

Notes

A Hazardous Mix: Discretion To Disclose and Incentives To Suppress Under OSHA's Hazard Communication Standard

Susan D. Carle

National surveys have shown that industrial chemical manufacturers fail to provide information identifying ingredients and warning of hazards with most of their products.¹ This practice leads workers to expose themselves unknowingly to chemical dangers, leaves them unaware of the true

1. A national survey conducted by the National Institute for Occupational Safety and Health (NIOSH) in 1972 found that 85,000 chemical products, accounting for 70% of workers' exposures, were labeled by trade names only. Neither employees nor employers knew the actual identities of the chemicals in 90% of these trade name products. Nearly 50% of trade name products contained chemicals regulated by the Occupational Safety and Health Administration (OSHA), and slightly over 5% contained suspected carcinogens. *Toxic Chemicals in the Workplace: Hearing before a Subcomm. of the House Comm. on Gov't Operations*, 97th Cong., 2d Sess. 3 (1982) (statement of James Melius, M.D., Chief of Hazard Evaluation, NIOSH).

In 1977, NIOSH estimated that 21 million workers were exposed to trade name or generically marketed products containing toxic chemicals. See HOUSE COMM. ON GOV'T OPERATIONS, FAILURE TO MEET COMMITMENTS MADE IN THE OSH ACT, H.R. REP. NO. 710, 95th Cong., 1st Sess. 15 (1977) [hereinafter 1977 OVERSIGHT REPORT], citing NIOSH, THE RIGHT TO KNOW 16 (1977).

In 1982, an Environmental Protection Agency (EPA) survey found that none of the small firms surveyed, and only 20% of larger firms, used labels revealing chemical identities rather than merely trade names. U.S. EPA, Analysis of Present Labeling Practices (unpublished), cited in Hadden, *Labeling of Chemicals to Reduce Risk*, 46 LAW & CONTEMP. PROBS., Summer 1983, at 235, 246.

causes of chemically induced diseases,² and gives rise to injuries,³ premature deaths,⁴ lost productivity, and medical and social welfare costs.⁵

After years of delay,⁶ OSHA⁷ in 1983 promulgated the Hazard Communication Standard (HCS).⁸ HCS requires chemical manufacturers to provide warnings with products they deem to be dangerous. Except for prescribing that a relatively small list of proven carcinogens must be labeled as hazardous,⁹ HCS leaves decisions about the elements and scope of

2. See P. BRODEUR, *OUTRAGEOUS MISCONDUCT: THE ASBESTOS INDUSTRY ON TRIAL* (1985) (workers not informed of known hazards of asbestos for 30 years); W. RANDALL & S. SOLOMON, *BUILDING SIX: THE TRAGEDY AT BRIDESBURG 107* (1977) (workers not informed of carcinogen responsible for deaths in plant for nine years); W. VISCUSI, *RISK BY CHOICE 71* (1983) (empirical evidence shows few firms make comprehensive efforts to inform workers of risks; rather, information provided is aimed at lowering workers' assessments of their risk).

3. See generally N. ASHFORD, *CRISIS IN THE WORKPLACE 74-80* (1976) (describing wide variety of harms caused by exposures to hazardous substances, including poisoning, internal organ damage, respiratory disease, cancer, and birth defects).

4. See *id.* at 79 (workers exposed to coke oven emissions are more than seven times more likely to die from kidney cancer than general population); Charnalia, *Current Concepts in Occupational Carcinogens*, in *PREVENTION OF OCCUPATIONAL CANCER-INTERNATIONAL SYMPOSIUM 124* (1982) (incidence of lung cancer in chromate industry workers is 25 times higher than in other industries, and in nickel industry, five times higher); Schottenfeld & Haas, *Carcinogens in the Workplace*, in *CANCER-CAUSING CHEMICALS 14* (1981) (work-related asbestos exposure will cause two million cancer deaths in next 40 years).

5. For example, the major sources of income for victims of occupational diseases are social security, received by 53%, and welfare, received by 16%. The Department of Labor predicts that rising numbers of chemical exposures will place a major burden on health care and income maintenance programs. See U.S. DEP'T OF LABOR, *AN INTERIM REPORT TO CONGRESS ON OCCUPATIONAL DISEASES 2-4* (1980).

6. OSHA first began to develop a hazard labeling rule in response to a recommendation by NIOSH in 1974. See Hazard Communication, 47 Fed. Reg. 12,092, 12,095 (1982). OSHA received its advisory committee's recommendations for the text of a standard in 1975. *Id.* at 12,096. Under the Occupational Safety and Health Act (OSH Act), OSHA is required to publish a proposed rule within 60 days of receipt of its advisory committee's report, 29 U.S.C. § 655(b) (1982), but OSHA did not publish a preliminary chemical labeling proposal until 1981. See Hazard Identification, 46 Fed. Reg. 4,412 (1981). This proposal was quickly withdrawn when President Reagan took office. 46 Fed. Reg. 12,020 (1981). See also HOUSE COMM. ON GOV'T OPERATIONS, *OMB INTERFERENCE WITH OSHA RULEMAKING*, H.R. DOC. NO. 583, 98th Cong., 1st Sess. 2-6 (1983) (discussing ex parte meetings between chemical companies and Office of Management and Budget that led to withdrawal of original proposal). The present standard was offered in its place in 1983, Hazard Communication, 48 Fed. Reg. 53,280 (1983), and began to take effect in 1986.

7. OSHA was established by the OSH Act of 1970, Pub. L. No. 91-596, 84 Stat. 1590 (codified at 29 U.S.C. §§ 651-678 (1982)), which defined OSHA's regulatory purpose and enforcement mechanisms in broad terms. Thus, OSHA's decisions about which health standards to promulgate and how to design them have largely been directed by factors other than statutory mandate. This is especially true of HCS which, as OSHA acknowledged, was tailored to ensure preemption of more stringent state "right-to-know" laws disliked by the chemical industry. See Hazard Communication Preamble, 48 Fed. Reg. 53,280, 53,284 (1983) [hereinafter Preamble] (preemption of state laws chief goal of HCS); Post-Hearing Comments of the Chemical Manufacturers Association 26 (Nov. 1, 1982) (on file at OSHA Docket Office) (arguing that federal preemption of state chemical labeling laws was imperative); see also *infra* note 11 (discussing preemption issue).

8. 29 C.F.R. § 1910.1200 (1987).

9. 29 C.F.R. § 1910.1200(d)(3) & (4) (1987). This "floor" list is comprised of 2,311 chemicals. OSHA Instruction CPL 2-2.38A, reprinted in 15 O.S.H. Rep. (BNA) No. 51, at 1312, 1325 (May 29, 1986). In contrast, the NIOSH Registry of the Toxic Effects of Chemical Substances classifies more than 60,000 chemicals as potentially hazardous. In *United Steelworkers v. Aucther*, 763 F.2d 728 (3d Cir. 1985), the Public Citizen Litigation Group challenged the adequacy of this "floor," arguing that all chemicals on the NIOSH Registry should be regarded as presumptive hazards that must be labeled. The court rejected this claim, upholding OSHA's view that the Registry was over-

adequate evaluation procedures to the "professional judgment"¹⁰ of manufacturers.¹¹ HCS presents a manufacturer with two options: It may decide that a chemical is a health hazard and thereby obligate itself to comply with extensive labeling and reporting requirements,¹² or it may decide that a product is not hazardous, and label it by trade or code names only. Courts have held that HCS preempts overlapping provisions of state "right-to-know" statutes,¹³ many of which contain more stringent hazard

inclusive, since not all chemicals on it are hazardous in common use. *Id.* at 739.

10. 29 C.F.R. § 1910.1200 app. B (1987) ("chemical manufacturers . . . are not required to follow any specific methods for determining hazards"); Preamble, *supra* note 7, at 53,297-99. OSHA specified some objective criteria for determining whether chemicals cause acute (immediate) health effects, such as skin corrosiveness, and lethal dose levels, 29 C.F.R. § 1910.1200 app. A (1987), but left judgments about how to evaluate the chronic (long-term) effects of chemicals to manufacturers' discretion. The agency stated that evaluators must consider animal and human studies, and must report the results of studies they judge to be conducted according to "established scientific principles" and to report "statistically significant" results, but declined to specify what constitutes "established scientific principle" or acceptable levels of statistical significance. *Id.* at app. B.

Manufacturers must prepare and keep on file a written statement of the general procedure used to evaluate chemicals, 29 C.F.R. § 1910.1200(d)(6) (1987), but need not document the steps of each evaluation performed.

11. OSHA may have felt compelled to leave decisions about whether chemicals were hazardous to manufacturers' discretion in order to ensure that it would achieve its goal of preempting state right-to-know laws through HCS. *See supra* note 7. In promulgating HCS, OSHA faced the Fifth Circuit's ruling in *Louisiana Chem. Ass'n v. Bingham*, 657 F.2d 777 (5th Cir. 1981), that any OSHA rule covering potential, as opposed to confirmed, hazards could have the status only of a "regulation," not of a "standard." This technical distinction had great importance because under the OSH Act only "standards," 29 U.S.C. § 652(8) (1982), explicitly preempt state laws covering the same matters, 29 U.S.C. § 667 (1982). "Regulations," defined as ancillary rules "deem[ed] necessary to carry out [OSHA's] responsibilities," 29 U.S.C. § 657(g)(2) (1982), have no such preemptive power, unless a reviewing court finds that overlapping state laws would make it impossible to comply with federal law or would obstruct the objectives of the Act. *See New Jersey Chamber of Commerce v. Hughey*, 774 F.2d 587, 594-95 (3d Cir. 1985). If OSHA had prescribed which substances should be considered hazardous under HCS, it would have left the standard open to challenge for covering potential, as well as confirmed, hazards. A ruling that the standard covered potential hazards, and therefore had the status only of a regulation, would have deprived the standard of its preemptive effect over state laws, thereby defeating one of OSHA's main goals in promulgating HCS. By leaving hazard evaluations to manufacturers, OSHA protected HCS against being challenged for covering substances not conclusively established to be hazardous. *See also infra* note 125 (discussing implications of *Bingham* on OSHA's rulemaking authority).

12. Warning labels for products deemed to be hazardous must include the manufacturer's name and address, an appropriate hazard warning, and the identities of the hazardous ingredients, unless they are claimed as trade secrets. 29 C.F.R. § 1910.1200(f)(1) & (i)(1) (1987). A safety data sheet accompanying the product must list the identities of all hazardous ingredients (comprising 1% or more of the product or 0.1% if carcinogenic), and provide a detailed explanation of potential hazards, a statement of safety precautions, control measures, emergency procedures, the name of the party responsible for preparing the safety data sheet, and notation of all information the manufacturer lacks. 29 C.F.R. § 1910.1200(g) (1987).

Manufacturers must attach warning labels to products they designate to be hazardous, 29 C.F.R. § 1910.1200(f)(1) (1982), and must provide safety data sheets with dangerous products on first shipment and whenever new hazard information becomes available. 29 C.F.R. § 1910.1200(g)(6) (1987). Employers purchasing products labeled as hazardous must ensure that manufacturers' labels remain on containers, 29 C.F.R. § 1910.1200(f)(4)-(9) (1987), and must make manufacturers' safety data sheets readily accessible to employees. 29 C.F.R. § 1910.1200(g)(8)-(9) (1987).

13. These statutes imposed varying chemical labeling, hazard reporting, worker training and community disclosure requirements on chemical manufacturers and employers. For a list of state right-to-know statutes, see O'Reilly, *Driving a Soft Bargain: Unions, Toxic Materials, and Right to Know Legislation*, 9 HARV. ENVTL. L. REV. 307, 309 n.13 (1985).

disclosure requirements.¹⁴

This Note argues that the wide discretion given manufacturers in performing hazard evaluations under HCS renders the standard ineffective.¹⁵ Section I draws on "law and economics" theory¹⁶ to identify two problems

14. *E.g.*, *Ohio Mfrs.' Ass'n v. City of Akron*, 801 F.2d 824 (6th Cir. 1986) (HCS preempts municipal ordinance coverage of manufacturers); *Manufacturers Ass'n of Tri-County v. Knepper*, 801 F.2d 130 (3d Cir. 1986) (HCS preempts most state law coverage of manufacturers); *New Jersey State Chamber of Commerce v. Hughey*, 774 F.2d 587 (3d Cir. 1985) (HCS preempts state law coverage of manufacturers, but state may be able to develop own list of hazards requiring labels); *United Steelworkers v. Aucther*, 763 F.2d 728, 735-36 (3d Cir. 1985) (HCS preempts state law coverage of manufacturers).

Most discussions of HCS have centered on the standard's preemption of state laws. *See, e.g.*, Feitshans, *Hazardous Substances in the Workplace: How Much Does the Employee Have the "Right to Know?"* 1985 DET. C.L. REV. 697 (arguing that state right-to-know laws are better than HCS in many respects, and should not and legally need not be preempted by federal standard); Schroeder & Shapiro, *Responses to Occupational Disease: The Role of Markets, Regulation, and Information*, 72 GEO. L.J. 1231, 1288-91 (1984) (arguing that HCS need not preempt state statutes offering workers greater protection); Tyson, *The Preemptive Effect of the OSHA Hazard Communication Standard on State and Community Right to Know Laws*, 62 NOTRE DAME L. REV. 1010 (1987) (arguing that HCS does preempt state and local laws); Note, *Toward a Meaningful "Right-to-Know": Model Legislation and Commentary*, 9 SETON HALL LEGIS. J. 621 (1986) (discussing preemption issue and proposing model state right-to-know legislation).

Opposition to HCS preemption of state laws is understandable, given the inadequacy of the federal standard. It is the premise of this Note, however, that a uniform federal standard is necessary to ensure that all workers are protected from unknown hazards. State laws do not offer sufficient protection because many states lack right-to-know laws and others lack the resources or commitment to enforce right-to-know laws already on their books.

Differing state laws on chemical labeling also place an unnecessary burden on chemical manufacturers, who must alter their labeling practices each time they ship products across state lines. Finally, state regulation of chemical product labeling runs the risk of contravening the dormant commerce clause. *Cf. Hunt v. Washington State Apple Advertising Comm'n*, 432 U.S. 333 (1977) (state's apple labeling laws unconstitutional due to discriminatory effect on out-of-state growers, which had to bear cost of changing labels).

15. Other commentators have criticized HCS for creating a loophole for manufacturers through its trade secret provisions, and for restricting the range of workplaces covered to the manufacturing sector. *See, e.g.*, Feitshans, *supra* note 14, at 703-05, 712-15. These concerns were largely resolved when the standard was reviewed in *Aucther*. Noting that exposure to toxic chemicals is not concentrated in the manufacturing sector but also poses serious problems for workers in hospital, construction, and other industries, 763 F.2d at 737, the court directed OSHA to reconsider applying HCS to nonmanufacturing-sector employees. *Id.* at 739. It also required OSHA to redefine its trade secret definitions to deny protection to chemical identity information discoverable through chemical analysis, or "reverse engineering," of the product. *Id.* at 739-43. OSHA complied with these directives by expanding the scope of HCS coverage to nonmanufacturing employees, *Hazard Communication*, 52 Fed. Reg. 31,852 (1987), and proposing to change its trade secret definitions, *Hazard Communication*, 50 Fed. Reg. 48,750 (1985).

16. Of course, an economic approach does not answer the myriad of political and moral questions inherent in the problem of worker exposure to hazardous chemicals. Economic analysis can only help in arriving at "efficient" outcomes; it cannot indicate whether outcomes conform to moral principles such as fairness or justice, *see* Coleman, *Efficiency, Utility and Wealth Maximization*, 8 HOFSTRA L. REV. 509 (1980)—except where these values are tied to efficiency, *cf. Schwartz, Proposals for Products Liability Reform: A Theoretical Synthesis*, 97 YALE L.J. 353, 357-58 (1988) (arguing that efficiency is primary value underlying commercial transactions and should therefore govern products liability law rules).

Although economic analysis cannot illuminate many important aspects of policy decisions, it adds to our understanding of how institutions work and helps to predict the feasibility and effects of proposed changes in legal rules. Economic theory is particularly helpful in evaluating how to regulate activities we wish not to ban outright, but to curtail so that their costs do not outweigh their benefits. For example, eliminating the harms of toxic chemicals by completely banning their production would be infeasible, as these materials are needed to produce goods central to modern life, such as plastics, computers and television sets. Instead, a balance must be achieved between the costs of industrial

that give rise to inefficiencies in the industrial chemical market: market incentives against hazard information disclosure, and the tort system's difficulty in imposing the costs of chemical harms on manufacturers.

Section II argues that HCS does not significantly alleviate these "market failure" problems: Market incentives against hazard labeling outweigh weak incentives to comply with the standard.¹⁷ OSHA officials have stated that they intend to rely heavily on the private liability system to enforce HCS, arguing that manufacturers can be expected to evaluate hazards carefully to avoid tort liability for not doing so.¹⁸ Yet recent studies show extensive noncompliance with HCS.¹⁹ Section II argues that manufacturers fail to conduct careful hazard evaluations under HCS because the standard does not require them to disclose product ingredients evaluated as *nonhazardous*. This lack of ingredient information hinders interested parties—such as industrial hygienists, workers' physicians, personal injury lawyers and OSHA inspectors—from evaluating the adequacy of manufacturers' hazard assessments. Section III argues that an effective standard must permit such independent evaluations by requiring chemical manufacturers to disclose product ingredients.²⁰ Disclosure of ingredients would make establishing a warning's inadequacy more feasible. Manufacturers would therefore have greater incentives to provide adequate hazard

chemical production and its benefits. Market mechanisms, reinforced by the tort system, are often relied on to accomplish this tally. See G. CALABRESI, *THE COSTS OF ACCIDENTS* 19 (1970) [hereinafter *COSTS OF ACCIDENTS*].

The political and moral values other than economic efficiency that are implicated by workplace chemical exposure, see MacCarthy, *A Review of Some Normative and Conceptual Issues in Occupational Safety and Health*, 9 B.C. ENVTL. AFF. L. REV. 773 (1981) (summarizing moral issues), may well suggest that protective measures other than those argued for here should be adopted. Cf. G. CALABRESI, *TRAGIC CHOICES* (1978) [hereinafter *TRAGIC CHOICES*] (examining various institutions used to make decisions about loss of life and other tragic harms, and analyzing tradeoffs involved in adoption of each alternative). This Note argues that current regulation fails to achieve even the more modest goal of promoting "efficient" outcomes. (For a discussion of alternative definitions of efficiency, see *infra* note 121).

17. The OSH Act denies private parties a cause of action to enforce its provisions, see 29 U.S.C. § 653(b)(4), but workers harmed by exposure to chemicals bearing inadequate warning labels can file suit against product manufacturers. See *infra* notes 53–57 and accompanying text.

18. See *Inadequacy, Quantity of Data Sheets Expected to be Greatest Problems with Rule*, 15 O.S.H. Rep. (BNA) No. 21, at 423 (Oct. 24, 1985).

19. Studies show that many manufacturers are failing to comply with even the most basic provisions of the standard, a finding described by one OSHA official as "incredible . . . for any new federal standard." *Problems with Standard's Basic Provisions Continue, Agency Official Tells Conference*, 16 O.S.H. Rep. (BNA) No. 39, at 1040 (Mar. 4, 1987). The most recent tally found 28,059 violations of various HCS provisions. See *Employers' Basic Compliance Problems Unchanged with Hazard Communication Rule*, 17 O.S.H. Rep. (BNA) No. 28, at 1046 (Dec. 9, 1987).

20. One commentator has recognized the benefits of chemical ingredient disclosure in the collective bargaining context. See Note, *Workplace Exposure to Toxic Chemicals: Information Disclosure Versus Trade Secret Protection*, 13 N.Y.U. REV. L. & SOC. CHANGE 149, 154–55 (1984–85). The merits of ingredient disclosure as a regulatory approach have been disregarded, however. See, e.g., Preamble, *supra* note 7, at 53,299 (dismissing ingredient disclosure as option in designing HCS); O'Reilly, *supra* note 13, at 314, 317 (1985) (chemical identity information is too technical to be useful to workers and harms their economic interests as well as employers'); Schroeder & Shapiro, *supra* note 14, at 1277, 1280 (suggesting that "mere possession of chemical identity . . . may be of limited use").

warnings, as they would face a greater likelihood of being sued by private parties or being fined by OSHA for failure to provide them.

Section IV examines the argument, advanced by opponents of ingredient disclosure, that such a requirement would destroy valuable trade secret information. The extent to which ingredient disclosure would jeopardize trade secrets has been greatly exaggerated, and bona fide trade secrets can be protected though carefully tailored agency procedures. The benefits of an ingredient disclosure rule therefore suggest that Congress should pass legislation directing OSHA to add such a requirement to HCS.

I. MARKET FAILURE: THE RATIONALE FOR HCS

In its Preamble to HCS, OSHA justified HCS as a market adjustment mechanism.²¹ This rationale is based on the premise that government regulation is not needed as long as a balance between safety and the costs of preventing product harm is achieved through the market. When this balance breaks down, government intervention may be necessary.²²

In a theoretically perfect market, products are manufactured and used only to the extent that their total costs, including the costs of harms caused by them, do not exceed their value to purchasers.²³ In an efficient market for industrial chemicals, for example, purchasers²⁴ would continue to buy and use hazardous products up to the point at which the total costs of these products began to surpass their value. At this point, purchasers would switch to cheaper substitutes.²⁵

Manufacturers therefore have incentives to improve product safety so as to lower products' costs and make them more attractive to buyers.²⁶ Such safety efforts can take many forms, including development of new, safer

21. Preamble, *supra* note 7, at 53,323-24.

22. See R. POSNER, *ECONOMIC ANALYSIS OF LAW* 343-45 (3d ed. 1986).

23. In this respect, markets can serve as a rough "testing ground" for industrial activities—such as the manufacture of exotic synthetic chemicals—that may or may not be worth their full costs to society. The market performs a type of experiment: If firms engaged in the activity remain in business even though the full costs of the activity are being charged to them, then the value of that activity must be greater than its total costs. See *COSTS OF ACCIDENTS*, *supra* note 16, at 19, 68; W. LANDES & R. POSNER, *THE ECONOMIC STRUCTURE OF TORT LAW* 115 (1987) (discussing strict liability).

24. In the case of industrial chemical products, purchasers are generally other industries, which employ workers who may be harmed by exposure to these products. Throughout this Note, "manufacturers" will be used to refer to firms that produce industrial chemical products; "employers" or "purchasers" will be used to refer to firms that purchase these products; and "workers" will be used to refer to employees of both purchasers and manufacturers of industrial chemicals.

25. W. LANDES & R. POSNER, *supra* note 23, at 293-94, 296.

26. *COSTS OF ACCIDENTS*, *supra* note 16, at 87; W. LANDES & R. POSNER, *supra* note 23, at 275.

products,²⁷ reduction in production levels for hazardous products,²⁸ research into hazards,²⁹ and provision of safety information with products. Manufacturers will invest in improving the safety of their products up to the point at which their expenditures on safety begin to exceed their expenditures resulting from product harms.

In order for manufacturers to feel competitive pressure to increase product safety, purchasers must have information allowing them to choose between competing items on the basis of the products' relative safety. Purchasers may obtain safety information in either of two ways: Manufacturers, the government, consumer groups or other sources may provide it; alternatively, hazard levels may be reflected in product prices—provided that the costs of product harms are imposed on manufacturers.³⁰ If product hazards are not revealed through either of these potential information sources, buyers will make ill-informed purchasing decisions, creating an inefficient product market, or "market failure."

A. *Market Failure Due to the Peculiarities of Information Markets*

Absent a legal duty to do so, manufacturers lack incentives to disclose product hazards because doing so will make their products less attractive to buyers.³¹ Potential product purchasers should be willing to pay manufacturers or third parties for hazard information, but such information may not be provided because markets for information often "fail."³² Providers of valuable information may not obtain buyers for it because potential purchasers cannot judge the value of information until they have it; yet once they have it, they no longer need to pay for it.³³ Suppliers of information also may be unable to capture its full value because it is difficult to prevent those who do not initially pay for information from obtaining it once it has been sold.³⁴ Hoping to benefit from information

27. W. LANDES & R. POSNER, *supra* note 23, at 291-93.

28. *See id.* at 293.

29. *Id.*

30. *Id.* at 287; R. POSNER, *supra* note 22, at 166.

31. *See* S. SHAVELL, AN ANALYSIS OF ACCIDENT LAW 55 (1987); Posner, *The Federal Trade Commission's Mandated-Disclosure Program*, in BUSINESS DISCLOSURE: GOVERNMENT'S NEED TO KNOW 335 (H. Goldschmid ed. 1979) (manufacturers have disincentives to disclose hidden product hazards because doing so benefits competitor manufacturers of nonhazardous substitute products).

Some manufacturers may want to disclose product information to show that their product is safer than that of competitors. This incentive will be diminished, however, if such disclosure would raise purchasers' awareness of the hazards of the general product class. *See id.* Similarly, manufacturers will not want to publicize the safety of their products if competitors with equally safe products will also benefit from such advertising. *See* R. POSNER, *supra* note 22, at 334.

32. For a general discussion of the economics of information, see R. COOTER & T. ULEN, LAW & ECONOMICS 112-16 (1988). For a discussion of information-transfer problems in employer-worker relationships, see W. VISCUSI, EMPLOYMENT HAZARDS 121-22 (1979) (employers may not disclose workplace hazard information, even if workers are willing to pay for it, because this information may damage general reputation of firm, boost future wage rates, and induce workers to quit).

33. *See* R. COOTER & T. ULEN, *supra* note 32, at 112; W. LANDES & R. POSNER, *supra* note 23, at 132, 281.

34. R. COOTER & T. ULEN, *supra* note 32, at 112-13.

without paying, potential purchasers may refrain from contributing for its production, leading to the underprovision of valuable data.

Products liability law attempts to ensure that hazard information will be provided despite these problems in information markets by imposing a duty to warn on product manufacturers.³⁵ Yet the tort system's difficulty in imposing the costs of chemical harms on manufacturers has reduced the effectiveness of this mechanism for compelling information disclosure.

B. *The Tort System's Difficulty in Imposing Chemical Injury Costs on Manufacturers*

The tort system has difficulty imposing liability in cases involving exposure to hazardous chemicals because of the difficulties of proving causation in these cases.³⁶ A long latency period typically characterizes the onset of chemically induced diseases.³⁷ Because of the length in time between exposure and the first manifestation of harm, victims of chemical diseases often do not recognize the true cause of their illness and do not file suit against the manufacturers of the product that caused their injury.³⁸ As time passes, it may also become difficult or impossible to identify which of many workplace products is responsible for an illness.³⁹ Finally, unless records are retained, injured workers may be unable to remember or establish the identity of the product manufacturer.⁴⁰

These problems in the tort system⁴¹ produce inefficiencies in the indus-

35. See *infra* notes 53-57 and accompanying text.

36. A vast literature documents this problem. See, e.g., McGarity, *Media-Quality, Technology, and Cost-Benefit Balancing Strategies for Health and Environmental Regulation*, 46 *LAW & CONTEMP. PROBS.*, Summer 1983, at 159, 166-75; Pierce, *Encouraging Safety: The Limits of Tort Law and Government Regulation*, 33 *VAND. L. REV.* 1281, 1281-1300 (1980); Robinson, *Probabilistic Causation and Compensation for Tortious Risk*, 14 *J. LEGAL STUD.* 779, 779-83 (1985); Schroeder & Shapiro, *supra* note 14, at 1237-55; Note, *Causation in Toxic Torts*, 96 *YALE L.J.* 376 (1986); Note, *Tort Actions for Cancer*, 90 *YALE L.J.* 840, 847-55 (1981); Note, *Occupational Health Risks and the Worker's Right to Know*, 90 *YALE L.J.* 1792, 1792-95 (1981).

37. This latency period can extend for 20 to 30 years or longer. Preamble, *supra* note 7, at 53,323.

38. See, e.g., P. BRODEUR, *supra* note 2, at 267 (only 25% of people who developed asbestos disease filed lawsuits due to low propensity to attribute disease to exposure dating back many years); Schroeder & Shapiro, *supra* note 14, at 1246 (low claim rates for brown lung disease show workers' lack of awareness of claims arising from long-latent diseases caused by hazardous exposure); see also Shavell, *Liability for Harm Versus Regulation of Safety*, 13 *J. LEGAL STUD.* 357, 370 (1984) (discussing problems of tort-liability approach to harms with long latency periods).

39. Robinson, *supra* note 36, at 779-80, 784; Preamble, *supra* note 7, at 53,323.

40. Cf. *Sindell v. Abbott Laboratories*, 26 Cal. 3d 588, 600-01, 607 P.2d 924, 927-30, 163 Cal. Rptr. 132, 137-38 (1980) (noting impossibility of identifying DES manufacturers responsible for individual cancer cases); P. BRODEUR, *supra* note 2, at 36 (describing case lost by plaintiff because he could not remember on which jobs he used which manufacturers' asbestos products).

41. The exclusive remedy provisions of workers' compensation laws have also insulated manufacturers from bearing the full costs of product harms by denying workers any recovery other than workers' compensation for workplace injuries. See Schroeder & Shapiro, *supra* note 14, at 1244-50.

In recent years, however, judicial interpretation of these exclusive remedy provisions has begun to change. Workers are now permitted to bring product liability suits against third-party manufacturers, see, e.g., *Borel v. Fibreboard Paper Prod. Corp.*, 493 F.2d 1076 (5th Cir. 1973), and, in some instances, against the parent and sibling corporations of their employers, or employers acting in a "dual

trial chemical market. Product prices are lower than they would be if the full costs of product harms were reflected in price,⁴² leading to higher levels of production and use of dangerous products and more injury from them.⁴³ Manufacturers' incentives to produce safer products or provide safety and warning information with potentially dangerous ones are reduced.⁴⁴ Without accurate information, purchasers of industrial chemical products cannot avoid the costs they bear in using dangerous products⁴⁵ by taking appropriate safety measures, such as substituting less hazardous products, implementing training programs to educate workers about safety precautions, or providing protective equipment. Workers lacking hazard information cannot observe correct safety procedures, bargain with employers for appropriate safety precautions or wage premiums to compensate for job risks,⁴⁶ or make informed decisions about the level of occupational risk they are willing to bear.⁴⁷

capacity" as product manufacturer and employer, *see, e.g.*, *Mercer v. Uniroyal*, 49 Ohio App. 2d 279, 361 N.E.2d 492 (1976). Workers who can prove that an employer intentionally concealed a workplace hazard have also been permitted to sue employers directly. *See* P. BRODEUR, *supra* note 2, at 170 (approximately 1,000 lawsuits by asbestos workers penetrated exclusive remedy shield of workers' compensation laws by suing Johns-Manville for fraud). *See generally* Note, *Exceptions to the Exclusive Remedy Requirements of Workers' Compensation Statutes*, 96 HARV. L. REV. 1641, 1649-50 (1983) (discussing trend away from exclusive remedy rule).

42. Of course, the full costs of such harms, such as loss of infinitely valuable human life or damages to resources available for future generations, would not be recouped through strict liability. Even when it functions well, the tort liability system can be said at best to impose approximate assessments for these costs—to produce a result better than that which would obtain otherwise.

43. *Cf.* COSTS OF ACCIDENTS, *supra* note 16, at 70 (discussing accident-prone activities in general).

44. *See* Shavell, *supra* note 38, at 363.

45. Although employers are immune from suit for workplace injuries under the workers' compensation system, *see supra* note 41, use of harmful workplace chemicals does impose costs on them. For large employers, premiums for workers' compensation coverage are often pegged to workplace injury rates. *See* J. CHELIUS, *WORKPLACE HEALTH AND SAFETY: THE ROLE OF WORKERS' COMPENSATION* 26 (1977). Employers' hiring and training costs are also likely to be higher if they maintain hazardous working conditions, because workers tend to quit jobs they perceive to be hazardous. *See* W. VISCUSI, *supra* note 32, at 122. Finally, workplace injuries impose costs on employers in the form of lost productivity from absenteeism and disability. *See* N. ASHFORD, *supra* note 3, at 17-18 (estimating total of these costs to national economy).

46. The effect on wage rates of lack of hazard information depends on how accurately workers currently estimate the overall danger of exposure to industrial chemical products. If workers overestimate the risk these chemicals pose as a class, employers' current wage costs are higher than they would be if accurate hazard information for specific products were available. If they underestimate risk overall, wage costs are lower than they would be given accurate information. If workers correctly estimate the risk of harm overall, provision of accurate information about specific products would not alter wage levels on average, but would lead to an adjustment of wage rates to reflect particular job risks more accurately.

47. S. SHAVELL, *supra* note 31, at 51 n.6. Not all workers have the option of quitting dangerous jobs, however. Workers who possess bargaining power by virtue of their job skills or union membership may demand wage premiums for job hazards or may quit to find less hazardous work. Yet workers with few skills, little job mobility, and no collective bargaining power may be forced to hold the least desirable jobs in the economy, including those involving serious chemical hazards. *Cf.* Davis & Rowland, *Problems Faced by Minority Workers*, in *OCCUPATIONAL HEALTH* 417 (B. Levy & D. Wegman eds. 1983) (nonwhite workers concentrated in many of most hazardous industries and most dangerous occupations within them); Mazorra, *Migrants and Seasonal Agricultural Workers in OCCUPATIONAL HEALTH*, *supra*, at 417, 423 (describing low wages and job hazards, such as exposure to pesticides, faced by migrant farm workers); English, *Sweatshops Are Back—And They're Thriving*,

II. THE INADEQUACY OF HCS

HCS fails to induce manufacturers to provide careful hazard warnings because it does not significantly counteract market incentives against provision of such warnings.⁴⁸ The special difficulties of proving causation in hazardous chemical cases further reduce industrial chemical manufacturers' incentives to provide proper warnings. Because victims will not sue if they are unaware that their illness has a chemical origin, chemical manufacturers have an incentive to avoid warning users of the hazards of their products.⁴⁹ Because victims cannot win a suit if they cannot establish or remember the identity of the product and the name of the manufacturer,⁵⁰ manufacturers have an incentive to market their products generically, with a minimum of information identifying their maker.⁵¹ Withholding chemical identities also makes it more difficult for potential litigants to investigate the possible inadequacy of hazard warnings.

OSHA's claim that the private liability system will enforce HCS⁵² therefore has serious flaws. The threat of liability under HCS appears largely equivalent to that already existing under common law duty-to-warn standards.⁵³ Under the common law, as under HCS, chemical manufacturers must provide warnings and safety information for foreseeably harmful products.⁵⁴ Under both standards, manufacturers must meet the evaluation standards of an expert,⁵⁵ keep up to date on scientific litera-

U.S. NEWS & WORLD REP., Jan. 16, 1984, at 68 (employer indicted for cyanide poisoning of workers hired mostly illegal aliens on assumption that they would not complain about lethal working conditions).

48. See *supra* note 31 and accompanying text.

49. See, e.g., P. BRODEUR, *supra* note 2, at 142 (quoting a court finding that correspondence between asbestos companies "reflect[ed] a conscious effort by the industry in the 1930's to downplay, or arguably suppress, the dissemination of information to employees and the public for fear of the promotion of law suits").

50. The novel "market share" liability doctrine, under which liability was imposed on some DES and asbestos manufacturers in proportion to their share of the market for these products, was developed to overcome this obstacle. See, e.g., *Sindell v. Abbott Laboratories*, 26 Cal. 3d 588, 611, 607 P.2d 924, 936, 163 Cal. Rptr. 132, 144 (1980) (noting that defendants' "conduct . . . played a significant role in creating the unavailability of proof."). Although market share liability theories have been accepted in several jurisdictions, courts in general have been unwilling to relax the traditional requirement that plaintiffs identify the specific defendants responsible for their harm. See R. CARTWRIGHT & J. PHILLIPS, *PRODUCTS LIABILITY* 957-67 (1986) (discussing cases).

51. See Robinson, *Multiple Causation in Tort Law: Reflections on the DES Cases*, 68 VA. L. REV. 713, 742 (1982).

52. See *supra* note 18 and accompanying text.

53. See RESTATEMENT (SECOND) OF TORTS § 402A comment j (1965). Manufacturers are held strictly liable for marketing products without safety directions or hazard warnings. Absence of this information renders dangerous products "unreasonably dangerous." *Id.*

Failure to warn of foreseeable hazards also establishes liability under doctrines of negligence and breach of implied warranty. PROSSER & KEETON ON THE LAW OF TORTS § 96(2) (5th ed. 1984) [hereinafter PROSSER & KEETON].

54. Under the common law of most jurisdictions, manufacturers can absolve themselves from "strict" liability for failure to warn by showing that, given the state of scientific knowledge at the time they marketed a product, they could not have known of its dangers. PROSSER & KEETON, *supra* note 53, § 99 at 697. A few courts have even held that lack of foreseeability is not a defense. *E.g.*, *Beshada v. Johns-Manville Products Corp.*, 90 N.J. 191, 447 A.2d 539 (1982).

55. Sales, *The Duty to Warn and Instruct for Safe Use in Strict Tort Liability*, 13 ST. MARY'S

ture,⁵⁶ and provide warnings before a danger is established as a scientific certainty.⁵⁷

Yet in spite of the duty to warn under the common law, chemical manufacturers have often resisted disclosing information about product hazards. Examples of manufacturers' reluctance to declare products harmful, even in the face of strong hazard evidence, include the cases of asbestos,⁵⁸ bis-chloromethyl ether (BCME),⁵⁹ vinyl chloride,⁶⁰ radium,⁶¹ dioxin,⁶² and benzene.⁶³ Under HCS, manufacturers can be expected to continue to exercise such standards of professional judgment, classifying the fewest products possible as hazardous.⁶⁴

If the deterrent effect of the private liability system is insufficient to counteract the strong incentives that discourage hazard labeling, the task of enforcing compliance with HCS must fall back to OSHA.⁶⁵ Yet given OSHA's limited enforcement resources⁶⁶ and the complexity of detecting

L.J. 521, 544-55 (1982).

56. Manufacturers are deemed to have constructive knowledge of any information, such as medical journal articles, available at the time the product was marketed. *E.g.*, *Borel v. Fibreboard Paper Prod. Corp.*, 493 F.2d 1076 (5th Cir. 1973). As *Borel* illustrates, discovery of early medical literature documenting the dangers of asbestos led to the first successful products liability suits against asbestos manufacturers. See P. BRODEUR, *supra* note 2, at 52.

57. Manufacturers' duty to warn commences as soon as sufficient evidence exists "that a reasonable man would want to be informed of the risk in order to decide whether to expose himself to it." *Borel*, 493 F.2d at 1088.

58. See P. BRODEUR, *supra* note 2, *passim* (although extensive evidence of hazards of asbestos existed by 1930's, asbestos industry did not begin to use warning labels until 1964).

59. See W. RANDALL & S. SOLOMON, *supra* note 2, at 71, 105 (Rohm & Haas did not conclude that BCME was carcinogen until 12 years after first evidence of high incidence of cancer deaths among workers, and played down significance of animal tests showing BCME to be one of most potent carcinogens ever tested).

60. See *Chemical Hazards at Work* (panel discussion), 9 HARV. ENVTL. L. REV. 331, 344 (1985) (B.F. Goodrich withheld data about hazards of vinyl chloride until after deaths of three of its employees from liver cancer).

61. See Nugent, *The Power to Define a New Disease: Epidemiological Politics and Radium Poisoning*, in DYING FOR WORK 177, 179 (D. Rosner & G. Markowitz eds. 1987) (radium industry refused to accept early study attributing illness and death among watch dial painters to radium poisoning).

62. See Schroeder & Shapiro, *supra* note 14, at 1237-38 n.50 (manufacturers of dioxin and benzene suppressed hazard information about their products).

63. See *id.*; see also D. BERMAN, DEATH ON THE JOB 83-94 (1978); S. EPSTEIN, THE POLITICS OF CANCER 102, 107 (1978) (both citing examples of manufacturers' suppression of hazard data).

64. This problem is already occurring. See, e.g., *Carcinogen Classifications Need Review*, 16 O.S.H. Rep. (BNA) No. 7, at 148 (July 17, 1986) (some manufacturers do not label 29 known carcinogens because these chemicals do not appear on HCS "floor" list).

HCS establishes the elements of an adequate warning label, see *supra* note 12, and thus may increase a manufacturer's vulnerability to private lawsuits once the firm decides to classify a product as hazardous. See G. NOTHSTEIN, THE LAW OF OCCUPATIONAL SAFETY AND HEALTH 548-52 (1983) (discussing admissibility of proof of violations of OSHA standards to establish negligence).

Yet this feature of HCS deters, rather than encourages, hazard labeling. By classifying a product as hazardous and revealing its identity, a manufacturer opens itself to potential liability for failing to report all of the safety information required under HCS.

65. To enforce hazard evaluation standards, OSHA could request chemical identity information from manufacturers and then employ expert industrial hygienists to review the adequacy of manufacturers' hazard evaluations. The agency could fine manufacturers for inadequate evaluations under the procedures defined in the OSH Act. 29 U.S.C. §§ 658-660 (1982).

66. OSHA has far too few inspectors to police compliance effectively. See L. BACOW, BARGAIN-

and proving noncompliance with HCS's vague "professional judgment" standard,⁶⁷ administrative enforcement of HCS promises to be difficult.⁶⁸ The threat of agency enforcement therefore provides little incentive for compliance, as the unusually high rate of noncompliance with HCS already indicates.⁶⁹

III. A REMEDIAL PROPOSAL: REQUIRING DISCLOSURE OF CHEMICAL INGREDIENTS

The hazard warning provisions of HCS fail to create strong compliance incentives through either tort liability or administrative enforcement, as discussed above. An effective standard must either permit better policing of the standard by OSHA, or allow for private monitoring of the adequacy of hazard warnings. Adding an ingredient disclosure requirement to HCS would have both these effects.⁷⁰ Such a requirement would increase

ING FOR JOB SAFETY & HEALTH 13 (1980) (OSHA has only 1,560 inspectors to monitor compliance in five million work places, making it incapable of inspecting more than two percent of all firms it regulates each year); Noble, *For OSHA, Balance is Hard to Find*, N.Y. Times, Jan. 10, 1988, at E5, col. 1 (number of compliance inspectors has declined to approximately 1,000).

67. See W. VISCUSI, *supra* note 2, at 20 (OSHA detects far fewer health risk violations than safety violations due to complex and time-consuming nature of health risk assessment); *MSDS Carcinogen Designation Not Limited to NTP and IARC Lists*, 16 O.S.H. Rep. (BNA) No. 21, at 539 (Oct. 22, 1986) (OSHA official concedes that agency lacks resources to confirm adequacy of manufacturers' hazard evaluations).

68. Under the Act, manufacturers may contest fines by appealing to the Occupational Safety and Health Review Commission, 29 U.S.C. § 659 (1982), and then to a federal court of appeals, 29 U.S.C. § 660 (1982). Defending appeals of fines for violating the vague "professional judgment" standard of HCS would require additional agency resources.

69. See *supra* note 19.

70. Two alternative proposals for hazard warning rules have been suggested by policymakers, but neither adequately considers the severe resource limitations faced by administrative agencies. H.R. 162, recently passed by the House, see 133 CONG. REC. H8692-712 (daily ed. Oct. 15, 1987), and now pending in the Senate, would establish a board within NIOSH to evaluate all potential workplace chemical hazards, identify the workers at risk of harm from exposure to them, and then notify these workers of their risk. This effort by Congress to remedy the deficiencies of HCS is commendable, but probably unrealistic. OSHA's poor track record suggests that agency efforts to evaluate hazards on a substance-by-substance basis will be unsuccessful. See 1977 OVERSIGHT REPORT, *supra* note 1, at 14 (criticizing OSHA for having set complete standards for only 16 substances, and partial standards for only 400 others, in its first six years). Other factors also suggest that a scheme placing the burden of hazard evaluation and notification on an agency will be infeasible. An agency would have to evaluate the huge number of industrial substances currently in use in the United States and then keep pace with the rapid development of new synthetic chemicals. See Schroeder, *Forward: A Decade of Change in Regulating the Chemical Industry*, 46 LAW & CONTEMP. PROBS., Summer 1983, at 1, 6 (55,000 to 63,000 chemicals currently in commercial use in United States; EPA receives 1,000 notices of intent to market new chemicals each year). The great number and diversity of American workplaces would further increase the difficulty of implementing such a centrally administered scheme. See L. BACOW, *supra* note 66, at 13.

Another chemical labeling plan, proposed during the Carter Administration, see Hazard Identification, 46 Fed. Reg. 4,412 (1981), would have required manufacturers to follow a specified procedure in evaluating hazards. This option had the advantage of placing the burden of conducting evaluations on manufacturers, but retaining OSHA's role in determining standards for adequate evaluations. However, the scheme would have required extensive agency resources to monitor compliance; it also proved difficult to define an evaluation procedure appropriate for all substances, cf. L. BACOW, *supra* note 66, at 11 (diversity in health issues makes it difficult for OSHA to specify most effective means for achieving objectives).

Adding an ingredient disclosure rule to HCS, in contrast, places the burden of evaluating chemicals

manufacturers' potential tort liability for inadequate warnings, inducing them to evaluate more carefully and disclose more often the chemical hazards of their products. Compliance with an ingredient disclosure provision would also be easier for OSHA to monitor than compliance with the current discretionary warning rule. Finally, ingredient lists would permit worker representatives and physicians to conduct independent assessments of the hazards of chemical products,⁷¹ and would allow workers to make better-informed decisions about the level of chemical injury risk they are willing to bear.

A. *Independent Hazard Verification*

Some commentators argue that long lists of polysyllabic chemical names would merely confuse workers, rather than inform them of hazards,⁷² but this argument misunderstands the way in which ingredient lists would be used. Under an effective ingredient disclosure rule, hazard warnings placed on containers would include only basic safety information;⁷³ ingredient information would be included in safety data sheets accompanying products.⁷⁴ Workers who were not interested in this information would not become confused, but would simply ignore it.⁷⁵ On the other hand, workers concerned that they were being exposed to highly dangerous products would use ingredient lists.⁷⁶ They could take ingredient lists to physicians for health risk evaluations or to aid in diagnosis of medical problems.⁷⁷

on manufacturers; allows workers, employers, and the tort system to help police compliance; and preserves flexibility in its hazard evaluation requirements.

71. Such assessments could now be carried out by taking products to chemical engineers for ingredient analysis or by filing suit against all manufacturers possibly responsible for a plaintiff's injuries and obtaining product ingredient lists through discovery. Both options would involve considerable expense. Such situations, in which product information can be obtained much more cheaply by manufacturers than by purchasers or users, present the strongest case for mandated disclosure. Cf. R. POSNER, *supra* note 22, at 99 (duty to disclose should turn on which party can produce information at lowest cost).

72. See, e.g., W. VISCUSI *supra* note 2, at 158-59.

73. See Hadden, *supra* note 1, at 255-61 (describing elements of effective hazard labels).

74. Under HCS, employers must keep safety data sheets on file in an area readily accessible to employees. See 29 C.F.R. § 1910.1200(g)(8) & (9) (1987).

75. Cf. Grether, Schwartz & Wilde, *The Irrelevance of Information Overload*, 59 S. CAL. L. REV. 226, 285-86 (1986) (consumers merely ignore information they find superfluous).

76. See W. LANDES & R. POSNER, *supra* note 23, at 296-97 (discussing benefits of warnings and ingredient labels when high risks are involved); see also M. BRYANT, *SUCCESS WITH OCCUPATIONAL SAFETY PROGRAMS* 75 (Occupational Safety and Health Services, International Labor Office, No. 52, 1984) (proposing that model safety program for small company would include maintenance of readily available register of workplace chemicals); J. STELLMAN & S. DAUM, *WORK IS DANGEROUS TO YOUR HEALTH* 356-59 (1971) (describing program instituted by union local to maintain inventory of workplace chemicals and accidents, worker health complaints, and safety precautions associated with each substance).

77. See Levy & Wegman, *Recognizing Occupational Disease*, in *OCCUPATIONAL HEALTH*, *supra* note 47, at 29, 32, 34 (obtaining ingredient names is key step in diagnosing occupational diseases).

The cost of such evaluation would often be covered by workers' health insurance. Certain public interest organizations also provide risk assessments for a nominal fee.

Ingredient lists would make the job of health and safety experts easier.⁷⁸ Instead of relying on manufacturers' evaluations, experts retained by employers or unions could independently evaluate product hazards and could assess any special hazards created by handling procedures or synergistic reactions⁷⁹ unique to particular workplaces.

B. *Increasing the Threat of Tort Liability*

If manufacturers were required to disclose product ingredients as well as hazards, incentives against providing hazard warnings would decrease. Victims would be better able to recognize and establish the link between their injuries and inadequately labeled chemical products. Manufacturers who omitted warnings to make products more marketable would therefore face a greater threat of private liability actions.⁸⁰ Heightened liability concerns would induce manufacturers to err on the side of disclosure when deciding whether hazard warnings were necessary.⁸¹ Coupled with an ingredient disclosure requirement, the discretionary "professional judgment" standard for hazard warnings under HCS would be more adequate. Manufacturers could be expected to use their best professional judgment to avoid liability for inadequate warning labels.⁸²

C. *Workable Administrative Enforcement*

An ingredient disclosure requirement would be easier to enforce administratively than HCS as currently designed because employers and workers, as well as OSHA compliance officers, could monitor whether manu-

78. See M. BRYANT, *supra* note 76, at 14 (substance analysis is key step in setting up workplace safety programs); J. STELLMAN & S. DAUM, *supra* note 76, at 328 (first step in workplace environmental monitoring is ascertaining chemical identities; "when unknown materials are involved, identification and analysis can become a real scientific challenge").

79. Synergism occurs when the "total effect of two active components in a mixture is greater than the sum of the two parts." MCGRAW-HILL DICTIONARY OF SCIENTIFIC AND TECHNICAL TERMS 1598 (1984). See, e.g., S. EPSTEIN, *supra* note 63, at 120 (potent carcinogen BCME may be formed in reactions); Riihimaki, *Interactions between Industrial Solvents*, in BIOLOGICAL MONITORING AND SURVEILLANCE OF WORKERS 231, 241 (1984) (discussing importance of synergism in causing toxicity of certain solvent mixtures).

80. Difficulties in proving causation in chemical disease cases would continue, of course, but with identity information, two major problems—victims' lack of awareness of the causes of disease, and their inability to establish the identity and manufacturer of the product causing their harm—would be ameliorated.

81. Cf. McGarity & Shapiro, *The Trade Secret Status of Health and Safety Testing Information*, 93 HARV. L. REV. 837, 844 (1980) (if safety data were publicly available, threat of scrutiny by critical outsiders would motivate industry to analyze it more carefully).

82. No private cause of action exists under the OSH Act for violations of its provisions, see *supra* note 17, so suits concerning chemical injuries with long latency periods might not take place for years. Accurate ingredient lists would increase the chances that these suits would succeed: Ingredient lists could be used to evaluate hazard warnings prepared when the product was marketed in light of the medical knowledge available at the time, and determinations that warnings were inadequate could inspire decisions to proceed with suits. Recognizing the likelihood of increased liability in the future, manufacturers would be deterred from inadequate labeling in the present.

facturers listed product ingredients.⁸³ OSHA would have little difficulty proving per se violations of the disclosure rule; a lack of an ingredient list would be conclusive evidence of noncompliance.⁸⁴ Although detecting and proving the inadequacy of hazard warnings would still require the attention of expert agency personnel, the need for agency enforcement of this provision would decrease due to the increased compliance incentives created by the tort system.

D. *Independent Decisionmaking by Workers*

Ingredient disclosure would also have the advantage of allowing workers to make their own decisions about the acceptability of workplace risk levels. With ingredient lists, workers could obtain independent assessments of the hazards posed by industrial chemical products.⁸⁵ According to their own preferences, workers could take individual safety precautions or seek less dangerous work.⁸⁶ Workers represented by unions⁸⁷ could bargain collectively with employers⁸⁸ for safer conditions⁸⁹ or higher compensation for risk.⁹⁰

83. Cf. L. BACOW, *supra* note 66, at 68 (steelworkers filed suit to enforce standard for coke-oven emissions); *id.* at 102 (OSHA often relies on unions to identify hazards, pressure management to comply with regulations, and bring violations to OSHA's attention).

84. Manufacturers could provide incomplete ingredient lists, however, leaving off hazardous ingredients in order to make products appear safe. This form of noncompliance would be difficult to detect; products would have to be submitted to chemical analyses, which could be very costly. To deter such omissions, OSHA would have to set a severe penalty for such behavior, counterbalancing the small chance of detection by the severity of punishment.

85. Such assessments could be obtained from physicians, union representatives, or public interest groups.

86. See W. VISCUSI, *supra* note 32 (empirical study found that workers are twice as likely to quit jobs they perceive as hazardous, and ill-informed workers accept more hazardous work than those who are better informed).

Workers who lack the job mobility or bargaining power to demand safety improvements or to leave dangerous jobs, see *supra* note 47, could not avail themselves of this option, but more accurate hazard information would at least serve to inform policymakers of the conditions under which these employees are forced to work.

87. In 1980, 25.2% of the nonagricultural workforce in the United States belonged to labor unions. See STATISTICAL ABSTRACT OF THE UNITED STATES 424, table 709 (105th ed. 1985).

88. Unions have attempted to obtain ingredient information through bargaining, but have met with resistance from employers. See, e.g., Borden Chem. Co., 261 N.L.R.B. 64 (1982); Colgate-Palmolive Co., 261 N.L.R.B. 90 (1982); Minnesota Mining and Mfg. Co., 261 N.L.R.B. 27 (1982) (finding companies to have committed unfair labor practices in refusing to disclose to union identities of chemicals not claimed as trade secrets).

89. Though hampered by lack of information about the nature of chemical hazards, bargaining over health and safety issues already occurs between unions and employers. See, e.g., L. BACOW, *supra* note 66, at 68-70 (describing steelworkers contract obtaining job rotation, increased incentive pay and engineering controls for workers exposed to hazardous coke-oven emissions). More than 84% of union contracts contain health and safety provisions, Collective Bargaining Negot. & Cont. (BNA) § 95 (1986), which can include provisions for protective equipment, *id.* § 95, at 145; hiring industrial hygienists, *id.* § 95, at 147; medical monitoring of workers in at-risk positions, *id.* § 95, at 301; joint management-union safety committees to identify and remedy hazardous conditions, *id.* § 95, at 181-82; and the right to refuse hazardous work, *id.* § 95, at 241.

90. See W. VISCUSI, *supra* note 2, at 3-5, 37-44; W. VISCUSI, *supra* note 32, at 250-51, 263. Viscusi's empirical work establishes that workers who are aware of the risk they face on hazardous jobs will demand substantial wage premiums to take these positions. These demands give firms a

Access to ingredient information would also improve physicians' ability to diagnose and treat chemically induced illnesses, and to detect dangerous synergism⁹¹ between chemicals. Finally, such a requirement might speed gains in scientific knowledge, making it easier to spot the link between diseases and particular chemical agents.⁹²

IV. THE TRADE SECRETS ISSUE

Businesses have protested that mandated ingredient disclosure would force them to reveal valuable trade secrets.⁹³ Manufacturers can make few bona fide trade secret claims against ingredient disclosure, however, and secrets that are established as bona fide can be protected through agency procedures. Some harm to manufacturers' interests may nevertheless occur from the disclosure of proprietary information that is not legally accorded trade secret status. Congress must balance this potential harm against the benefits of disclosure.

A. Provisions for Bona Fide Trade Secrets

As do other ingredient disclosure laws, a rule for industrial chemicals could include procedures to protect manufacturers' bona fide trade secrets.⁹⁴ Courts have generally held that the protection granted trade secrets under agency disclosure rules should match that offered under state trade secrets law.⁹⁵ Under state common law trade secrets doctrines, manufacturers can raise only a restricted set of claims against an ingredient disclosure rule.

The common law of trade secrets does not protect information discoverable by examining public documents⁹⁶ or analyzing a product.⁹⁷ Nor may

choice between paying risk premiums or reducing wage costs by investing in safety equipment. Viscusi concludes that this choice creates a powerful incentive for firms to invest in safety of approximately \$70 billion annually, or 3,000 times the total annual fines levied by OSHA.

91. See *supra* note 79.

92. See, e.g., Note, *supra* note 20, at 155 n.64 (identity information was required to link workers' sterility to exposure to pesticide).

93. See, e.g., Statement of Master Chemical Corporation for the Public Hearings on the Department of Labor's Proposed Rule on Hazard Communication 2 (July 27, 1982) (on file at OSHA Docket Office) [hereinafter Master Chemical Testimony] ("chemical identity disclosure . . . would jeopardize the existence of small chemical firms").

94. E.g., 21 C.F.R. § 20.44 (1987) (providing for applications for exemption from disclosure of confidential information under the Food, Drug and Cosmetic Act).

95. See, e.g., *United Steelworkers v. Auchter*, 763 F.2d 728, 740 (3d Cir. 1985) (invalidating trade secret provisions of HCS because they protected chemical identities discoverable through chemical analysis, which are not protected under state law).

96. See RESTATEMENT OF TORTS § 757 (1939) [hereinafter RESTATEMENT]; UNIF. TRADE SECRETS ACT § 1, commissioners' comment, 14 U.L.A. 541 (1980 & Supp. 1987).

The *Restatement (Second) of Torts* does not examine trade secrets, and many courts continue to rely on the original *Restatement* definition. See, e.g., *Kewanee Oil Co. v. Bicron Corp.*, 416 U.S. 470, 474-75 (1974). Sixteen states have adopted versions of the Uniform Trade Secrets Act, see 14 U.L.A. 309 (Supp. 1987), which retains the *Restatement* definitions of trade secrets to the extent relevant here.

97. RESTATEMENT, *supra* note 96; UNIF. TRADE SECRETS ACT § 1, commissioners' comment, 14

businesses claim trade secret status for information that is of little value⁹⁸ or insufficient in itself to give competitors a valuable advantage if known by them.⁹⁹ Each of these requirements eliminates certain classes of chemicals from the scope of those raising trade secret concerns.

Ingredient information for industrial chemicals marketed in the United States may already be subject to public disclosure under the Toxic Substances Control Act (TSCA).¹⁰⁰ The ingredients in all industrial chemicals marketed in western Europe are also subject to European Economic Community (EEC) chemical labeling and reporting requirements,¹⁰¹ which have led to disclosure of many confidential chemical identities.¹⁰² Finally, ingredients in patented chemicals are not trade secrets, as they are on file at the Patent Office.

Ingredient disclosure also would not reveal trade secrets of manufacturers of basic chemicals.¹⁰³ Similarly, no trade secret problem would arise if ingredients could be discovered through chemical analysis, or if knowledge of ingredients alone would give competitors no advantage because they would be unable to duplicate the product without also knowing the formula, process, or proportions used.¹⁰⁴ Given all these restrictions, man-

U.L.A. 541.

98. RESTATEMENT, *supra* note 96; UNIF. TRADE SECRETS ACT § 1(4)(i), 14 U.L.A. 541.

99. RESTATEMENT, *supra* note 96, comment b; UNIF. TRADE SECRETS ACT § 1(4)(i), 14 U.L.A. 541.

100. 15 U.S.C. § 2601 (1982). The TSCA requires the EPA to disclose, in response to request, "any health and safety study . . . with respect to any chemical substance . . . offered for commercial distribution," except process and portion information marked by the submitter as proprietary. *Id.* § 2613(b); *see also* 40 C.F.R. § 2.306 (1986) (implementing this provision of TSCA).

Whether this provision requires ingredient disclosure is a matter of some debate. *See* McGarity & Shapiro, *supra* note 81, at 876-77 (summarizing arguments about whether ingredient information should be disclosed under TSCA and arguing that problem only arises for chemicals not marketed publicly since most identities are ascertainable through chemical analysis). Ingredient information that is not asserted as proprietary by submitters clearly is subject to EPA disclosure. *See* 40 C.F.R. §§ 2.203(b)-(c), 2.204(b)-(c)(2)(i).

101. *See Council Directive of 18 Sept. 1979*, 22 O.J. EUR. COMM. (No. L 259) 10 (1979) (known as the Sixth Amendment).

102. Under EEC regulations, manufacturers must disclose exact chemical names on the labels of their products, *id.* art. 16, at 16, eliminating the trade secret status of ingredients in products exported to EEC member countries. More than 20% of the chemical mixtures produced in the United States are exported to member countries. *European Community, U.S. to Meet Again on Goal to Harmonize International Labels*, 16 O.S.H. Rep. (BNA) No. 40, at 1068 (Mar. 11, 1987); *see also* Biles, *Harmonizing the Regulation of New Chemicals in the United States and in the European Economic Community*, in *TSCA'S IMPACT ON SOCIETY AND THE CHEMICAL INDUSTRY* 39 (1983); O'Reilly, *Confidentiality of Chemical Identities*, in *TSCA'S IMPACT ON SOCIETY AND THE CHEMICAL INDUSTRY*, *supra*, at 133 (discussing impact of EEC regulations on American chemical industry).

103. As one manufacturer testified during public hearings on HCS, "basic chemical" manufacturers do not have trade secret concerns because for them "it is usually the process rather than the chemical identity that is considered a trade secret[;] . . . the identity of the basic chemical has no intrinsic value." Master Chemical Testimony, *supra* note 93, at 3.

104. Requiring manufacturers to disclose information about the concentrations of ingredients in their products might provide additional useful information to those seeking to evaluate product hazards; however, such a requirement would also increase the potential for trade secrets disclosure. Mindful of the need to balance workers' and manufacturers' interests, this Note does not propose disclosure of ingredient concentrations.

ufacturers would have few bona fide trade secret claims against product ingredient disclosure.¹⁰⁵

Some legitimate trade secret concerns remain.¹⁰⁶ To protect legitimate trade secrets, a procedure should be established under which manufacturers could apply to OSHA for exemptions from ingredient disclosure on trade secret grounds. Reviewing manufacturers' trade secret applications would require OSHA resources. The resources needed could be minimized, however, by placing the burden of proving claims on manufacturers, rather than requiring OSHA to disprove trade secret claims, as HCS currently does.¹⁰⁷

Shifting the burden of proof to manufacturers would prevent a trade secrets exemption from swallowing the rule, a result which many commentators argued would occur under HCS.¹⁰⁸ Manufacturers applying for exemption should be required to prove that product ingredients are entirely secret—not subject to public disclosure under TSCA, EEC regulations or other laws, and unidentifiable through chemical analysis—and of significant value to competitors in and of themselves. OSHA could conduct special reviews of the adequacy of hazard warnings for products surviving this test for exemption.¹⁰⁹

B. *Disclosure of Proprietary Information Without Trade Secret Status*

To determine whether agency disclosure of proprietary business information is appropriate, courts balance¹¹⁰ society's interest in disclosure—

105. For example, Polaroid found that it did not have to claim trade secret status for the chemical identity of a single product whose ingredients had to be disclosed under Massachusetts' right-to-know law. *Chemical Hazards at Work*, *supra* note 60, at 338. Similarly, in an unfair labor practices case against an adhesives manufacturer who refused to give its union ingredient information, the manufacturer admitted that only one of its 700 chemical products contained an ingredient that could be considered a trade secret. *Minnesota Mining & Mfg. Co.*, 261 N.L.R.B. 27, 41 (1982).

106. For manufacturers of certain chemical mixtures, for example, "the ingredient information is the crucial trade secret, very often the only trade secret." *Master Chemical Testimony*, *supra* note 93, at 3.

Another class of chemicals raising legitimate trade secret concerns are catalysts, which do not appear in end products and are not publicly marketed, but are introduced in manufacturing processes to speed reactions. *See McGarity & Shapiro*, *supra* note 81, at 878. Under the proposed rule, the identities of these in-house chemicals would be disclosed only to the workers handling them; secrecy could be ensured through use of confidentiality agreements.

107. 29 C.F.R. § 1910.1200(i)(10) (1987).

108. *See Schroeder & Shapiro*, *supra* note 14, at 1281-82. If trade secret claims are presumed valid subject to agency review, a loophole is created in the standard: Companies may avoid complying with the ingredient disclosure provisions by filing trade secret claims for most of their products. *Cf. National Parks & Conservation Ass'n v. Morton*, 498 F.2d 765 (D.C. Cir. 1974) (business cannot be judge of what information constitutes trade secrets). To further deter manufacturers from abusing the trade secret exemption, a fine could be imposed for the filing of frivolous claims.

109. Although it is possible that conducting such assessments would place a burden on OSHA, it is more likely that few products would withstand a stringent trade secrets test. *See supra* note 105.

110. *See, e.g., Pennzoil Co. v. Federal Power Comm'n*, 534 F.2d 627, 632 (5th Cir. 1976) (decisions as to appropriateness of public disclosure of trade secret information require "balancing of the public and private interests").

such as protecting the public from unknown health risks¹¹¹—against society's interest in preserving trade secrets—such as the creation of incentives for innovation.¹¹² Courts may also look to the statutory authority under which the agency promulgated a disclosure rule to determine whether Congress intended to authorize such action.¹¹³

In many other contexts, Congress has determined that the benefits of ingredient disclosure outweigh the costs. For example, manufacturers are required to disclose ingredients in cosmetics,¹¹⁴ many foods,¹¹⁵ prescription drugs,¹¹⁶ pesticides,¹¹⁷ and hazardous consumer products.¹¹⁸ Requiring disclosure of ingredients in industrial chemical products would fill a gap in this already extensive network of ingredient disclosure laws.¹¹⁹

The social costs¹²⁰ resulting from workers' exposure to hazardous industrial chemicals weigh heavily in favor of requiring a disclosure rule despite the potential for some damage to proprietary information.¹²¹ The language of the OSH Act, mandating that the agency require use of labels "to insure that employees are apprised of all hazards to which they are

111. See *Ruckelshaus v. Monsanto Co.*, 467 U.S. 986, 1015-16 (1984) (Congress may determine optimal amount of disclosure to assure product safety and allow individuals to assess risks for themselves); *Public Citizen Health Research Group v. FDA*, 704 F.2d 1280, 1289 n.25 (D.C. Cir. 1983) (public interest may require disclosure of health and safety information in spite of policy protecting proprietary interests); cf. *Corn Prod. Ref. Co. v. Eddy*, 249 U.S. 427, 431-32 (1919) ("right of a manufacturer to maintain secrecy as to his compounds . . . must be held subject to the right of the State . . . to require that the nature of the product be fairly set forth").

112. See *Kewanee Oil v. Bicron Corp.*, 416 U.S. 470, 493 (1974).

113. *Chrysler Corp. v. Brown*, 441 U.S. 281, 304 (1979) (nexus must exist between disclosure regulation and delegation of legislative authority for its promulgation).

114. 21 C.F.R. § 701.3 (1987).

115. 21 C.F.R. § 101.3-4 (1987).

116. 21 U.S.C. § 352 (1982); 21 C.F.R. §§ 201.10, .50, .57(a)(vi), .100(b)(4)-(5) (1987).

117. 40 C.F.R. § 162.10(a)(vi)(g) (1987).

118. 15 U.S.C. § 1261(p)(1)(b) (1987).

119. HCS exempts substances covered by these laws from its coverage. 29 C.F.R. § 1910.1200(b)(4)(i), (ii) & (iv) (1987).

120. See *supra* notes 3-5.

121. If the procedure described above successfully protects manufacturers from trade secret damage, an ingredient disclosure rule might be said to be more "efficient" than HCS in the sense of being "Pareto superior" to it: The rule would make some parties—workers—better off, while leaving none worse off. See R. COOTER & T. ULEN, *supra* note 32, at 49-50. Regulatory interventions cannot be proven to be Pareto superior to market results, however, because the affected parties have not affirmed the superiority of the result through voluntary exchanges among themselves, see TRAGIC CHOICES, *supra* note 16, at 84, and because price increases resulting from regulation make some parties worse off.

The rule's superior efficiency therefore must be justified in economic terms as a "potential Pareto improvement:" It must improve the welfare of those benefiting from it more than it damages the welfare of those made worse off. See R. COOTER & T. ULEN, *supra* note 32, at 50-51. Thus, an ingredient disclosure rule would be more efficient than HCS if the benefits to workers of ingredient information outweigh the costs to manufacturers of disclosure. Costs imposed by the proposed rule include those incurred by manufacturers conducting more extensive hazard evaluations to protect themselves from liability for inadequate warnings. See *supra* Section III-B. These costs will clearly be efficient, however; manufacturers will cease expending resources on hazard evaluations when the costs of additional research begin to exceed expected liability costs. Additional costs in the form of additional paperwork will be insignificant, as these costs are already imposed by HCS. An ingredient disclosure rule therefore results in significant benefits for workers, without imposing excessive additional costs on manufacturers.

exposed,"¹²² suggests that Congress authorized OSHA to promulgate such a rule. The vagueness of the Act¹²³ may leave this question in some dispute, however, and explicit Congressional authorization of an ingredient disclosure rule would therefore be desirable.¹²⁴ Congress should pass legislation¹²⁵ directing OSHA to develop a chemical hazard labeling standard requiring disclosure of product ingredients as well as hazards, subject to a procedure protecting manufacturers' narrowly defined, bona fide trade secrets.

IV. CONCLUSION

Inefficiencies in the market for industrial chemical products have given rise to incentives against the provision of adequate product hazard warnings. A rule requiring chemical manufacturers to provide hazard information must therefore create strong incentives for compliance, an objective that HCS, with its highly discretionary hazard evaluation provisions, failed to accomplish.

Legislation amending HCS to require disclosure of product ingredients as well as hazards will create the compliance incentives HCS now lacks. With product ingredient information, interested parties—union representatives, public interest organizations, plaintiffs' lawyers, and physicians—will be able to conduct independent hazard assessments and moni-

122. 29 U.S.C. § 655(b)(7) (1982).

123. *See supra* note 7.

124. Schroeder & Shapiro, *supra* note 14, at 1269.

125. Amending HCS through legislation rather than agency action has the added benefit of dispelling the confusion created by the Supreme Court's construction of the OSH Act in *Industrial Union Dep't v. American Petroleum Inst.*, 448 U.S. 607 (1980) (Benzene). In that decision, a plurality of the Court held that before promulgating standards, OSHA must establish the existence of a "significant risk of harm." *Id.* at 642. This holding was interpreted in *Bingham v. Louisiana Chem. Ass'n*, 657 F.2d 777 (5th Cir. 1981), to bar OSHA from promulgating standards for "possible hazards," *id.* at 782, as opposed to "particular hazards already identified," *id.* at 785; *see also supra* note 11 (discussing significance of defining rules as "standards," as opposed to "regulations," under the OSH Act).

Under *Benzene*, as interpreted by *Bingham*, OSHA cannot fulfill its statutory mandate "to set the standard which most adequately assures, to the extent feasible, on the basis of the best available evidence, that no employee will suffer material impairment of health . . . even if such employee has regular exposure to the hazard dealt with by such standard." 29 U.S.C. § 655(5) (1982). Because the hazards of chemicals can be conclusively established only after years of worker exposure reveal a pattern of disease or death, *see Note, Trans-Science in Torts*, 96 *YALE L.J.* 428, 429 (1986), barring OSHA from promulgating standards on the basis of preliminary hazard evidence will necessarily result in avoidable harm.

That *Benzene* tends to obstruct justified rulemaking efforts is demonstrated by the subsequent history of the case itself. After the Court invalidated OSHA's lower exposure limit for benzene on the ground that inadequate evidence justified the need for a stricter standard, several studies documented that workers exposed to permissible levels of benzene were many times more likely to develop leukemia and other blood disorders than the general population. *See Occupational Exposure to Benzene*, 52 *Fed. Reg.* 34,460, 34,462-63 (1987). On the basis of these new studies, OSHA again lowered its permissible exposure level for benzene. *Id.*

A statute directing OSHA to promulgate an across-the-board ingredient disclosure requirement would implicitly demonstrate, or could explicitly state, that Congress intends OSHA to promulgate reasonable rules for potential workplace hazards as well as for "conclusively established" ones.

tor the adequacy of manufacturers' warnings. Workers who become ill from exposure to harmful products will be better able to identify and document the causes of their diseases, increasing manufacturers' liability concerns and inducing them to err on the side of disclosure in preparing hazard warnings. Finally, the ability to conduct independent hazard assessments will allow the purchasers of industrial chemical products, and the workers exposed to them, to make better informed decisions about how to respond to product dangers.

