemicals.¹²³ The EPA will select the categories from which chemicals will be regulated under TSCA from categories that will include chemicals not previously commercialized¹²⁴ and chemicals required to undergo EPA's new chemical screening process.¹²⁵ As a result of the chemical screening process, the EPA will have the

ual, contract, or noncontract service basis and have little awareness of the risks about which regular employees are warned, they may be more susceptible to harmful exposure situations. OSHA's expansion of the definition of the word "employer" to include contractors and subcontractors will increase information flow to these workers. Revision of Hazard Communications Standards, 52 Fed. Reg. 31,852, 31,864 (to be codified at 29 C.F.R. pts. 1910, 1915, 1917, 1918, 1926, 1928) (1987).

119. The data provides the plaintiff's medical expert with a biased source, for the expert will never see reports coming from the tobacco smoke, food, or beverages that the plaintiff may have ingested or from any other ingested or inhaled sources of carcinogens. The selectivity of the sources in these reports distorts the overall causative perspective. See L. Novey, *supra* note 5, at 135 (smoking distorts some occupational epidemiology studies).

120. 42 U.S.C. § 11044(b).

121. The individual's cumulative knowledge of the risk from all sources, not only employer or manufacturer warnings, is admissible to show assumption of the risk of misuse. See, e.g., *American Mutual Liability Ins. Co. v. Firestone Tire & Rubber Co.*, 799 F.2d 993, 995 (5th Cir. 1986).

122. 15 U.S.C. §§ 2601-2629 (1982) [hereinafter TSCA].

123. 15 U.S.C. § 2605(a)(1)-(3), authorizes control of existing chemicals and 15 U.S.C. § 2504, authorizes control of "new" chemicals not previously in commerce.

124. 15 U.S.C. § 2604 provides the criteria for determining whether a chemical is to be considered "new", and the requirements for complying with the EPA Administrator's rules for the manufacture and use of a new chemical. *Id.*

125. 40 C.F.R. pt. 720 (1987), discusses the new chemical review process.

power to impose a warning requirement on the use of the screened chemical to limit potentially unsafe worker exposure.¹²⁶ The warning requirement could include EPA-mandated labeling, material safety data sheets, and employee training.¹²⁷ Manufacturers could be required to label new chemicals before they reach the workplace.¹²⁸ The EPA views these measures as necessary to limit the risks from new chemicals, the effects of which are not yet fully understood.¹²⁹

The EPA program and the OSHA hazard communication standard further the same goal of worker risk notification.¹³⁰ However, because the EPA program is prospective and deals with new chemicals only, it will have a slight effect, if any, on current products liability exposure.

III. DIFFICULTIES IN ASSESSING THE IMPACT OF THE NEW FEDERAL SYSTEM IN TORT CASES

Employers are responsible for the collection and assembly of safety data, as well as the effective education of workers under the OSHA, SARA, and EPA systems. The inability of some employers to collect, process, and interpret safety data inherently weakens the quality of communication and hinders efforts to assess the effectiveness of these worker-protection programs.

Two difficulties exist in weighing the impact of federal regulation upon tort exposure. Both relate to conditions at the workplace of the particular employer. The first problem stems from lack of employer sophistication: a function of an employer's awareness of new rules, awareness of toxic chemicals, ability to process incoming paperwork from suppliers about these chemicals, and ability to foresee a risk situation. The proper response to this problem is for manufacturers to promote voluntary education of employees and users.

The second problem involves the strength of disincentives where the small plant with the lowest cost-of-production wins contracts, but also declines to pay for the engineering controls needed to alleviate a potential risk situation

126. *Id.*

127. 40 C.F.R. §§ 722.70-722.75 (1987).

128. *Id.* The regulations would require labeling of mixtures containing a "new" chemical before its introduction into the workplace.

129. The TSCA program is analogous to the clearance procedure conducted for a new drug. The Food and Drug Administration restricts uses of and requires cautions on a drug until experience with the drug is developed. 21 U.S.C. § 355 (new drug applications); 21 C.F.R. pt. 314 (1987) (procedures for new drug approval).

130. The former head of OSHA has noted that the programs of the two agencies are moving towards one another with respect to the reviewing of hazardous chemical substances. Tyson, *OSHA, EPA Responsibilities Merge as Agencies Develop Similar Interests*, 56 OCCUPATIONAL HEALTH & SAFETY 84 (1987).

posed by the presence of a toxic chemical. Because workers' compensation generally shields employers from the tort system's deterrence potential,¹³¹ regulation poses a much more tangible threat to force employers into compliance with the law and to stimulate education of workers. Regulatory fines are not covered by insurance,¹³² and they generate bad publicity.¹³³ Furthermore, although the recent past has seen virtually no criminal enforcement,¹³⁴ OSHA violations carry potential criminal penalties.¹³⁵ Enforcement of all available sanctions to force the noncomplying employer to meet the same safety prerequisites to operation as competitors must meet should compensate for disincentives to compliance.¹³⁶

States that previously have enacted their own worker right-to-know legislation will enjoy reductions of tort liability more rapidly than states without a similar incentive toward compliance.¹³⁷ Regulation has substituted for tort deterrence longer in these states than in others. While the federal system overshadows the state legislative role of worker right-to-know enforcement,¹³⁸ state efforts deserve praise for addressing the two issues of sophistication and incentives. The background of state regulation has motivated compliance by smaller employers and has raised the level of employer consciousness about chemical exposures. State laws and their advocacy by

131. *See supra* note 3.

132. Insurance for casualty losses typically requires an unanticipated "event," while regulatory fines apply to a pattern of misconduct. Additionally, it may be against public policy to allow the compensation of persons for violations resulting in penalties.

133. Extensive publicity concerning OSHA fines has been used to deter violations of injury recordkeeping requirements, such as \$2,600,000 against IBP Inc., *see OSHA Cracking Down*, RIGHT-TO-KNOW NEWS, Aug. 15, 1987, at 9, and \$1,380,000 against Union Carbide, *see Rich, OSHA Has "Got to Nail Somebody,"* CHEMICAL WEEK, Apr. 9, 1986, at 11. The combined use of publicity and OSHA as a vehicle of union leverage during a strike is taking on new importance where safety violations are alleged, as it did in a 1987 Connecticut strike in which \$480,840 in federal penalties for hazard communication violations were proposed by OSHA. *See OSHA Fines Uretek Inc.*, RIGHT-TO-KNOW NEWS, Aug. 15, 1987, at 9; Ravo, *Chemical Fumes Set Off Plant Strike*, N.Y. Times, Apr. 15, 1987, at 14, col. 1.

134. A report from the National Safe Workplace Institute in Chicago Illinois challenged lax enforcement of OSHA criminal remedies. *See generally* J. KINNEY, SAFETY AT BAY—THE FAILURE OF THE DEPARTMENT OF JUSTICE TO ENFORCE FEDERAL OCCUPATIONAL SAFETY LAWS (1987).

135. 29 U.S.C. § 666(e). It has been argued that these provisions preempt state criminal prosecution for workplace deaths. Kendall, *Criminal Prosecution: At Odds with the OSH Act?*, OCCUPATIONAL HAZARDS, Oct. 1986, at 60.

136. Economists have found that workers will demand a "risk premium" of higher pay if told the actual risks to which the job exposes them. W. VISCUSI & W. MAGAT, *supra* note 34, at 119. Enforcement of the OSHA standard across all competing domestic manufacturers would presumably equalize the risk-related aspect of wages.

137. State right-to-know laws exist in about 32 states apart from the federal requirements. 52 Fed. Reg. 31,857 (1987).

138. *United Steelworkers of Am. v. Auchter*, 763 F.2d 728, 736 (3d Cir. 1985).

unions has raised the expectations of workers as well.¹³⁹

Further empirical work will undoubtedly be done throughout the 1990's to measure the effect the federal system has on the incidence of tort liability actions involving industrial chemicals. While injurious exposures will undoubtedly decrease because of increased awareness and detection of safety problems, the incidence of tort suits against chemical products suppliers may increase because of increased worker awareness of potential occupational causes of chronic illnesses.

IV. THE IMPACT OF FEDERAL REGULATION UPON THE ASSUMPTION OF RISK DEFENSE

As discussed in Section I,¹⁴⁰ traditional tort law discounted the assumption of risk defense because workers in occupational settings had little opportunity to understand and no opportunity to change hazardous conditions of machinery, ladder, or building use.¹⁴¹ Increased federal involvement in dissemination of worker safety information presages a shift of balance; the same

139. A union has a moral obligation to its members to promote safe working conditions. Principal support for the adoption of state right-to-know laws came from union efforts in state legislatures. See O'Reilly, *Driving a Soft Bargain: Unions, Toxic Materials, and Right to Know Legislation*, 9 HARV. ENVTL. L. REV. 307, 318 (1985). Unions presumably will actively use their express rights under the OSHA hazard communication standard. See 29 C.F.R. § 1910.1200(i) (1987) (enabling unions to have access to trade secrets unavailable to other organizations).

Unions are likely to escape tort liability to injured employees as a result of the United States Supreme Court's 1987 decision in *IBEW v. Hechler*, 107 S. Ct. 2161 (1987). In *Hechler*, the Court held that the employer, "not a labor union . . . owes employees a duty to exercise reasonable care in providing a safe workplace." *Id.* at 2167. The question whether the union had adopted such a nonstatutory duty by contract was deferred to labor law remedies, such as arbitration, rather than to tort remedies. *Id.* at 2168-69. Although a case can be made that the union has an independent duty to communicate information to its members based upon information the union has received, the union will probably not defend in worker tort actions as a result of *Hechler*. See *Union Had No Duty to Ensure Safety, Court Rules in Dismissing Widow's Claim*, Daily Lab. Rep. (BNA) No. 191, at A-2 (Oct. 5, 1987). While the union's contribution to the continued risk by silence about known risks could present a moral obligations issue, it probably would not become a compensable tort.

140. See *supra* notes 56-58 and accompanying text.

141. See *Hammond v. International Harvester Co.*, 691 F.2d 646, 652 (3d Cir. 1982); *Brown v. Quick Mix Co.*, 75 Wash. 2d 833, 836, 454 P.2d 205, 208 (1969). An expert commentator put this into perspective by noting that "[t]he War over assumption of risk sees some of its fiercest battles in arguments about dangerous products in the workplace." M. SHAPO, *supra* note 3, at 20-20 (citing *Green v. Edmands Co.*, 639 F.2d 286, 290 (5th Cir. 1981)). Chemical exposure case law allows the defense of assumption of risk where a worker knew of discussions concerning a risk and, without instruction to do so, directly exposed himself to that chemical. See *Oatis v. Catalytic Inc.*, 433 So. 2d 328, 333 (La. App.), *cert. denied*, 441 So. 2d 215 (La. Sup. Ct. 1983).

dissemination of risk information that spurred workers' tort claims will restore viability to the assumption of risk defense.

A. The End of Uninformed Workers?

The federal system described in Section II¹⁴² creates a massive, documented system of mandatory training of individual workers about workplace chemical risks. Employers will deliver to workers information specific to the chemical product exposures experienced in the workplace. Risks will be communicated about the products, even where specific components may remain trade secrets.¹⁴³ Secrets will no longer exist about products posing the potential for serious illness from chronic exposure. Employees will be informed at the workplace of special safety precautions recommended or required for work with certain chemicals.¹⁴⁴ Obviously, the result will be a greater onus on the worker not to disregard safety precautions.

B. Validating the Employer's Compliance with Its Duty to Warn

Adequate safety communications reduce the liability of both manufacturers and employers. The external validation by federal inspectors of the hazard warning messages provided by the manufacturers' product labeling and data sheets will benefit indirectly manufacturers facing tort suits. Furthermore, OSHA instructs inspectors to ensure that employers provide adequate warning information.¹⁴⁵ OSHA measures the warnings provided by the manufacturer and delivered by the employer against the warning information that the federal agency considers to be adequate for that plant and those workers.¹⁴⁶ OSHA acts as an auditor of the manufacturer through its inspections of employers.

Performance flexibility in standards aids both the manufacturer and the employer.¹⁴⁷ The manufacturer uses flexibility to select from several possible approaches such as brochures, package labels, or material safety data sheets. The manufacturer also has a choice of data formats. The customer-

142. See *supra* notes 62-130 and accompanying text.

143. 29 C.F.R. § 1910.1200(h)(2), (iv), (i) (1987).

144. *Id.* § 1910.1200(h). OSHA requires training for new and reassigned employees. Field inspectors have been told to interview employees to determine if they actually received the information and were able to utilize that data. OFFICE OF HEALTH COMPLIANCE ASSISTANCE, OSHA, INSPECTION PROCEDURES FOR THE HAZARD COMMUNICATION STANDARD, CPL 2-2.38A, at 23-26 (1986) [hereinafter OFFICE OF HEALTH COMPLIANCE ASSISTANCE].

145. OFFICE OF HEALTH COMPLIANCE ASSISTANCE, *supra* note 144, at 23-26.

146. OSHA measures the performance of the label against the quality that its industrial hygiene evaluators would expect. For OSHA's evaluation procedure, see *id.* at 11-16.

147. See generally *supra* note 88 and accompanying text. However, flexibility may carry the burden of unpredictable defense from liability. See *supra* note 89 and accompanying text.

employer retains flexibility to utilize the information provided by the manufacturer in a different format when the employer trains its workers.

In a future tort suit, it will be more difficult for a worker-plaintiff to argue the inadequacy of some federal norm of training to meet a tort defendant's duty to warn. Instead, the defendant will argue that, under the performance standard, a federal official reviewed and accepted without challenge its specific choice of training content and warning methods.¹⁴⁸ In effect, the defense can rely on a federal stamp of approval to establish the adequacy of its warnings.

C. *The Mutual Need to Comply*

The task of complying with the OSHA hazard communication standard requires the joint efforts of employees, unions, employers, and manufacturers who control warning content. The standard assumes active participation of all these parties; ignorance by any one of them reduces the likelihood that all will benefit from safety efforts in the workplace.

The novel aspect of the hazard communication process is the transfer to workers of some of the employer's chemical information, and, with it, some of the employer's prior, exclusive control over information. More dissemination of risk information and mandatory worker training in hazard communication will occur. As a result, new information about risks will likely be spread within the plant and beyond its gates to local residents. Individual training and more extensive data sharing may lead to aggressive worker involvement in decisions regarding safe work practices. As a consequence of this action, however, the worker assumes some of the risks if he or she consciously chooses to violate known safeguards and an injury occurs.¹⁴⁹

148. The hazard communication compliance is a standard subject of the field inspection at a facility. OFFICE OF HEALTH COMPLIANCE ASSISTANCE, *supra* note 144, at 8-10. If the OSHA inspector reviewed the plan and chose not to cite the employer for a violation, that probably would be admissible as some evidence of approval. If the inspector found a violation and the administrative law judge later ruled that the firm was in compliance, the firm in a tort action could offer the adjudicative decision as an authoritative conclusion of adequate communication.

149. The worker cannot assert that the federal standard should be used as the measure of adequate training for periods before the 1986 effective date. OSHA concluded that a "critical need" for this mandatory standard existed because it was industry custom not to communicate. 48 Fed. Reg. 53,282 (1983). Thus, industry custom, in the absence of more specific proof, must be presumed to be noncommunication prior to the 1986 effective date of the standard. Adoption of the subsequent remedial standard contradicts any assertion that full communication was the industry's practice prior to the federal standard. As to employee assumptions prior to the standard, see *Oatis v. Catalytic Inc.*, 433 So. 2d 328, 333 (La. App.), *cert. denied*, 441 So. 2d 215 (La. Sup. Ct. 1983) and Note, *Assumption of Risk and Strict Products Liability*, 95 HARV. L. REV. 872, 875-77 (1982).

Insurance carriers' risk management inspections often stimulate employers to comply with warning requirements. Insurance agents insist on tougher work rules at the work site to reduce liability exposures. The prudent employer will actually read and file the incoming safety data sheets and other data to comply with the new federal regulations. The new knowledge imposes a more precise duty to control risks. Previously, an employer would be held to the level of knowledge of an expert in the particular manufacturing field. Now, the employer who assigns workers to handle particular chemicals has the more precise duty to comply with safeguards prescribed in the manufacturer's material safety data sheet or label.¹⁵⁰

If the employer decides to suppress the manufacturer's safeguard information rather than install engineering controls or provide protective equipment called for in the manufacturer's hazard information, that conscious decision will carry the potential for increased liability exposures. For example, a chemical may be so powerful that its manufacturer will direct employers to enclose totally the chemical processing system in pipes or vessels that prevent vapors from escaping. A small employer, however, may find a redesigned plant with totally enclosed piping prohibitively expensive. Alternatively, the employer could choose to use a less hazardous material, could invent a safer process of handling, or could choose to expose the workers to the chemical notwithstanding the manufacturer's instructions for safe use.¹⁵¹ If an employer chooses the latter action and an injury occurs, the employer may face liability under intentional tort theories, which in some states may impose tort liability over and above workers' compensation coverage.¹⁵² A worker-plaintiff in such a case would seek heavier damage awards with arguments of egregious violations.¹⁵³

The hazard communication standard's "performance" orientation allows

150. Employers are free to vary from manufacturers' material safety data sheets, "but if [employees] do so, [they] would then assume responsibility for the adequacy and accuracy of the information they use." *OSHA, Hazard Communication Standard* preamble, 48 Fed. Reg. 53,280, 53,306 (1983).

151. Divergence from a manufacturer's label warnings subjects the person making the divergence to some increased exposure to liability in actions brought by injured third parties in the drug field. Gilhooley, *Learned Intermediaries, Prescription Drugs, and Patient Information*, 30 ST. LOUIS L.J. 633, 670-71 (1986); Kessler, *Regulating the Prescribing of Human Drugs for Nonapproved Uses Under the Food, Drug, and Cosmetic Act*, 15 HARV. J. ON LEGIS. 693, 749 (1978). A similar phenomenon may develop in future chemicals injury cases.

152. State law prohibitions against tort recovery contained in workers' compensation laws often have an intentional torts exception, but the exception is difficult to satisfy. See M. SHAPO, *supra* note 3, at 15-2; see also *Jones v. VIP Development Co.*, 15 Ohio St. 3d 90, 97, 472 N.E.2d 1046, 1051 (1984) (defendant chemical user told workers that acid fumes were not a hazard; plaintiff argued affirmative misrepresentation of risks of exposure).

153. The foreseeability of an event reduces the ability of the defendant to assert that such an event excused its negligent act.

the employer to select communication and control measures appropriate for particular use conditions. Specific chemical regulatory standards that prescribe defined limits restrict this flexibility. The employer's failure to meet the chemical handling conditions shown on the manufacturer's instructions do not impose automatic penalties, but OSHA inspectors probably would require the employer to document and justify the alternative method of worker safeguards selected. If a tort suit arose, the employer would face the additional risk of a manufacturer-defendant's cross-claim that the negligent action or omission of the employer superseded the product manufacturer's liability.¹⁵⁴

V. THE EMPIRICAL STUDY PERSPECTIVES

Work by several economics and behavioral science scholars suggests that increasing the quality of workplace communications will improve safety. Through their examination of worker and consumer responses to sample labeling, Viscusi and Magat demonstrated that providing risk information changes actions.¹⁵⁵ Individuals who get adequate risk information demand higher pay for work that poses greater risk or select a different level of precautionary behavior. In a 1987 book, Viscusi and Magat articulated that adequate information stimulates the individual recipients' preferences to avoid injury, encouraging safer behavior.¹⁵⁶ However, the information must be *convincing* to change behavior: "Information policies should be designed both to convey accurately the best objective estimates of product risks and to convince users of the accuracy of those estimates."¹⁵⁷

An earlier paper by Schwartz and Driver studied workplace use of cautionary information.¹⁵⁸ Deficient workplace data did not provide adequate warning and posed liability problems.¹⁵⁹ Labels must be understandable by workers.¹⁶⁰ Products liability consequences of this inadequate warning were explored and suggestions for improvement in labeling and communications

154. Industrial injury cases involving machinery frequently involve such cross-claims. M. SHAPO, *supra* note 3, at 14-32. An employer who fails to communicate risk may receive all the liability in an action originally begun solely against the manufacturer. *See, e.g.,* Goodbar v. Whitehead Bros., 591 F. Supp. 552, 559 (W.D. Va. 1984), *aff'd sub nom.* Beale v. Hardy, 769 F.2d 213 (4th Cir. 1985).

155. *See generally* W. VISCUSI & W. MAGAT, *supra* note 34.

156. *Id.* at 128.

157. *Id.* at 126.

158. Schwartz & Driver, *Warnings in the Work Place: The Need for a Synthesis of Law and Communication Theory*, 52 U. CIN. L. REV. 38 (1983).

159. *Id.* at 43-45.

160. *Id.* at 58-59.

methods were made.¹⁶¹

Dr. Charles O'Connor, former head of labeling for a large chemical firm and author of a book on chemical warnings, has studied workers' responses to data about chemical exposure risks. In a 1987 study of worker behavior, Drs. O'Connor and Viscusi concluded that workers quit jobs where risks make employment "sufficiently unattractive."¹⁶² O'Connor and Viscusi also studied data on responses by workers to chemical safety data.¹⁶³ Their paper concluded that the better the informational content of the safety data communicated to the workers, the more influence the hazard warning would have upon worker behavior.¹⁶⁴

These economic examinations of risk communication aid the manufacturer in its argument that after imposition of a regulatory requirement of training and labeling, and after employers come into compliance with that requirement, the courts should presume that worker conduct *will* change to avoid risks—to the point that nonconformity with a label will be deemed an assumption of risk.¹⁶⁵ It is impossible to measure the probability that a given accident will occur at a chemical plant. Warnings reduce the potential for accidents, but they cannot eliminate human errors. Economic studies suggest that an adverse effect from exposure will be more likely to be avoided if more attention to safety devices and more self-protective caution is stimulated. There is proof that these factors are stimulated if the worker gets the kind of information which the OSHA and SARA systems provide.¹⁶⁶

Economic arguments justifying strict products liability, a policy widely debated in recent scholarship, suggest that manufacturers' strict liability spreads product injury losses across many customers.¹⁶⁷ By analogy, federal safety regulation can spread the costs of OSHA labeling and data sheet prep-

161. *Id.* at 67-72.

162. Viscusi, *Hazard Warnings for Workplace Risks*, in W. VISCUSI & W. MAGAT, *supra* note 34, at 99.

163. W. VISCUSI & W. MAGAT, *supra* note 34, at 61.

164. *Id.* at 99.

165. There is already a presumption that if label warnings were given, they would have been heeded by the injured person. RESTATEMENT OF TORTS §§ 388(a), 402A comment j (1965). The manufacturer can also expect the employer to pass along the warnings so that the worker understands them. *Adams v. Union Carbide Corp.*, 737 F.2d 1453, 1457 (6th Cir. 1984); *Goodbar v. Whitehead Bros.*, 591 F. Supp. 552, 559 (W.D. Va. 1984), *aff'd sub nom. Beale v. Hardy*, 769 F.2d 213 (4th Cir. 1985).

166. See Viscusi, *Hazard Warnings for Workplace Risks*, in W. VISCUSI & W. MAGAT, *supra* note 34, at 99.

167. See, e.g., *Passwaters v. General Motors Corp.*, 454 F.2d 1270, 1273 (8th Cir. 1972); M. SHAPO, *supra* note 3, at 7-23 to 7-24; Landes & Posner, *A Positive Economic Analysis of Products Liability*, 14 J. LEGAL STUD. 535, 542 (1985).

aration across hundreds of purchasers.¹⁶⁸ However, in the industrial setting, once the manufacturer-vendor pays the regulatory cost-of-communication, it should not also bear strict liability when one of its customers, an employer, fails to communicate adequately with its workers.

Courts should employ the existing presumption that a warning label, if used, would have been heeded.¹⁶⁹ Moreover, the law should presume that industrial product warnings flowing downstream from manufacturers to industrial customers will actually get to the workers who need them. The manufacturer who complied with OSHA should be accorded a "reward" of presumptions that adequate warning did occur. Conversely, the intervening lack of compliance by an employer should be rebuttably presumed to have affected the worker's ability to protect against harm from the chemical product.

The allocation of costs makes the picture more complex. The Viscusi study suggests that the cost of keeping workers at a job will increase as the workers gain more information about the risks of that job.¹⁷⁰ Wage cost increases will be borne by the employer, as will lost production time spent on mandatory safety training. Disability or workers' compensation systems currently bear the largest direct costs of a chemical exposure injury. Employers shoulder these costs in addition to the indirect costs of temporary replacements; retraining, or reassignment after an injured worker's rehabilitation; and incidental costs caused by illness of missing workers. The consumer subsidizes these costs in higher prices for the manufactured item.

Mandatory hazard labeling and training forecloses an employer's economic option of silence. The OSHA standard requires active, federally monitored performance.¹⁷¹ The entity that chooses how to implement this performance standard is the employer. Avoidance of the consequential costs of injury, as well as the regulatory costs of a violation, provides an incentive to perform adequate training. The employer may have felt a disincentive to warn, recognizing that workers will command higher wages for jobs with newly recognized dangers, as Viscusi has observed.¹⁷² However, mandatory risk communication circumvents the use of higher wage costs as a justification for *not* communicating risks.

168. Costs of material safety data sheet preparation vary with the amount of professional time and preproduction required. Cylinders for printing new labels and the initial label run may cost \$3000 depending on the volume of label and numbers of cylinders needed for the printing test.

169. RESTATEMENT OF TORTS §§ 338(a), 402A comment j (1965).

170. W. VISCUSI & W. MAGAT, *supra* note 34, at 129.

171. Active performance is required and cannot be avoided. Failure to act is a serious violation of the standard.

172. W. VISCUSI & W. MAGAT, *supra* note 34, at 99.

Worker safety training, therefore, delivers visible benefits such as reduction of illness-related loss. At the same time, regulation overrides the traditional rationale against worker information: the economic concern that better risk communication would increase wage costs for more risky jobs. The beneficial effects of increased safety communication on injury and illness rates should justify the economic aspects of safety-related regulation.¹⁷³

As between tort litigation and administrative agency rulemaking, the regulatory option more economically delivers cautionary data to workers who may need it.¹⁷⁴ Tort law would deter nonlabeling in some cases, but tort deterrence is episodic, unpredictable, and belated. Moreover, tort law cannot deal with these economic benefits in broad, socially beneficial terms. The tort suit recovers damages for individual workers and deters individual product sellers, one at a time. Only regulatory controls can provide the "big picture" of prospective control.

The current study of the tort law system by the American Law Institute, which includes economic as well as legal assessments of the system, probably will examine any correlations between societal benefits and tort law remedies for a variety of products liability situations.¹⁷⁵ This study, to be completed a quarter-century after the landmark *Restatement of Torts* § 402A,¹⁷⁶ perhaps will include an examination of liability considerations in the workplace hazard communication setting.

VI. ANALYZING THE IDEAL INDUSTRIAL RISK COMMUNICATION

In the ideal system, workplace communications will operate so efficiently that workers, employers, and unions cooperate in the safe handling of any hazardous material that enters the workplace. Reduction in the number of exposures to potential irritants and carcinogens will reduce time lost due to illness and injury and will produce a more efficient workplace. Training costs will be moderate, and new safety equipment costs may be moderate to high. Moreover, new engineering controls will be expensive if they are fully automated and enclosed to remove airborne exposures. The quality of the communication will remain high, policed by frequent inspections and by complaints received from workers and unions who review filings made under SARA and OSHA.¹⁷⁷

173. Future empirical studies will be needed to demonstrate this effect, but they are not likely to occur soon.

174. The economic cost of learning about risk decreases more with prospective dissemination than with individual payments for disability and other benefits.

175. See ALI REPORT, *supra* note 11, at 2.

176. RESTATEMENT OF TORTS § 402A comment j (1965).

177. See *supra* notes 84-121 and accompanying text.

If this ideal situation transpires during the 1990's, will tort law's strict liability for failure to warn have any continued societal rationale? When identical conduct is systematically pursued and prosecuted without transaction costs for the individual worker-plaintiff, tort law's deterrent role loses its relevance. Society no longer needs the additional tort deterrence to supplement the growing regulatory efforts to obtain a better informed and, therefore, safer workplace.¹⁷⁸

VII. THE USE OF FEDERAL REGULATION IN THE TORT CASE OF THE FUTURE

One can speculate that the future industrial products liability case will differ in several ways from today's more traditional action. Today, advocates most often challenge the inadequate preparation of a warning label under strict liability failure to warn theories.¹⁷⁹ During discovery, parties examine documents about the product planning team's awareness of the scenarios of injury.¹⁸⁰ While the defendant's consultants testify that the label met current state-of-the-art, the worker-plaintiff's consultants assert that the label could have been better and hint that the plaintiff would have heeded a more thorough label, thereby avoiding injury. The plaintiff's lawyer asserts that the cost per label of revisions and improvements would be a tiny fraction of the plaintiff's suffering.

The jury question of label adequacy might be unaffected today by external considerations such as federal regulatory labeling rules. If that is the case, then the wrong people are reviewing adequacy. Failure to consider compliance with federal safety safeguards distorts the decisional process for the jurors, just as an employer's denial of transmission of specific safety data distorts the process of safety communications normally flowing from manufacturer to worker.¹⁸¹

178. This is particularly true as the reach and scope of control regulations expands into virtually all workplaces. *OSHA, Hazard Communication Expansion*, 52 Fed. Reg. 31,852 (1987). Arguably, a value of compensation for injuries remains uncovered by insurance programs such as workers' compensation. Even this purpose has diminished in importance due to insurance availability. See *supra* note 8 and accompanying text.

179. The strict liability action for failure to warn has the same characteristics and processes as a negligence action. J. O'REILLY, *supra* note 14, § 6.3.

180. See generally T. KIELY, *PREPARING PRODUCTS LIABILITY CASES* (1986) (examining the records of product design to determine a basis for foreseeability); Allen, *U.S. Companies Pay Increasing Attention to Destroying Files*, Wall St. J., Sept. 2, 1987, at 1, col. 1 (describing policies for record retention).

181. Refusing to pass along the data would be a violation of federal requirements, 29 C.F.R. § 1910.1200(f) (1987), and would at least be evidence of negligent conduct. See, e.g., *Dougherty v. Santa Fe Marine Inc.*, 698 F.2d 232, 234-35 (5th Cir. 1983). Similarly, if the jury attempted to identify unreasonably dangerous labels in a strict liability action, the law would

In future tort litigation, manufacturer-defendants will seek to show that OSHA had inspected the type of containers which the worker-plaintiff routinely handled and that their labels clearly warned of the risk of disease for failure to follow safeguards. Depositions could establish the worker-plaintiff's disregard of the material safety data sheet, label, or other warnings. Documents could show that the worker-plaintiff had attended numerous training hours in safe handling of the chemical mixture and the availability of monitoring data about the mixture.¹⁸² Under the Freedom of Information Act,¹⁸³ manufacturer-defendants could obtain any OSHA industrial hygiene inspection reports. Typically, inspectors may have visited the plant in response to anonymous complaints, but failed to take enforcement action.¹⁸⁴

Under these circumstances, the federal presence is likely to affect heavily future tort cases. Worker-plaintiffs will have to weigh the costs that would result from preparing a tort case for trial where the defendant can bring together a strong indication of external endorsement of its label and a stronger suggestion of assumption of the risk by the informed worker. Detering such cases will not leave the worker without remedy because workers' compensation remains available.¹⁸⁵ While compliance with OSHA requirements does not guarantee avoidance of tort liability, the existence of *information*-based protections, may cause acceptance of the assumption of risk defense.¹⁸⁶ The strict liability tort system redresses the evil of lack of information. The availability of adequate communication, sufficient for society and its microcosm, the jury, should justify denial of tort recovery.

VIII. CONCLUSION

Speculating about the persuasiveness of arguments to juries during the

measure unreasonableness as of the time the containers left the control of the manufacturer, RESTATEMENT OF TORTS § 402A(a)(b) (1965), and it would be improper to disallow evidence that the Restatement condition had been met by the supplier's compliance with the regulatory standard.

182. 29 C.F.R. § 1910.1200(h) (1987) requires training. OSHA instructs its employees to look for evidence of the adequacy of the training. OFFICE OF HEALTH COMPLIANCE ASSISTANCE, *supra* note 144, at 23-26. Monitoring data is required to be available to the workers under 29 C.F.R. § 1910.20 (1987).

183. 5 U.S.C. § 552 (1982).

184. OSHA would shield confidentiality in one of two ways. It would either not record the identity of the caller, or it would withhold the caller's identity as law enforcement data, the disclosure of which could invade the privacy of a private individual, or which would interfere with OSHA investigations. *See, e.g., Akron Standard Div. v. Donovan*, 788 F.2d 1223, 1223 (6th Cir. 1986); *Borton, Inc. v. OSHA*, 566 F. Supp. 1420, 1422 (E.D. La. 1983); 5 U.S.C. § 552(b).

185. *See supra* note 3.

186. OSHA compliance does not assure the absence of further tort duties to the persons within the work area beyond the duty to deliver information concerning hazards.

next decade is inherently risky. However, the changes in the assumption of risk doctrine, and a major change in the foundation of strict liability for failure to warn, merit consideration and further empirical research.

It is probable that defendants in industrial products liability actions during the 1990's will have a far easier time asserting the assumption of risk defense against worker-plaintiffs than current defendants have experienced. The law of warnings, once driven by tort deterrence, now gets its momentum from the more cost-efficient system of prospective regulation.

In the workplace of the future, optimal communication patterns will feature multiple routes for workers to gain information needed for self-protection. Even before joining a company, prospective applicants will have access to chemical safety data in publicly accessible SARA files. Before manufacturers introduce new chemicals, EPA and OSHA requirements will assure that workers have the tools to understand risks and precautions.

Knowledge is power; sharing power comes only with difficulty. However, in the end, the industrial tort defendant will find that it has shared not only power, but also self-protective obligations.

