

The Future of Federal Solid Waste Regulation

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I. INTRODUCTION

In the past decade, the federal government has focused an extraordinary effort on the regulation of solid waste.¹ Despite that effort, the legal framework for addressing such wastes is inadequate, in part because of policy confusion about the exact goals of solid waste regulation. Is the goal to prevent short-term harms to air, water and groundwater? If so, how does solid waste regulation relate to the other federal laws that focus directly on preventing such harms? Or is the goal to prevent long-term risks to future generations that can arise when waste is disposed of without prior detoxification? If the safety of future generations is our chief concern, what are the proper standards for regulation, and how effectively do our existing laws embody these standards?

Whatever our objectives, it is clear that existing regulations cannot serve them effectively. Only a very small minority of solid waste — less than 10% of the total — is regulated as hazardous under federal law. Although these wastes are subject to extraordinarily comprehensive controls, there is no way such a tiny fraction can account for even half of either the short or the long-term environmental risks posed by solid waste as a whole.

In 1984, Congress required EPA to issue rules to forbid the land disposal of any hazardous waste without prior detoxification. The cost and complexity of the detoxification program operates as a major incentive either to recycle this waste or simply to not

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1. This article will use the definition of solid waste found in the Solid Waste Disposal Act, which slightly broadens the ordinary meaning of the phrase:

The term 'solid waste' means any garbage, refuse, sludge from a waste treatment plant, water supply treatment plant, or air pollution control facility and other discarded material, including solid, liquid, semisolid, or contained gaseous material resulting from industrial, commercial, mining, and agricultural operations, and from community activities. RCRA § 1001 (27), 42 U.S.C. § 6901 (1988).

This definition also contains some exemptions, which are quoted and discussed in detail below.

generate it in the first place. But by applying such a major new regulatory burden to hazardous wastes, Congress discouraged any expansion of hazardous waste regulation beyond the very small fraction of waste to which it now applies.

Wastes that are not hazardous are largely exempt from prospective federal regulation. For non-hazardous solid wastes, only the prospect of future environmental liability operates to promote detoxification and waste minimization. Yet, although liability for waste disposal is now essentially unlimited, the exact impact of that liability on disposal practices is very uncertain and likely to vary widely among different types of waste generators.

Although the current approach is not ideal, regulations governing disposal of solid waste, along with other laws that regulate discharges to air and water, are probably sufficient to prevent unacceptable short-term air, water, or groundwater pollution from solid waste disposal. But solid waste, unlike discharges to air and water, is frequently disposed of on land, where it may remain over long periods of time creating new environmental problems in the distant future when and if containment breaks down.

In principle, there are three ways of dealing with such a possible export of risks from this generation to our descendants. One approach is to avoid land disposal. Another is to reduce the toxicity of the waste so that it no longer poses long-term dangers when disposed of on land. Finally, a trust fund can be created to address future damages if and when they arise.

This article contends that since our current approach to the solid waste problem has reached its natural limits, market-based approaches provide the best option to induce further reduction of the quantity and toxicity of wastes disposed of on land. Market-based approaches to pollution control have often been supported on grounds of economic efficiency. These approaches have already been implemented to address other environmental problems. For example, chemicals that deplete the stratospheric ozone layer are now restricted by a system of fully transferable production permits.² Over-consumption of water in the West is now being discouraged by letting the market set prices.³ And on a larger scale, if major efforts to reduce emissions of "green-

2. 53 Fed. Reg. 30,566 (1988).

3. Parrish, *Speculating in Water: A New Generation of Entrepreneurs is Selling a Precious Resource to the Highest Bidder with Potentially Profound Effects on Development in the West*, L.A. Times, Sept. 10, 1989, Part 4 at 1, Col. 2.

house" gases become necessary to control global warming, they will almost certainly have to include significant changes in energy prices to reduce fossil fuel consumption.⁴

A market-based approach to waste control could encourage recycling of major items like automobiles by requiring a deposit at the time of purchase, which would be refunded when the item was reclaimed.⁵ Recycling could also be encouraged by removing tax preferences that encourage the use of "virgin" products, by taxing virgin products directly, by allowing an offsetting preference or subsidy for the use of corresponding types of recycled materials, or by some combination of all of these tools.⁶

Measures to encourage recycling, however, do not directly address the environmental dangers of waste disposal. This article, therefore, argues that, although recycling should be encouraged, Congress should also address existing regulatory deficiencies by adopting economic restrictions on the land disposal of *any* waste toxic enough to present an appreciable long-term environmental danger.

Economic restrictions could take the form of either a tax on land disposal or a requirement that such waste be disposed of only under a government-issued allowance authorizing the land disposal of a set quantity of waste. Allowances would be issued yearly in fixed and perhaps diminishing numbers, thus placing an absolute limit on annual land disposal.⁷

Either approach would admittedly raise formidable problems of design and implementation. Indeed, these problems would, in many ways, mirror the difficulties of the present regulatory system. But it might be possible to design economic incentives that would be less sensitive to those defects than our current ap-

4. MINTZER, A MATTER OF DEGREES: THE POTENTIAL FOR CONTROLLING THE GREENHOUSE EFFECT (1987).

5. See Russell, *Economic Incentives and Hazardous Waste*, 13 COLUM. J. ENVT. L. 257, 267-70 (1988).

6. One such combination is found in several recent bills to amend RCRA. The bills require certain products like newsprint or lubricating oil to contain a certain percentage of recycled material. However, this percentage must be met only across the industry as a whole. Consequently, a company that cannot meet its percentage in its own production can still satisfy the law by buying "recycling credits" from a company that is recycling more than the law requires. The result is to force those who recycle little to subsidize those who recycle significantly by buying "recycling credits" from them.

7. Such an "allowance" system is the central feature of the "acid rain" control program under the new Clean Air Act amendments. See Pub. L. No. 101-549, §§ 401-507, 104 Stat. 2399, 2584-2648 (1990).

proach. The adoption of a tax approach to waste disposal could also raise money for the future cleanup of hazardous waste. This approach might allow one of the most troublesome features of current hazardous waste law — the imposition of future liability on waste disposed of in full compliance with today's environmental standards — to be repealed.

Part II of this article will explore the definitional problems that arise in solid waste regulation. Part III will examine the objectives of the regulatory system and will show that the current design and implementation of solid waste regulations fail to meet these objectives. In response to the need for reform of the system, Part IV proposes a market-based approach as an alternative to the command-and-control system currently in effect.

II. THE NATURE OF THE SOLID WASTE PROBLEM

Both conceptual and technical difficulties hamper assessment of solid waste disposal as an environmental problem. In some sense, all of society's discards — whether they take the form of a water discharge, air emissions, or landfilled materials — are "waste." Measuring the total amount of "solid waste" therefore requires not only a somewhat arbitrary decision as to when material has been discarded⁸ but another decision as to what portion of the total discards should receive the "solid waste" label. Although current law answers that question by restricting "solid waste" to "discarded" material temporarily held for treatment or disposal, and to material disposed of on land, variations in applying the definition make measurement of solid waste difficult.

In addition, EPA has failed to generate accurate survey data on waste generation. According to one Congressional study:

a major conclusion that one may draw from [a review of the available information] is that there are significant limitations in the existing factual base. Ten years after the passage of RCRA, there are no current data concerning most facets of hazardous waste generation and disposal. The Environmental Protection Agency (EPA) has made several efforts to collect such information, but most remain unpublished because of problems in

8. For example, EPA treats certain types of recycled material as "discarded waste". However, the courts have at least partially rejected this position. *American Mining Congress v. EPA*, 824 F.2d 1177 (D.C. Cir. 1987). Ironically, the courts also rejected EPA's position that the recycling of certain materials was *exempt* from RCRA when it took place in a facility very similar to the one that generated the waste in the first place. *American Petroleum Inst. v. EPA*, 906 F.2d 729, 739 (D.C. Cir. 1990).

methodology that raise significant questions about data quality.⁹

According to the Office of Technology Assessment, "ten years after RCRA was enacted, the data on [hazardous] waste generation are generally accepted to be incomplete, out of date, unreliable, and sadly lacking in detail."¹⁰ The data on generation of nonhazardous waste are even worse.¹¹

Separate difficulties arise in measuring the environmental impact of "solid waste." Direct discharges into air and water are generally excluded from the definition of "solid waste." A solid waste dump, however, can be an indirect source of air, water, groundwater and even soil pollution, in varying proportions depending on circumstances. Even a facility that is secure at present can be a future source of air and water pollution. Indeed, the potential for future environmental degradation will often far outweigh any present harm. Further, unlike pesticides or other individual chemicals, which also can affect more than one part of the environment, "solid waste" has no set chemical identity. It presents a wide variety of toxicity levels and toxicity profiles depending on its exact composition.

Despite these conceptual and technical difficulties, several general statements can be made about the nature of the waste problem. First, out of approximately eleven billion tons of solid waste generated annually in the United States,¹² only a small fraction of that total, maybe 10%, is classified as "hazardous" under federal law.¹³ Ninety percent of waste, therefore, is not federally regulated. This includes 7.6 billion tons of waste generated by indus-

9. MCCARTHY & REISCH, HAZARDOUS WASTE FACT BOOK 2 (Congressional Research Service 1987).

10. OFFICE OF TECHNOLOGY ASSESSMENT, SERIOUS REDUCTION OF HAZARDOUS WASTE 21 (1986).

11. See generally ENVIRONMENTAL PROTECTION AGENCY, SUBTITLE D OF THE RESOURCE CONSERVATION AND RECOVERY ACT STUDY PHASE I REPORT (1986) [hereinafter SUBTITLE D REPORT].

12. 53 Fed. Reg. 33,317 (1988). Eleven billion tons is the latest figure. An earlier study put the total at about 400 million tons a year. SUBTITLE D REPORT, *supra* note 11, at 2-4, 3-8-3-9. The two results are not as far apart as they might seem. Not only did the earlier study have data gaps, it also measured weight on a *dry* basis. Normally the weight of waste includes its water content; indeed, much "hazardous waste" is mostly water. Accordingly, one would expect dry waste measurements to be dramatically lower than wet ones.

13. One report noted that "[t]he most recent studies, by EPA and others, appear to have reached a consensus that total U.S. hazardous waste generation is in the range of 247

try.¹⁴ In addition, mining operations account for 1.4 billion tons of waste annually, petroleum extraction for 2-3 billion tons, and fly ash and scrubber sludge from utility boilers for 55 million tons.¹⁵ Beyond these commercial wastes, some 6,000 municipal landfills receive 160 million tons of municipal wastes every year,¹⁶ while several million tons of medical waste require annual disposal.¹⁷

Second, EPA's list of old waste disposal sites set for federal cleanup indicates that waste disposal can lead to local groundwater and soil pollution.¹⁸ Other studies have shown the importance of some sites as sources of air pollution.¹⁹ Groundwater, soil and air pollution can be caused by "non-hazardous,"²⁰ as well as "hazardous," wastes.²¹

Third, although some solid wastes lose toxicity over time even under the isolated conditions of a landfill, other solid wastes will retain their toxicity indefinitely.²² In comparison, direct pollution of the air or water is often destroyed or neutralized by natural forces in a short time once the discharge itself has stopped. Since

to 275 million metric tons per year . . . Five studies, using different methodologies, have arrived at a similar bottom line." MCCARTHY & REISCH, *supra* note 9, at 5.

However, the report goes on to question whether the consensus is more than coincidental. See also the latest EPA SURVEY, 1985 NATIONAL BIENNIAL REPORT OF HAZARDOUS WASTE GENERATORS AND TREATMENT, STORAGE AND DISPOSAL FACILITIES REGULATED UNDER RCRA, Volume I, Summary at 5 (1989) [hereinafter 1985 REPORT] (271 million tons of hazardous waste generated annually). Regulatory actions since these reports were written have considerably increased the amount of waste that must be covered by such estimates. In particular, the EPA's new "toxicity characteristic" rule has increased the amount of "hazardous" waste by an estimated 730 million metric tons a year, almost all of it wastewater. 55 Fed. Reg. 11,855 (1990).

14. 53 Fed. Reg. 33,317 (1988).

15. *Id.*

16. 53 Fed. Reg. 33,317-18 (1988).

17. OFFICE OF TECHNOLOGY ASSESSMENT, ISSUES IN MEDICAL WASTE MANAGEMENT I n.3 (1988).

18. See 40 C.F.R. §§ 300.66, 300 app. B (1989) (National Priorities List of Superfund sites) and the preambles accompanying their promulgation.

19. See 55 Fed. Reg. 25,454, 25,456-57 (1990).

20. As of May 1986, twenty-two percent of the sites listed on the CERCLA clean-up list were old municipal landfills, despite an EPA policy that discouraged their inclusion. 53 Fed. Reg. 33,313, 33,319 (1988).

21. Waste disposal sites are far from being the major source of groundwater pollution, the environmental problem with which they are most frequently associated. Instead, the main culprits are such mundane activities as road salting, fertilizing, run-off from paved areas, pesticide use and salt water intrusion due to withdrawal of fresh water. See A.D. TARLOCK, LAW OF WATER RIGHTS AND RESOURCES, § 2.03[2] (1988). Solid waste control alone, therefore, falls far short of a cure for the groundwater contamination problem.

22. See N.Y. Times, Oct. 5, 1989, at B1, col. 1.

solid wastes deposited in a landfill may remain toxic for long periods of time, both the amount of waste contained in the earth and its potential for future environmental damage will increase as long as disposal continues, even if the *rate* of disposal does not increase.

III. HOW WASTE IS REGULATED

Given these basic features of "solid waste," a "solid waste" regulatory program must serve two somewhat conflicting goals. First, it should prevent short-term harms, such as air, water, soil or groundwater pollution, from improper waste disposal. Second, it should address the potential of certain types of waste disposal to cause long-term environmental harm. Ideally, short and long term regulatory burdens should be imposed on a type of waste disposal according to the short and long term environmental risks that it poses.

Our current national effort to address these goals rests largely on two statutes, the Solid Waste Disposal Act²³ (universally and hereinafter called "RCRA," the acronym for its 1976 amendments, entitled the Resource Conservation and Recovery Act)²⁴ and the Comprehensive Environmental Response, Compensation and Liability Act ("CERCLA" or "Superfund").²⁵ RCRA requires EPA to define "hazardous waste" by regulation and then issue rules to reduce both the short-term and long-term dangers of hazardous waste disposal.²⁶ In general, RCRA operates prospectively to regulate future conduct. CERCLA requires the reporting of any release of a "hazardous substance"²⁷ - a broader term than "hazardous waste"²⁸ - and imposes retroactive liability for the cleanup of old "hazardous substance" disposal sites both on their owners and on practically everyone ever involved in the transport and disposal of the waste.²⁹ CERCLA also creates a trust fund for the cleanup of these sites through a tax on oil and

23. 42 U.S.C. §§ 6901-6987 (1988).

24. Resource Conservation and Recovery Act of 1976, Pub. L. No. 94-580, 90 Stat. 2795 (current version at 42 U.S.C. § 6901 (1988)).

25. 42 U.S.C. §§ 9601-9657 (1988).

26. RCRA §§ 3001-3005, 42 U.S.C. §§ 6921-6925 (1988).

27. CERCLA § 103, 42 U.S.C. § 9603 (1988).

28. See CERCLA § 101(14), 42 U.S.C. § 9601(14) (1988), which defines "hazardous waste" as a subcategory of "hazardous substance."

29. CERCLA § 107, 42 U.S.C. § 9607 (1988).

various chemicals, to be used when private funds are insufficient.³⁰

Although, in the abstract, the two statutes together do provide a mechanism for addressing most types of waste disposal, their actual performance has been less than satisfactory. This can be seen most clearly by examining the three central elements of the current system: (1) the classification of wastes as hazardous or not hazardous, (2) the regulation of both "hazardous" and "non-hazardous" wastes to address the short-term dangers their improper handling may pose, and (3) the regulation of long-term dangers from both "hazardous" and "non-hazardous" waste.

A *Determining Whether a Waste Should Be Regulated as Hazardous*

In order to become a candidate for regulation as a "hazardous" waste under RCRA, a material must first be a "solid waste," which means it must be discarded or thrown away in some sense.³¹ Moreover, a material that is discharged as a gas,³² is handled under a permit for discharge into inland or coastal water,³³ has been released under a permit for dumping into the ocean,³⁴ is injected underground,³⁵ or is dumped into a sewer carrying domestic sewage,³⁶ cannot be a "solid waste." Once any of these

30. CERCLA § 111, 42 U.S.C. § 9611 (1988).

31. RCRA § 1004 (27), 42 U.S.C. § 6903 (27) (1988). See *supra* note 1.

32. The RCRA definition of "solid waste" includes "contained gaseous material," thus excluding free gaseous material. *Id.*

33. The RCRA definition of waste does not include "solid or dissolved material in . . . industrial discharges which are point sources subject to permits under Section 1342 of title 38 [FWPCA § 402]." *Id.* EPA has applied this exclusion to all discharges (not simply industrial discharges) subject to such a permit.

34. Waste dumped under such a permit does not formally lose its "hazardous waste" status. Instead, the disposal is granted a permit that satisfies all RCRA requirements by operation of law. 40 C.F.R. 271.1(b)(1)(ii) (1989).

35. A similar "permit by rule" is also granted to any properly permitted injection well that receives hazardous waste. 40 C.F.R. § 146 (1989). However, this is only a formal exemption, since the injection well rules themselves have been extensively rewritten to incorporate RCRA requirements. *NRDC v. EPA*, 907 F.2d 1146 (D.C. Cir. 1990).

36. The definition of "solid waste" states explicitly that it does not apply to "solid or dissolved material in domestic sewage." RCRA § 1004 (27), 42 U.S.C. § 6903 (27) (1988). In 1984, Congress ordered EPA to study the exemption out of concern that it allowed generators to escape from the regulatory system simply by dumping material into a sewer, thereby creating water pollution and contaminating the treatment sludges. RCRA § 3018. Based on that examination, EPA concluded the exemption should be retained, and that contamination of sludge should be prevented by issuing additional regulations under the Clean Water Act. ENVIRONMENTAL PROTECTION AGENCY, REPORT TO CONGRESS ON THE DISCHARGE OF HAZARDOUS WASTES TO PUBLICLY OWNED TREATMENT WORKS (1986).

boundaries is crossed, solid waste law yields jurisdiction to other regulatory programs. "Solid waste," accordingly, includes only material held in storage for treatment or disposal, material undergoing incineration, heat or chemical treatment, and material disposed of on land.

Unlike discharges directly into air and water, solid waste and hazardous waste, as defined by the statutes, do not degrade the environment directly, but only insofar as they give rise to air and water pollution. How a waste is handled is, therefore, critical in determining the waste's potential to harm the environment. RCRA attempts to address the problem of when a waste is potentially hazardous to the environment by directing EPA to list a waste as hazardous if the waste could pose a risk to human health and the environment when "improperly . . . managed."³⁷ However, this formula does not provide a useful test for regulation, since there is literally no waste that might not pose such a danger if severely mismanaged. For example, pure uncontaminated topsoil, if dumped into a reservoir or wetland, could do considerable damage.

EPA has developed two alternative tests to determine whether a material should be included in the hazardous waste system. EPA can designate ("list") the material as hazardous on the ground that it contains unacceptable levels of one or more of a list of 500 "hazardous waste constituents."³⁸ Alternatively, the agency can utilize a more or less objective "characteristic" test that automatically includes all wastes that fail the test.³⁹

37. The statute notes that:

[t]he term "hazardous waste" means a solid waste, or combination of solid wastes, which because of its quantity, concentration, or physical, chemical, or infectious characteristics may-

(A) cause, or significantly contribute to an increase in mortality or an increase in serious irreversible, or incapacitating reversible, illness; or

(B) pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, or disposed of, or otherwise managed.

RCRA § 1004(5), 42 U.S.C. § 6903(5) (1988). The reference to improper management only applies to paragraph (B) of the definition. However, paragraph (A), which lacks that qualifying phrase, poses the same problem because the potential for a waste to become hazardous and lead to an increase in mortality or serious illness depends critically on how the waste is managed.

38. 40 C.F.R. § 266.30 (1990).

39. RCRA requires EPA to publish "criteria for identifying the characteristics of hazardous waste, and for listing hazardous waste." RCRA § 3001(a). EPA must then "list" hazardous wastes on the basis of these "criteria." RCRA § 3001(b). In response, EPA has

Neither of these alternatives, however, resolves the conceptual problem of deciding when a waste is hazardous, because both tests are designed to determine the basic toxicity of the waste itself, not whether that toxicity is likely to lead to actual environmental problems.⁴⁰ This lack of resolution, in turn, gives EPA essentially unlimited discretion in listing decisions. As a result, some solid wastes are excluded from the hazardous waste system even though they pose risks greater than those that are in the system, while other far less hazardous wastes are included in the system. In other words, the current system is both underinclusive and overinclusive.

1. Underinclusion of Wastes in the Hazardous Waste System

Although EPA has broad discretion to classify wastes as hazardous, only a minor fraction of the waste generated in this country has been listed.⁴¹ In addition, the most encompassing character-

issued both listing "criteria" consisting of a number of specific characteristics (such as ignitability) and a list of "toxic constituents" that may make a waste hazardous. 40 C.F.R. § 261.31 (1990). Most waste listings have been based on the presence of one or more of these constituents. 40 C.F.R. pt. 261, app. VII (1990).

EPA lists wastes in two primary categories. The first are "F" wastes, which can come from any source as long as they fit the description in the regulation — for example, "spent halogenated solvents." 40 C.F.R. § 261.32 (1990). The second are "K" wastes which originate from specific sources, such as "slop oil emulsion solids from the petroleum refining industry." 40 C.F.R. § 261.32 (1990). Such wastes must derive from the exact process described. A slop oil emulsion solid from petroleum distribution would not be a listed waste under the above definition no matter how similar in chemical nature it was to a refining emulsion solid. In addition, EPA has listed several hundred chemical products as hazardous wastes ("P" and "U" wastes) if and when they are discarded. 40 C.F.R. § 261.33 (1990). K. Florini, R. Denison & P. Rathbun, *EPA's Delisting Program for Hazardous Wastes: Current Limitations and Future Directions*, 19 *Envtl. L. Rep.* (Envtl. L. Inst.) 10558, 10559 (1989) [hereinafter Florini]. The "characteristic" tests, which automatically make a waste hazardous, are set out in 40 C.F.R. §§ 261.20-24 (1990).

40. EPA noted that:

[t]he first inquiry . . . is whether the waste contains any of the toxic constituents listed in Appendix VIII. . . . [T]he presence of any of these constituents in the waste is presumed to be sufficient to list the waste unless after consideration of . . . multiple factors, EPA concludes the waste is not hazardous. These multiple factors include the type of toxic threat posed, the concentrations of the toxic constituents in the waste, the migration potential, persistence and degradation potential of the toxic constituents, the degree to which the toxic constituents bioaccumulate in ecosystems, the plausible types of improper management to which the waste could be subjected, the quantities of waste generated, and other factors not explicitly designated by the Act. 45 *Fed. Reg.* 33,107 (1980). *See also* 55 *Fed. Reg.* 11,800 (1990).

41. Only about 10% of the hazardous waste generated in 1985 was "listed" and 56% was hazardous by "characteristic" only. The balance was a mixture that could not be broken down. Computed from 1985 REPORT, *supra* note 13, Table III-7 at III-18. EPA "list-

istic test is based on the potential of a waste to leach any one of 39 substances of concern in quantities that might violate drinking water guidelines when disposed of in an "actively decomposing landfill that overlies an aquifer."⁴² Such a test is both overinclusive, because not all waste is disposed of in an environment prone to extensive leaching, and underinclusive, because it fails to address other forms of pollution, such as air emissions, ecological damage, or, indeed, any type of environmental harm other than damage to drinking water.

EPA and Congress have been deterred from aggressively expanding hazardous waste program coverage because of the stigma and drastic regulatory burden that attend listing a waste. Household wastes,⁴³ medical wastes,⁴⁴ mining wastes,⁴⁵ petroleum wastes,⁴⁶ used oil,⁴⁷ utility wastes⁴⁸ and wastes from small generators⁴⁹ have all been excluded from regulation by EPA or Congress, or both. The most commonly-provided reason for excluding such wastes is that, while the waste may present some risks, the hazardous waste regulatory requirements are too strict to be appropriate. As a result, the total amount of characteristic waste excluded from the RCRA system exceeds the amount included,⁵⁰ though this problem was partially addressed when Con-

ing" decisions have been successfully challenged in court on only one occasion. *American Mining Congress v. EPA*, No. 88-1835 (D.C. Cir. July 10, 1990).

42. See 55 Fed. Reg. 11,800 (1990).

43. See 40 C.F.R. § 261.4(b)(1) (1990).

44. See 45 Fed. Reg. 33,087 (1980). See also 54 Fed. Reg. 12,326 (1989).

45. See 40 C.F.R. § 261.4(b)(3), (7) (1990).

46. See 40 C.F.R. § 261.4(b)(5) (1990).

47. See 51 Fed. Reg. 41,900 (1986); 45 Fed. Reg. 11,798 (1990).

48. See 40 C.F.R. § 261.4(b)(4) (1990).

49. See 40 C.F.R. § 261.5 (1990).

50. In its initial regulations, EPA excluded household wastes from "hazardous" status even if they would have been hazardous under the usual tests, finding that Congress had not intended to subject household waste to such a regulatory burden. 45 Fed. Reg. 33,098-99 (1980). Similarly, EPA excluded industrial hazardous waste generated by "small quantity generators" from most requirements, concluding that it would not be cost-effective to include such small polluters in the regulatory system. *Id.* at 33,102-05. Congress subsequently endorsed both decisions, RCRA §§ 3001(i), 3001(d), although it required EPA to narrow the boundaries of the "small quantity generator" category, RCRA § 3001(d), and impose some regulation on facilities that received excluded household and small quantity generator waste.

Household and small quantity generator wastes only account for about a million tons of the several hundred million tons of hazardous waste generated annually in this country. SUBTITLE D REPORT, *supra* note 11, at 3-6, 3-16. However, at the other end of the scale, Congress also required EPA to exclude most mining, utility, and petroleum production waste from the hazardous waste system pending more detailed study, expressing a fear

gress, in a 1984 amendment to RCRA, directed EPA to consider new listings and to expand the characteristics test.⁵¹

2. Overinclusion of Wastes in the Hazardous Waste System

RCRA also classifies as hazardous many wastes that are far less toxic than those that have been excluded from the system. Since 1980, EPA has asserted that any waste "mixed with" or "derived from" a listed hazardous waste is itself that waste for all regula-

that the extremely complex "hazardous waste" regulatory matrix was not appropriate for wastes presenting relatively low hazard but generated in large quantity. RCRA §§ 3001(b)(2), (b)(3), 8002(m). After the completion of these studies, EPA decided to continue the exclusion of these wastes, in large measure because it concluded that the existing hazardous waste regulations were too restrictive and far out of proportion to the risks presented. EPA also doubted its ability to devise more appropriate alternatives, despite unquestionable statutory authority to make such an effort, at least for mining wastes, RCRA § 3004(x), and probably for other wastes as well. 53 Fed. Reg. 25,446 (1988) (decision not to regulate oil and gas production wastes). The courts have upheld this basic approach to mining wastes, *Environmental Defense Fund v. EPA*, 852 F.2d. 1309 (D.C. Cir. 1988), although they have forced EPA to include in the regulatory system additional mining wastes that do not meet the basic regulatory test of "high volume/low hazard." *Environmental Defense Fund v. EPA*, 852 F.2d. 1316 (D.C. Cir. 1988). Since then EPA has acted to include a number of such wastes, *see, e.g.*, 55 Fed. Reg. 2,322 (1990), although the courts have not always sustained EPA's efforts. *See supra* note 41.

EPA has also chosen not to extend Subtitle C to medical waste, although the statute, at RCRA § 1001(27), explicitly authorizes classifying waste as hazardous because of its "infectious" properties, or to ash from municipal incinerators, even though that ash frequently fails the EP-toxicity test. Again, the Agency had doubts about the appropriateness of the Subtitle C system for such varieties of wastes. Congress and the courts have extended the incinerator exemption even beyond EPA's original intent. *See* RCRA § 3001(i); *Environmental Defense Fund v. Wheelabrator Technologies*, 725 F. Supp. 758 (S.D.N.Y. 1989); *Environmental Defense Fund v. City of Chicago*, 727 F. Supp. 419 (N.D. Ill. 1989).

Finally, EPA responded to an explicit directive to consider listing "used oil" as hazardous, at RCRA § 3014(b), coupled with authority to set special, less prescriptive standards for used oil, at RCRA § 3014(c), by deciding that the "stigma" of listing would unduly discourage used oil recycling. This argument, which the Agency itself has not found persuasive when applied to wastes already listed, has been rejected by the courts and the issue sent back to the agency. *Hazardous Waste Treatment Council v. EPA*, 861 F.2d. 270 (D.C. Cir. 1988).

The end result, according to one survey, is that "more waste with hazardous characteristics is excluded from regulation under RCRA than is regulated." MCCARTHY & REISCH, *HAZARDOUS WASTE FACT BOOK* (Congressional Research Service 1987). The subsequent text makes clear that this is due to the various statutory and regulatory exclusions from "hazardous waste" status. *Id.* at 16-18.

51. RCRA § 3001(e), added in 1984, requires EPA to consider listing wastes from twenty-one additional waste categories, some of which are very broad ("dyes and pigments"). § 3004(g) and (h) require EPA to "examine the deficiencies of the [most widely used] characteristic" test and correct them, and also to add to the test "additional characteristics of hazardous waste, including measures or indicators of toxicity."

tory purposes.⁵² Under EPA's rule, a pile of leaves onto which a cup of listed waste (or the residue from treating that waste) was spilled, would become that listed waste, no matter how great the dilution factor or whether the waste was present in the treatment residue at all.⁵³ The "mixture" and "derived from" rules therefore mean that any new waste listed in an effort to reduce the underinclusiveness of the current system will simultaneously expand the system's overinclusiveness by automatically including all mixtures and derivatives of the new waste in the hazardous waste system.

Since 1980, EPA has held out the possibility of "delisting" a listed waste⁵⁴ as a cure for the overinclusion created both by the coarse cut of the listing categories and by the "mixture" and "derived from" rules.⁵⁵ Under the "delisting" procedures, EPA can conclude, in response to a petition from a waste generator, that a waste does not exhibit the dangers for which it was originally listed or any other dangers that warrant its continued inclusion in the hazardous waste system.⁵⁶

The delisting test, however, is strict, data intensive and must follow procedures that satisfy full rulemaking requirements.⁵⁷ It is often more extensive than the test for listing of a waste since

52. 40 C.F.R. § 261.3 (a)(2)(iii) (1990) (mixture rule); 40 C.F.R. § 261.3 (c)(2) (1990) (derived from rule).

53. This example is not exaggerated. EPA has asserted, in applying these rules, that the water that leaches through a hazardous waste landfill becomes each and every waste that was ever put in the landfill in the eyes of the law, since the water probably became mixed with each of those wastes as it leached through. 53 Fed. Reg. 31,146-50 (1988). The courts have upheld this interpretation in general outline. *Chemical Waste Management, Inc. v. EPA*, 869 F.2d 1526 (D.C. Cir. 1989). EPA later somewhat tempered its original position on this issue. 55 Fed. Reg. 22,520 (1990).

Even if we look only at the text of the regulations themselves, we find exemptions designed to make sure that routine wastewater does not become a hazardous waste because of contamination with parts per million of solvents used in the plant or chemical products produced there. 40 C.F.R. § 261.3 (a)(2)(iv) (1990). Such exemptions themselves illustrate the extraordinary breadth of the "mixture" rule.

54. The characteristics test does not present this problem because a "characteristic" waste leaves the RCRA system whenever, as a result of treatment or some other change, it no longer exhibits the RCRA "characteristic." 40 C.F.R. § 261.3 (a)(2)(iii), (d)(1) (1990).

55. 40 C.F.R. § 260.22 (1990). In 1984, Congress significantly tightened these "delisting" criteria to forbid EPA's prior practice of simply delisting a waste upon finding that it did not meet the original listing criteria, without examining whether there were other reasons why the waste might be still hazardous. RCRA § 3001(f)(1).

56. RCRA § 3001(f)(1).

57. RCRA § 3001(f)(2)(B). In 1984, Congress similarly prohibited EPA from "delisting" a waste, even on an interim basis, without full rulemaking procedures. *Id.*

many of the original waste listings were based on very little data.⁵⁸ Indeed, the listing process does not consider all environmental dangers that may be posed by a waste. Critics argue that these unconsidered questions should be addressed before a waste can be delisted⁵⁹ and Congress has to some extent accepted this argument.⁶⁰ However, by making exit from the RCRA system far more difficult than entry, Congress has decreased the utility of delisting and ensured that many wastes will be retained in the hazardous waste system even though they are markedly less hazardous than many wastes outside it.

3. Regulation of Hazardous Waste Under Other Federal Statutes

In a few cases, a waste that is not hazardous under RCRA may be subject to comparable regulation under other federal environmental statutes. The major examples are polychlorinated biphenyl wastes,⁶¹ radioactive wastes,⁶² sewage sludge,⁶³ and, in a somewhat different category, wastes from the surface mining of coal.⁶⁴

58. When EPA originally listed these wastes, EPA made the following comments: The Agency anticipates arguments that these toxicity listing determinations are made on the basis of inadequate data EPA recognizes that these listing determinations are essentially qualitative judgments However, the statute requires only that a qualitative judgment be made, namely that the wastes, if mismanaged, pose sufficient potentiality of hazard to warrant careful regulation. The Agency believes that it has compiled sufficient information on which to make this judgment. Nor would the delay necessary to compile in-depth . . . information on potentially hazardous waste be preferable in light of the urgent need for rapid implementation of the hazardous waste management program.

45 Fed. Reg. 33,113-14 (1980).

59. Florini, *supra* note 39, at 10,567.

60. See RCRA § 3001(f).

61. See section 6 of the Toxic Substances Control Act, 15 U.S.C. § 2605 (1988), and 40 C.F.R. pt. 761 (1990).

62. Radiation from source, special nuclear and byproduct material associated with the nuclear fuel cycle is governed by the provisions of the Atomic Energy Act of 1954, 42 U.S.C. §§ 2011-2296 (1988).

63. The Federal Water Pollution Control Act, commonly referred to as the Clean Water Act, 33 U.S.C. § 1345 (1988), provides that any disposal of sewage sludge into navigable waters must be authorized by a permit issued by the Administrator. Regulations to implement the use and disposal of sewage sludge have been proposed by EPA and await final adoption. See 54 Fed. Reg. 5,746 (1989).

64. Title V of the Surface Mining Control and Reclamation Act of 1977 ("SMCRA"), 30 U.S.C. §§ 1251-1279 (1988), provides for the control of environmental hazards from surface coal mining through both state and federally promulgated permit programs. Any person that engages in surface coal mining must first obtain a valid state or federal permit.

Beyond these isolated examples, federal controls of “nonhazardous” waste tend to take the form of liability rather than regulation. CERCLA automatically classifies as a hazardous substance essentially any material that EPA has ever regulated as hazardous under any of its statutes.⁶⁵ Any person who sends a waste containing such a substance in any concentration to a landfill becomes liable for cleanup costs if environmental problems develop there. The fact that the waste’s contribution to the problem was minuscule or nonexistent is not a defense to liability.⁶⁶

While EPA can only expand the list of “hazardous” wastes by the laborious regulatory process of new listings or changes to the characteristics tests, the list of “hazardous substances” triggering CERCLA liability expands automatically whenever EPA regulates a new substance as hazardous. Moreover, while certain types of releases, notably those into the air or water, are exempt from CERCLA liability if they are “federally permitted,”⁶⁷ the exemption for waste sent to RCRA facilities is very narrow, and does not apply if the facility ever leaks.⁶⁸ Accordingly, even disposal that takes place currently in full compliance with RCRA can lead to CERCLA liability at a later date.

The standards of performance for surface mining activities are contained in 40 C.F.R. pt. 816 (1990).

The provisions of SMCRA and RCRA purposefully complement each other. RCRA provides that EPA must affirmatively determine that the SMCRA regulations do not adequately address the purposes of RCRA before issuing any RCRA regulations applicable to surface coal mines. The Department of the Interior, not EPA, is then responsible for implementing such regulations. RCRA § 1006(c).

65. 42 U.S.C. § 9601 (14) (1988).

66. *Amoco Oil Co. v. Borden, Inc.*, 889 F.2d 664, 669 (5th Cir. 1990) (CERCLA does not impose any quantitative requirement on the term “hazardous substance”); *United States v. Western Processing, Inc.*, 734 F. Supp. 930 (W.D. Wash. 1990) (Party is liable for costs of clean up even if insignificant contributor of wastes; the amount of waste contributed goes to the apportionment of costs, not liability).

67. The CERCLA “federally permitted release” provision for solid waste applies only to: (a) hazardous waste; (b) sent to a fully permitted hazardous waste treatment, storage, or disposal facility; and (c) when such permit specifically identifies the hazardous substances and makes such substances subject to a standard of practice, control procedure, or bioassay limitation or condition, or other control on the hazardous substances in such releases. 42 U.S.C. § 9601(10)(E) (1988).

The only such “condition, control or limitation” applying to releases to groundwater, by far the most frequent source of long-term environmental contamination, generally forbids any release above background levels or above any applicable drinking water standards. 40 C.F.R. § 264.94 (1989).

68. 40 C.F.R. 264.94 (1989).

4. Evaluating Waste Hazards

As a result of the inconsistencies in and incoherence of the listing part of the regulatory program, the question of how to evaluate and react to the long-term hazard of a waste is in a state of complete uncertainty at present. In addition to the lack of any comprehensive standards for listing a waste, EPA uses one model and set of risk factors in deciding whether to find a waste hazardous by characteristic; a second, and more conservative model and set of risk factors in deciding when to "delist" a listed waste; and a third, still more conservative approach in deciding when a contaminated hazardous waste site has been cleaned up satisfactorily under Superfund. EPA has even promised a fourth set of "relisting" criteria that will set contaminant levels below which wastes are automatically not regarded as hazardous, without saying how these criteria will be designed or how they will avoid the problems that have derailed past attempts at consistency.⁶⁹ EPA denies that these approaches are inconsistent with each other since (in EPA's view) they each implement different programs with different statutory purposes.

B. *Regulations Addressing Short-Run Waste Danger*

Once a waste is listed as hazardous, the RCRA rules subject it to extraordinarily strict controls designed to assure that its generation and fate are completely documented,⁷⁰ that it is stored with minimal danger of spills,⁷¹ that spills are promptly cleaned up,⁷² and that waste is sent only to a properly permitted and tightly regulated "treatment, storage or disposal (TSD) facility."⁷³ The

69. See 55 Fed. Reg. 6,640, 6,641 n.1 (1990); 55 Fed. Reg. 11,798, 11,830-34 (1990); Florini, *supra* note 39, at 10,564-65.

70. See 40 C.F.R. §§ 262.20-23; 263.20, 264.76 (1989) (implement the requirement of RCRA § 3002(b)(5) that all movements of hazardous waste from generation site to final disposal facility, or from "cradle to grave," be documented through a "manifest").

71. 40 C.F.R. § 262.34 (1989) (security requirements applicable to facilities that store wastes for less than 90 days).

72. *Id.* A person who spills a process chemical that is not a "waste" converts it into a waste by the act of spilling it. Ordinarily, treatment of a "waste" is forbidden without first obtaining a permit. However, EPA has slightly amended this requirement through issuance of a temporary emergency permit to allow immediate clean up of a spill. 40 C.F.R. §§ 270.1(b)(3), 270.61 (1990).

73. The entire universe of RCRA "treatment, storage and disposal" ("TSD") facilities falls into the following categories subject to different regulatory requirements:

"containers" which are portable devices in which wastes are "stored, transported, treated, disposed of, or otherwise handled." 40 C.F.R. § 260.10 (1990);

hazardous waste regulations also include safeguards against groundwater pollution from any TSD facility and against air pollution from incinerators.⁷⁴ The groundwater protection rules forbid most discharges that could pose any environmental danger between the time a waste is generated until 30 years after the closure of a landfill containing that waste.

Nonhazardous waste management, on the other hand, currently is largely left to the states. However, Section 1008 of RCRA does authorize the Administrator to "publish suggested guidelines" for states to use in administering their solid waste controls. A parallel provision, RCRA § 4004(a), authorizes EPA to promulgate criteria to distinguish between acceptable solid waste disposal facilities ("sanitary landfills") and unacceptable facilities ("open dumps"). These provisions have slightly more than the precatory effect their language might suggest since Subtitle D provides that upon the promulgation of such criteria "any solid waste management practice . . . which constitutes the open dumping of solid waste or hazardous waste is prohibited," unless it is

"tanks" which are self-supporting non-earthen "stationary devices." 40 C.F.R. §§ 260.10, 264.190-99 (1990);

"surface impoundments" which are excavations or depressions used for treating or storing (but not disposing) liquid wastes. 40 C.F.R. §§ 260.10, 264.220-31 (1990);

"waste piles" which are what the name implies, used for storing non-liquid wastes. 40 C.F.R. §§ 264.250-59 (1990);

"land treatment facilities" which are facilities where the waste is mixed with soil, generally to be destroyed by natural soil processes. 40 C.F.R. §§ 260.10, 264.270-83 (1990);

"landfills" which are "disposal facilities" where wastes will remain in the ground permanently, and which are not regulated under any of the other categories. 40 C.F.R. §§ 260.10, 264.300-17 (1990). Surface impoundments, waste piles and land treatment facilities where waste will remain after closure are in effect treated as landfills; "incinerators" which destroy wastes by flame combustion. 40 C.F.R. §§ 260.10, 264.340-51 (1990); and

"miscellaneous" units, which do not fall into any other category. EPA's rule suggests they will mainly consist of units to destroy waste by heat or energy without exposure to flames, geologic repositories, and detonation facilities. 40 C.F.R. §§ 260.10, 264.600-03 (1990).

The boundaries between these different categories form a legal field in themselves. For example, a "tank" can be "mobile" despite the literal language of the definition. 52 Fed. Reg. 20,914-15 (1987). However, such issues bear little relation to the subject of this article and will not be discussed here.

74. 40 C.F.R. pt. 264, subpt. F (groundwater protection at land disposal units), subpt. O (incinerator standards) (1990). EPA has announced its intention to tighten significantly standards for burning "hazardous waste" by proposing additional controls on emissions of metals, residual organic compounds and hydrogen chloride emissions. 54 Fed. Reg. 45,311 (1989); 55 Fed. Reg. 17,862 (1990).

subject to a state compliance schedule under an EPA-approved management plan.⁷⁵ Although EPA itself cannot enforce this requirement, it can be enforced by the public through a "citizen suit" under RCRA.⁷⁶

EPA is now engaged in using its authority to regulate non-hazardous solid waste disposal, in tandem with its powers under the Clean Air Act, to regulate the landfilling and incineration of municipal solid waste. The controls will require future protection of groundwater at landfills⁷⁷ and reduction of several different types of air emissions from municipal waste incinerators.⁷⁸ Neither rule, however, has been issued in final form and, even when issued, the rules will address only one to two percent of the non-hazardous waste generated annually in this country.

EPA has suggested that similar initiatives lie in store for selected types of industrial non-hazardous waste.⁷⁹ Bills to amend RCRA would likewise expand regulation of non-hazardous waste, generally by subjecting certain types of non-hazardous waste to certain features of the hazardous waste system.⁸⁰ In either case, however, any additional regulation lies many years in the future.

Beyond these regulations aimed specifically at "waste," any discharge into the water from any waste facility must be permitted and must observe control standards under the Clean Water Act.⁸¹ Similarly, emissions into the air from waste facilities are controlled under the Clean Air Act.⁸² Congress has recently greatly

75. RCRA § 4005(a).

76. RCRA § 7002. In addition, for one class of hazardous waste management facilities — those that may receive hazardous waste excluded from Subtitle C because the waste comes from a household or small quantity generator — Subtitle D requirements can be enforced by application of the full array of civil and criminal enforcement authorities that apply to hazardous waste. RCRA § 4005(c)(2).

77. 53 Fed. Reg. 33,314, 33,323-24 (1988).

78. See § 129 of Clean Air Act as Amended by Title III of the Clean Air Act Amendments of 1990, Pub. L. No. 101-549, 104 Stat. 2399 (1990).

79. 53 Fed. Reg. 33,322 (1988) (EPA proposes to begin gathering data on an estimated 28,000 industrial nonhazardous waste facilities and to propose a rule "at such time as EPA has adequate data on which to base its decisions.").

80. See, e.g., H.R. 3735, 101st Cong., 2d Sess. (1990).

81. 33 U.S.C. § 1342 (1988).

82. In general, emissions from these facilities must be regulated as necessary to achieve air quality standards. 42 U.S.C. § 7511(b) (1988). The Clean Air Act Amendments of 1990 direct EPA to issue guidance on a priority basis for the regulation of these facilities. Pub. L. No. 101-549, § 129, 104 Stat. 2399, 2443 (1990).

tightened standards on "hazardous" air pollutants of the sort that may be given off by waste disposal operations.⁸³

CERCLA provides an added incentive to waste generators to dispose of their waste properly. Short-term dangers posed not just by hazardous waste but by any "hazardous substance," can trigger CERCLA cleanup liability.⁸⁴ Indeed, CERCLA puts great pressure on those who create such problems to cure them quickly by imposing a duty to report to the government the unpermitted release of any "hazardous substance" into the "environment," a term that includes any release outside of a building.⁸⁵

Finally, even in the absence of a release, storage of "non-hazardous" waste and of other materials in underground tanks is regulated by recently enacted federal legislation.⁸⁶ Transportation of both hazardous and non-hazardous materials is regulated by the Hazardous Materials Transportation Act.⁸⁷

C. *Long-Run Dangers from Hazardous and Non-Hazardous Waste Disposal*

In waste control, as elsewhere, no clear boundary divides the short term from the long. Instead, differences in time scale affect the balance between philosophies of regulation. Short-run dangers can be, and historically have been, addressed by controls on the owners of pollution sources to directly or indirectly limit the amount of pollution emitted into the air or water. The RCRA requirements to document waste shipments, prevent spills or clean them up quickly, monitor and, if necessary, clean groundwater, and scrub incinerator emissions embody this philosophy as do the CERCLA requirements for reporting spills and the limits on air or water discharges under other statutes.

There is no assurance, however, that such requirements can be administered, or that the owners themselves will even continue to exist,⁸⁸ when a source like a landfill poses a danger over the long term. Accordingly, long-run problems call for three types of solutions quite different from those used to address short-run

83. See Title III of the Clean Air Act Amendments of 1990. Pub. L. No. 101-549, 104 Stat. 2399 (1990).

84. CERCLA § 107, 42 U.S.C. § 9607 (1988).

85. 42 U.S.C. §§ 9603, 9601 (1988).

86. 42 U.S.C. §§ 6991-91h (1988).

87. 49 U.S.C. §§ 1801-13 (1988).

88. "Of the top 25 companies in the year 1900 only two are on the list today." B.J. WATTENBERG, *THE GOOD NEWS IS THE BAD NEWS IS WRONG* 262 (1984).

problems. First, waste minimization reduces the need for land disposal. Second, the pollution can be detoxified so that it no longer poses an environmental danger, even if disposed of in a landfill or other similar facility. Finally, in a combination of short-term and long-term approaches, the long-term problem can be turned over to a long-lived organization such as a government trust fund that would be capable of monitoring and controlling current and future discharges to the environment.

1. Waste Minimization

Before 1984, RCRA contained no special regulatory provisions aimed at the long term. In implementing the law, EPA concerned itself exclusively with tightening the controls on various types of waste treatment or disposal, without directly attempting to favor one approach over another. To the extent that EPA considered the issue, it hoped that the increased cost of waste disposal stemming from these controls would produce new incentives for "waste minimization."⁸⁹

Indeed, during this period, EPA issued rules that actually discouraged recycling, one of the most widely practiced types of waste minimization. The rules included certain types of waste reclamation in the RCRA system without regard to how much care was used in recycling or to the value of the final product. Ironically, EPA made it quite clear that the less analogous reclamation was to production using virgin materials, the more likely the process was to be regulated under RCRA.⁹⁰ The effect was to place the stigma of hazardous waste treatment, a number of short-run housekeeping requirements of doubtful value, and po-

89. See Senate Comm. on Environment and Public Works, S. REP. No. 284, 98th Cong., 1st Sess. 1-7 (1983) (discussing failure of the EPA regulatory program and stressing need for future waste minimization efforts).

90. The D.C. Circuit called the EPA "recycling rules" that express this judgment "mind-numbing." *American Mining Congress v. EPA*, 824 F.2d 1177, 1189 (D.C. Cir. 1987). In brief summary, however, the recycling rules make any expended production materials (e.g., contaminated solvents), any listed by-products of production, and any listed pollution control sludges into "hazardous wastes" whenever they are reprocessed off the original production site, unless they are used immediately and directly as part of a new product. 40 C.F.R. § 261.1(c)(4), .2(c)(3), .2(e) (1990). Even materials reclaimed on the generation site are "wastes" unless (a) they are returned to the original process in which they were generated and (b) that process is based on the use of raw materials. 40 C.F.R. § 261.2(e)(iii) (1990). Under this last distinction, bag-house dust returned to the original smelter would not be a waste; however, bag-house dust would be a waste if it were reclaimed in a separate furnace, or off-site. See 50 Fed. Reg. 640-41 (1985). Recycling

tentially burdensome cleanup requirements,⁹¹ on precisely those activities that, by minimizing waste, could make the largest contribution to removing its long-term dangers.

2. Toxicity Reduction

a. *Hazardous Waste.*

Despite the growth of RCRA regulation in the early 1980's, for many types of waste land disposal remained cheaper than any alternative. Indeed, before 1984, RCRA discouraged the development of alternative waste treatment technologies: the new TSDs required to embody technical advances could not be constructed without first obtaining a RCRA permit, which took several years.⁹² Meanwhile, existing facilities (largely landfills and sur-

used automobiles would always involve waste disposal, since there is no analogous process using "virgin" product.

The recycling rules also contain a generalized prohibition against "sham" recycling that is really waste disposal under another name, 50 Fed. Reg. 638-39 (1985), and provide that materials that are unduly accumulated without being recycled automatically become wastes. 40 C.F.R. §§ 261.1(c)(8), .2(d)(4) (1990). Full compliance with these rules, however, does not exempt those who recycle listed sludges, by-products, and spent materials from "hazardous waste" status.

The courts have found that these rules exceed EPA's authority in situations where the material at issue is not a "waste" because it has not been "discarded." *See e.g., American Mining Congress*, 824 F.2d at 1189. However, EPA's proposed rule in response does not change any of the features discussed above. *See* 53 Fed. Reg. 519 (1988).

91. Despite asserting authority to do so, EPA does not currently regulate the act of recycling "hazardous waste." 40 C.F.R. § 261.6(c)(1) (1990). However, recycling facilities that receive "hazardous waste" must register with EPA and must conform to the manifest system. 40 C.F.R. § 261.6(a) (1990). They also must cope with the public and customer fears raised by the label of "hazardous waste facility".

If such facilities plan to store waste, they must get a RCRA permit before beginning operations. *Id.* The applicant is generally subject to a long wait before receiving a permit. Upon receipt of the permit, one is then required to clean up any *other* "solid waste management units" at the facility, regardless of when they were created. RCRA § 3004(u), (v), 42 U.S.C. § 6924 (u), (v) (1976). The unpredictable prospect of incurring such liability is a major deterrent to entering the hazardous waste system. In terms of environmental protection, these requirements provide, at best, limited assurance that the materials at issue will be stored and handled carefully. However, the potential triggering of CERCLA already provides a large degree of such assurance that all hazardous chemicals, including wastes, will be properly handled, at least in the short run. Moreover, if the recycling really does have commercial value, as it must to claim a RCRA exemption, there will be little motive to handle the material with any less care than a virgin product.

92. Although the original version of RCRA did not contain any bar on beginning construction of a hazardous waste treatment facility without getting a permit first, EPA included such a bar in its original implementing regulations. 40 C.F.R. § 270.10(f)(1) (1990). Congress then endorsed that decision and wrote it into the statute in 1984. RCRA § 3005(a), 42 U.S.C. § 6925(a) (1976).

face impoundments) could operate indefinitely in grandfather status while their permits were processed.⁹³

Eliminating incentives for land disposal was the major theme of the 1984 RCRA amendments. Congress accomplished this by the gradual phase-out of grandfather protection, particularly for the less secure land disposal facilities.⁹⁴ In a far greater break with the past, Congress placed EPA on a schedule to gradually forbid the land disposal of any hazardous waste that had not first been treated to a level defined by use of the "best demonstrated available technology" ("BDAT"). The statute required full promulgation of these "land ban" regulations by May, 1990, subject only to limited individual extensions. Land disposal of any waste for which BDAT had not been set was forbidden after May 1990, no matter how well the waste had been treated.⁹⁵

93. Since 1976, RCRA has required that once regulations establishing the program were issued, all hazardous waste treatment, storage, and disposal facilities must have permits to operate. RCRA § 3005(a). However, the 1976 statute exempted facilities "in existence" when the statute was enacted from the permit requirement. RCRA § 3005(e). EPA extended this provision in its implementing regulations; these provided that any facility in existence when the regulatory program took effect and which promptly filed a short notification form with EPA would be grandfathered (have "interim status") until its full permit was processed. 40 C.F.R. §§ 265.1, 270.10 (1990). The approach survived without serious challenge and was explicitly endorsed in the 1984 RCRA amendments. RCRA § 3005(e).

94. In 1984, Congress amended RCRA to force closure of most "surface impoundments" that did not meet certain minimum technical requirements, RCRA § 3005(j), and of landfills that were not in compliance with groundwater monitoring requirements and "financial responsibility" provisions to ensure future clean-up costs could be covered. RCRA § 3005(e)(3)(B). It also required all existing facilities that had not yet applied for permits to do so, and put EPA under a deadline to respond. RCRA § 3005(c), (e). Finally, Congress acted to limit the possible expansion of any existing facility before it received a final permit. RCRA § 3015.

95. In 1984, Congress amended RCRA to provide explicitly that because "certain types of land disposal facilities are not capable of assuring long-term containment of certain hazardous wastes," land disposal should be "the least favored method for managing hazardous wastes." RCRA § 1002(b)(7).

To enforce that policy, Congress required EPA to forbid the land disposal of any hazardous waste that had not first been subject to

levels or methods of treatment . . . which substantially diminish the toxicity of the waste or substantially reduce the likelihood of migration of hazardous constituents from the waste so that short-term and long-term threats to human health and the environment are minimized.

RCRA § 3004(m).

EPA concluded, based on statements in the legislative history, that this standard requires application of reasonable, state-of-the-art, treatment standards, or "best demonstrated available technology" ("BDAT"). 51 Fed. Reg. 40,578 (1986). The courts upheld this important conclusion but required EPA to provide a fuller explanation of its decision not to consider health effects in setting treatment standards. Hazardous Waste Treatment

In the short term, this program can be viewed as involving huge expenditures for almost no gain.⁹⁶ In some cases, the health risk of BDAT treatment of a waste may actually exceed the health risk of continued land disposal.⁹⁷ A long-term view, however, yields a more favorable perspective. BDAT treatment standards certainly reduce long-term dangers from a waste, though there is no assurance that they eliminate them. In addition, the cost of treatment, although not tied to any overall environmental purpose, serves as

Council v. EPA, 886 F.2d 355, 361-66 (D.C. Cir. 1989), *cert. denied*, 111 S. Ct. 139 (1990). EPA has since provided that explanation, reaffirming its original position, 55 Fed. Reg. 6,640-42 (1990), and the court has accepted it. 55 Fed. Reg. 22,535 (1990).

The rules implementing BDAT were to be issued in four stages. EPA has met its schedule for all four. Although some types of land disposal were permitted during the period while the rules were being issued, RCRA § 3004(g)(6), all land disposal of untreated waste has been barred since May of 1990 with two exceptions. First, the Agency may issue a special exemption, of strictly limited duration, RCRA §§ 3004(h)(2), (h)(3). Second, the Administrator may find that there will be no migration off-site for as long as the wastes remain hazardous and permit disposal. RCRA § 3004 (d). EPA has interpreted this to mean no migration for a period of 10,000 years. NRDC v. EPA, 907 F.2d 1146, 1152 (D.C. Cir. 1990).

"Land disposal" subject to these provisions includes "any placement" (meaning both treatment and long-term storage) of "hazardous waste in a landfill, surface impoundment, waste pile, injection well, land treatment facility, salt dome foundation, salt dome bed formation, or underground mine or cave." RCRA § 3004(k).

96. EPA estimated the cost/benefit ratio of its "land ban" rules for solvents to be approximately \$90 million per cancer case avoided. 51 Fed. Reg. 40,634 (1986). For another complete set of "land ban" rules, it estimated the ratio at about \$200 million per cancer case avoided. 53 Fed. Reg. 31,207 (1988). For another, the cost was about \$30 million to avoid .07 cancer cases, or over \$400 million per cancer avoided. 54 Fed. Reg. 26,646 (1989). None of these estimates take account of the time at which risks are incurred. However, EPA has said that "it can be generally observed that the effect of restricting land disposal is to reduce risk in absolute terms while shifting it forward temporally." 52 Fed. Reg. 25,786 (1987). In other words, while the "land ban" rules will result in somewhat fewer cancers, they will probably be incurred earlier, as we trade the long-term dangers of land disposal for the short-term dangers of incineration and other treatment. The estimates of \$90 million and greater per cancer avoided far exceed the cut-off points generally used to determine cost-effectiveness of a federal regulation.

97. EPA's original formal policy was not to approve as BDAT any treatment method that was clearly more risky than land disposal. 51 Fed. Reg. 40,589 (1986). However, "whenever it is uncertain that a technology is riskier than land disposal, the Agency will consider the treatment 'available' for determining BDAT." 51 Fed. Reg. 40,610 (1986). On that logic, EPA specified incineration as an available treatment method for metal-bearing solvent wastes, despite studies showing that incineration of these wastes might well present more risk than continued land disposal. Incineration would convert possible long-run dangers from buried waste into far more likely short-run dangers from air emissions. *Id.* More recently, EPA has abandoned the use of such comparative risk analysis altogether, 53 Fed. Reg. 31,190-91 (1988), and successfully defended its abdication against legal challenge. American Petroleum Inst. v. EPA, 906 F.2d 729, 737-38 (D.C. Cir. 1990).

a crude regulatory tax that discourages generation of any waste subject to a particular standard.

b. Non-Hazardous Waste.

No treatment requirements analogous to the "land ban" apply to non-hazardous wastes. Instead, the federal requirements now under development for municipal landfills and incinerators, like those of RCRA before 1984, set minimum standards for certain types of treatment without requiring the selection of one type of treatment over another. By increasing the cost and complexity of municipal waste disposal, these federal requirements can be expected to pressure municipalities toward increased recycling and other forms of waste minimization. In addition, the possibility that CERCLA cleanup responsibility will attend any future disposal of wastes with toxic properties imposes a risk tax of highly uncertain magnitude on all such long-term disposal that also encourage waste minimization, including recycling, and treatment.

3. Trust Funds

In contrast to the relatively steady growth of reliance on waste minimization and detoxification, the current law's approach to trust funds has been limited and inconsistent. RCRA requires those who operate land disposal facilities where hazardous waste will be left after closure to demonstrate "financial responsibility" to deal with future environmental problems.⁹⁸ EPA has expanded this into a detailed regulatory obligation to post a very large bond, or its equivalent, until thirty years after closure have gone by without any significant problems.⁹⁹ However, the regulations are completely silent on what happens thereafter. Originally, the liability was to be turned over to a federal trust, funded by a tax on waste disposal.¹⁰⁰ That provision was suspended, pending further study, in 1986, after it became apparent that the existing fund would probably cover about one percent of the long-run costs of hazardous waste disposal.¹⁰¹

98. RCRA § 3004(a)(4).

99. 40 C.F.R. §§ 264,140-151 (1990).

100. CERCLA § 107(k)(1)-(4), 42 U.S.C. § 9607(k)(1)-(4) (1988).

101. § 514 of the Superfund Amendments and Reauthorization Act of 1986 repealed the provision. For the finding that the fund would only cover one percent of future post-closure hazardous waste disposal costs, see OFFICE OF SOLID WASTE, EPA, REPORT TO THE CONGRESS OF THE UNITED STATES ON THE POST-CLOSURE LIABILITY TRUST FUND (1986). Although the fund was projected to be inadequate to cover even its statutory obligations,

CERCLA includes a trust fund financed by a tax on chemicals considered likely to end up as "hazardous substances" to fund the cleanup of abandoned waste sites.¹⁰² However, the statute contemplates that any expenditure of public money will be accompanied by a maximum effort to recover as much of the money as possible from anyone who is liable under the expansive CERCLA definitions.

There is thus no clear exit from liability for anyone who disposes of waste on land. As a practical matter, the generator who sends hazardous waste to a permitted facility may be able to look to the operator, and to the financial assurance requirements during their period of coverage. But that is a practical rather than a legal defense against CERCLA liability.¹⁰³ Moreover, the current scheme leaves unanswered the question of what happens after the financial assurance requirements expire.

Those who send non-hazardous waste to non-federally permitted landfills do not enjoy even this limited protection, despite the presumptively less hazardous nature of their activity. If the landfill leaks, these generators will be immediately and directly exposed to CERCLA liability as long as their material includes any "hazardous substance."¹⁰⁴

IV. ASSESSING THE CURRENT SYSTEM

Three major conclusions arise from this overview of the current waste control system. First, the current hazardous waste regulatory system cannot and should not be expanded or asked to perform any tasks beyond its present function. The defects of that system are too technical and the philosophical underpinnings too debatable to be profitably addressed by Congress. Second, the short-run dangers from any form of waste disposal do not present a legislative priority. With a few possible exceptions, these dan-

its coverage of such a small percentage of total hazardous waste costs was due largely to the small number of facilities that the fund was expected to cover. *Id.* at IV-19. Of course, the fund's ability to cover the future costs of *all* waste disposal would have been even smaller.

102. 42 U.S.C. § 9611 (1988); 26 U.S.C. §§ 4611-12, 4661-62 (1988).

103. Indeed, CERCLA provides that "[n]o indemnification, hold harmless, or similar agreement" can relieve a person of CERCLA liability, although it may determine who ultimately pays the cost of that liability. CERCLA § 107(e), 42 U.S.C. § 9607 (e)(1) (1988).

104. As noted earlier, the CERCLA "federally permitted release" exemption simply does not apply to any landfill not fully permitted to receive hazardous waste. *See supra* note 67 and accompanying text.

gers are already adequately addressed, often by other environmental statutes whose major function is to control such risks whether they are posed by wastes or by some other material. Third, the long-run dangers of waste disposal are poorly dealt with at present and require significant legislative attention.

A. The Hazardous Waste Rules Should Not be Expanded

The current hazardous waste system has reached or almost reached its natural limits. Since there is no unified principle on which to include or exclude wastes, there is no coherent policy argument for expanding the hazardous waste system. In addition, the history of the past ten years proves that, as a practical matter, the system is too burdensome to grow very much.

Although the existing system lacks any overarching principle and therefore should not be expanded, several regulatory efforts now under way could, in principle, correct many of the current inconsistencies, such as its over- and underinclusiveness, if these efforts are left to run their natural course. First, EPA has recently published a new characteristic test that increases the number of leachable chemicals that can make a waste hazardous from 25 to 39 and is examining adding more chemicals to that list.¹⁰⁵ This new test will considerably increase the comprehensiveness of the protection afforded groundwater under the current system. Second, greater reliance on characteristic tests could reduce the regulatory system's overinclusion problem, since characteristic wastes are not subject to the "mixture" and "derived from" rules that create so much of the problem.¹⁰⁶ Finally, as mentioned in Part IIIA, EPA plans to address the "mixture" and "derived from" rules directly by specifying, for each listed waste, concentrations of toxic components below which the waste (or its derivatives) will no longer be "hazardous."¹⁰⁷ This would require EPA to define when, and by what standards, a waste should be judged

105. 55 Fed. Reg. 11,798 (1990).

106. EPA has recognized this advantage of the characteristic test. See 55 Fed. Reg. 11,805-06 (1990).

107. 55 Fed. Reg. 6,641 (1990). The same Federal Register notice detailed the difficulties in developing such "screening levels." A very partial list included: dealing with the large number of hazardous constituents controlled under the RCRA subtitle C program (which exceed by several times even the extensive list of priority pollutants under the Clean Water Act), assessing and possibly devising exposure scenarios for the air and environmental (rather than human) exposure pathways, developing analytical detection methods for over 100 hazardous constituents, and

“hazardous.” Although that question has repeatedly proved resistant to legislative solution, the need to define when a waste is “hazardous” will become progressively less important as the controls on non-hazardous waste are increased. Nonetheless, since the issue of “acceptable risk” will be relevant to non-hazardous waste regulation as well as hazardous waste regulation, Congress should commission a study under RCRA similar to the study Congress commissioned on “acceptable risk” under the Clean Air Act¹⁰⁸ to help resolve the issue.

B. *Short-Run Dangers*

Analysis of the current legal framework suggests that short-run dangers from current solid waste disposal are relatively small and decreasing particularly when compared to other sources of environmental harm. Controls on the handling, storage, transportation, burning, treatment, deep well injection, or land disposal of “hazardous” wastes are already as strict as any regulations EPA has ever issued. As a result, few people contend that more legislation to address such wastes is required.

For non-hazardous wastes, if short-term pollution reduction were our only goal, one might argue that there was no need for a separate RCRA system, since short-term dangers are restricted to contamination of air, water, or groundwater, and other statutes already exist to control environmental discharges into each of these media. If these statutes are imperfect, it would make more sense to correct them than to create an entirely new layer of controls one step further removed from the problem.¹⁰⁹ Indeed, imposing controls only on *wastes* that contaminate air, water, or groundwater could have the environmentally counterproductive

determining an approach when threshold levels are less than the pollutant's limit of detection.

55 Fed. Reg. 6,642 (1990). EPA could also have added predictive difficulties and uncertainties in the groundwater model itself to its list of difficulties in developing “screening levels.”

108. See Title III of the Clean Air Act Amendments of 1990, Pub. L. No. 101-549, 104 Stat. 2399 (1990).

109. Perhaps the only exception would be for groundwater pollution. Evidence suggests that the prospect of CERCLA liability by itself has not been adequate to prevent past disposal practices from causing groundwater contamination. Additional controls on waste disposal on land or in surface impoundments therefore may be needed to avoid short-term hazards to groundwater. However, unless combined with other approaches, such controls would only address a small part of any groundwater problems. See TARLOCK, *supra* note 21.

effect of discouraging the reuse or recycling of wastes whenever they compete with similar "virgin" products.

C. *Long-Term Dangers*

1. The Inadequacy of the Current System

The incentives for waste minimization in the current federal solid waste system include: (a) the "land ban" rules for hazardous waste; (b) a possible increased burden from new EPA standards for other types of waste disposal; and (c) the pressure of potential CERCLA liability. Each of these incentives, however, is inadequate. First, the lack of any substantial growth in the number of materials regulated as hazardous waste shows that even before the land ban the hazardous waste system was considered too burdensome to be extended much beyond the small fraction of wastes to which it now applies.¹¹⁰ Second, any standards EPA may set for disposal facilities for non-hazardous wastes will be both slow in coming¹¹¹ and inadequate to prevent continued reliance on land disposal.

Finally, the "risk tax" imposed by CERCLA has serious limits in forcing waste minimization, since its impact depends entirely on the degree of farsightedness and aversion to future risks of each private waste generator or disposer, which will vary greatly from company to company and sector to sector.¹¹² Most likely, large companies that foresee a long existence will be affected more than smaller ones, particularly if those large companies have good management. And although the chance of CERCLA liabil-

110. This lack of growth certainly has not been the result of any EPA conclusion that the system has reached its natural boundaries. For example, the GAO has quoted the EPA "division director responsible for hazardous waste identification" as saying "EPA does not know if it has identified 90 percent of the potential hazardous waste or only 10 percent." GENERAL ACCOUNTING OFFICE, HAZARDOUS WASTE: EPA HAS MADE LIMITED PROGRESS IN DETERMINING THE WASTES TO BE REGULATED 19 (1986); GENERAL ACCOUNTING OFFICE, NONHAZARDOUS WASTE: ENVIRONMENTAL SAFEGUARDS FOR INDUSTRIAL FACILITIES NEED TO BE DEVELOPED 21 (1990) [hereinafter GAO NONHAZARDOUS WASTE REPORT].

111. At present, EPA has not even begun to collect the necessary data with which to set these standards. According to GAO, that makes it mathematically impossible for EPA to set these standards before 1996. GAO NONHAZARDOUS WASTE REPORT, *supra* note 110, at 25.

112. The mere expression of concern about liabilities does not mean that it will affect decision-making. While 10 of 13 waste managers interviewed said that their firms were "very concerned" about hazardous waste liability, only three said it was a significant waste reduction factor. OFFICE OF TECHNOLOGY ASSESSMENT, FROM POLLUTION TO PREVENTION: A PROGRESS REPORT ON WASTE REDUCTION 27 (1987).

ity forty or fifty years from now may be enough to change a big company's present conduct, potential liability may not be enough to change that conduct when more remote dangers are involved. Yet from a truly long-term perspective, dangers that materialize even hundreds of years from now — far beyond CERCLA's likely sphere of impact — are also of policy concern.

2. Paths to Reform

Our current reliance on detailed classification of wastes into or out of a very restrictive regulatory system has reached its limits. Not only has the system proved very difficult to expand, but in addition the small size of the regulated universe and the detailed rules for entering and leaving it have given rise to endless legal disputes about coverage which have little, if any, relation to protecting the environment. It seems more logical to impose a less oppressive burden that would affect all waste disposal practices equally.¹¹³

This could be accomplished by a system of economic restraints on waste disposal in the form of either a tax or a system of federally issued allowances. Allowances would authorize disposal of a set quantity of waste and would be surrendered and cancelled on disposal. They would be issued in limited and perhaps decreasing number, thus setting an automatic limit on the amount of waste that could be disposed of annually.

Whether a tax or an allowance approach is adopted, however, the central question is the same: what types of disposal activities

113. A useful first step would be to relax the hazardous waste rules to encourage recycling. Some commentators have argued that our focus should not be on "recycling" but on "waste minimization," with a corresponding inference that changes to the regulatory system to encourage recycling are unnecessary. See, e.g., Office of Technology Assessment, *Serious Reduction of Hazardous Waste* 3 (1986) ("Actions taken away from the waste generating activity, including waste recycling . . . are not considered waste reduction."). However, this argument can be criticized on legal and policy grounds. In legal terms, the question of whether a given substance is a material in process or a waste being recycled is determined far more by the intricacies of the EPA regulatory system than by any real physical distinction. A strong argument can be made that *any* material that is promptly recycled to produce a valuable product has not been "discarded" within the meaning of RCRA § 1001(27) and therefore cannot be a "waste." And if diminution of long-run dangers is our goal, how much difference does it make whether a material is promptly recycled, or is never generated in the first place? Although recycling, like any other industrial process, requires the handling of material with a consequent danger of release, "[a] process that produces relatively large quantities of waste that can be used in another process may be preferable to one that produces smaller amounts of waste for which there is no use." Frosch & Gallopoulos, *Strategies for Manufacturing*, 261 *Sci. Am.* 144, 149 (1989).

should be included in the system. The two most obvious alternatives are including all types of disposal or including only disposal practices that pose some long-run environmental danger.

As noted above, the labels "solid waste" and "hazardous waste" require a somewhat arbitrary subcategorization of society's discards. For that reason, some have advocated a general effort to reduce use and emissions of all toxic chemicals, without regard to such distinctions.

A broad waste minimization incentive applied without regard to its impact on the receiving air or water, however, risks taking our attention off the need to set clear air and water quality goals and pursue them. In many ways, such an incentive would be analogous to technology-based air and water control standards,¹¹⁴ which apply without regard to the quality of the receiving air or water. As many studies have shown,¹¹⁵ this approach is very expensive and often ineffective in protecting the environment.

In addition, the primary task today in many environmental fields is controlling polluting activities, like non-point sources of water pollution and pollution from small businesses and automobiles, that are resistant to control by traditional means. There is little reason to expect that these sources would be any easier targets for a broadly conceived minimization tax. Under a broad waste minimization program, the tax would most likely affect only large facilities that were easy to regulate, leaving the real sources of the problem still unaddressed.

A program that addressed only waste disposal that posed long-run danger, meaning primarily waste disposed on land,¹¹⁶ would be both more workable and more defensible than a program that

114. The most prominent examples are contained in section 111 of the Clean Air Act, 42 U.S.C. § 7411, which requires EPA to set standards for new sources without direct reference to their impact on air quality "by requiring reductions equal to those provided by the best system of continuous emission reduction which (taking into consideration the cost of achieving such emission reduction, and any nonair quality health and environmental impact and energy requirements) the Administrator determines has been adequately demonstrated." 42 U.S.C. § 7411(a)(1)(B) (1988).

A parallel test governs the issuance of "effluent limitations guidelines" under the Clean Water Act. 33 U.S.C. § 1314(b) (1988).

115. See Ackerman & Stewart, *Reforming Environmental Law*, 37 STAN. L. REV. 1333 (1985); B. ACKERMAN & W. HASSLER, *CLEAN COAL/DIRTY AIR* (1981); Pedersen, *Turning the Tide on Water Quality*, 15 *ECOLOGY L. Q.* 69 (1988).

116. Discharges into water of long-lived pollutants that could accumulate in bottom sediments might also be a candidate for inclusion.

addressed all waste. First, apart from illegal dumping,¹¹⁷ the number of facilities to be addressed by such incentives is a manageable size.¹¹⁸ Second, and more important, the central question of any economic incentive program - how to set the level of the incentive - is easier to answer when the program is limited to land disposal. Unlike other forms of waste disposal, landfilling tends to hamper the breakdown of toxic components of waste. As long as waste with long-term toxicity is disposed of on land at a faster rate than natural processes detoxify it, the potential future burden will increase. As a result, there is no analytic stopping point for action against such uncertain future harms, except perhaps the unrealistic goal of zero net land disposal of such waste. Accordingly, imposing an economic burden on long-term land disposal does not risk the same danger as a more generic tax of diverting attention from the real problem.

By the same token, the tax (or allowances) should be set to have only a moderate impact. The uncertainty of the final goal in terms of desired quantity of waste disposal reduction makes a program with drastic impact hard to justify. A moderate program would also reduce the risk of encouraging illegal disposal. Finally, and perhaps most important, a moderate level of impact would reduce the need for the system to answer the difficult question of when a waste should be considered hazardous.

117. In its 1986 amendments to CERCLA, Congress considered and ultimately rejected a "waste end" tax designed to apply to all disposal of hazardous waste and designed to tax land disposal more heavily than other approaches. See H.R. REP. NO. 253, 99th Cong., 1st Sess., pt. 2, at 9-15, 50 (1985). Although these provisions were adopted by the full House, 131 CONG. REC. H11,595-96 (daily ed. Dec. 10, 1985), no counterpart provisions were included in the Senate bill or the conference version. According to Senator Bentsen, one of several reasons for rejecting the tax was a fear that it might "have proven to be a stimulus for midnight dumping." 132 CONG. REC. S14,909 (daily ed. Oct. 3, 1986).

However, it is not at all clear why a moderate waste tax poses an unacceptable risk of encouraging illegal disposal while the much greater incentive for such activities provided by the drastic "hazardous waste" regulatory requirements is considered acceptable. In fact, because a tax can be set as low as the legislating authority desires, a tax system has greater flexibility than a regulatory approach and can minimize the danger of illegal disposal. See Hahn, *An Evaluation of Options for Reducing Hazardous Waste*, 12 HARV. ENVTL. L. REV. 201, 211 (1988) ("One undesirable consequence of the current legislation is that it increases incentives for illegal dumping.").

118. EPA estimates that there were approximately 5,000 TSD facilities for "hazardous" waste in the country in 1985, 1985 REPORT, *supra* note 13, Table 2 at 11, and approximately 130,000 such facilities for nonhazardous waste, SUBTITLE D REPORT, *supra* note 11, Table ES-3 at p. ES-9. In this second category, approximately 21,000 facilities handle industrial solid waste. GAO NONHAZARDOUS WASTE REPORT, *supra* note 110, at 19.

Under this proposal, which is intended merely as a sketch of how some obvious implementation problems might be addressed and not as a finished solution, waste disposed of on land would be divided into three categories. First, as noted earlier, since any waste can cause short-term damage if disposed of improperly, there is a need for "housekeeping" rules to establish minimum short-term disposal standards. Waste disposed of in violation of these standards would comprise a first category of waste, which would not fall under the economic incentive system, but would be subject to the normal enforcement mechanisms.¹¹⁹ As discussed above, most of these standards have already been established under existing environmental laws. But to improve coordination and enforcement of such laws, EPA should be required to issue a comprehensive statement of these standards and supplement them as necessary.

Waste disposed of in accordance with these standards would be divided into the remaining two categories. Waste that, even with proper disposal, posed a greater danger of long-term environmental harm than the raw materials from which it was derived,¹²⁰ would be subject to a tax (or an "allowance" requirement). Waste that had been shown not to pose an incremental long-term danger would be exempt.

How to make the "long-term danger" decision is, of course, the central question under the RCRA program that EPA has so conspicuously failed to answer during that program's ten year his-

119. Alternatively, waste disposal not in compliance with these "baseline" requirements could be assessed a higher fee, or be subject to a tighter "allowance" requirement. Under this approach, the "baseline" requirements would be incorporated into the economic incentive program itself, thus reducing the need to make certain that all "baseline" requirements were legally enforceable in their own right.

120. The qualification that a waste would have to pose greater long term dangers than the raw material from which it was derived is necessary to avoid imposing a burden on conduct of extractive industries that may not add to social risk. For example, uranium ore is both radioactive and, by definition, generally rich in heavy metals. Such characteristics of the ore can themselves create environmental risks. If the residues from processing these ores incur an economic burden solely because of the long-run dangers posed by their radioactivity or heavy metal content, those who process them might be forced to make payments even though the actual environmental hazards posed by the final residues might not exceed those of the original ore itself.

Of course, proper disposal practices would likely need to be complied with to ensure no increase in environmental risk. However, given such compliance, the waste should be removed from the incentive system even if some risk was still present as measured against an absolute baseline.

tory. However, an economic incentive program could be designed to begin operation without first answering this question.

One approach would be for the program to provide that no waste stream would be subject to the fee or allowance requirement until EPA affirmatively included the waste stream in the system by regulation. That would amount to organizing the fee system on the same outline as the present RCRA system in that the result of government inertia would be a smaller system, not a bigger one. In practice, it would also place the burden on EPA to justify its decision to include wastes in the system. However, EPA might be more willing to include wastes in such a program than it has been to include them in the hazardous waste system, because the tax would be viewed as a less drastic burden than the burden resulting from classification of a waste as "hazardous."

An alternative approach would be to include all wastes in the system unless EPA affirmatively acted to exclude them upon petition from the generators. Under this approach, the start-up date of the tax (or allowance requirement) could be deferred for several years to allow time for the processing of exemption requests before any tax would have to be paid or any allowance purchased.¹²¹

Such an approach clearly poses a risk of overregulation, and thus reinforces the already strong arguments for a financial burden that is only moderate. For the same reason, strong procedural protections for the regulated community would be appropriate. EPA should be required to decide on petitions within a set deadline, and the petitions should be deemed granted if EPA failed to act on them within that period.¹²² If Congress thought it appropriate, EPA could also be forbidden to include more than a certain percentage of the waste generated annually in the incentive system.

If the risk of overregulation could be addressed satisfactorily, this latter approach offers some distinct advantages over the for-

121. Indeed, an "allowance" system could be designed so that its initial impact on generators was slight or even nominal. This could be accomplished by allocating allowances directly to generators in proportion to the amount of waste they had generated in the last year. These allocations would then be gradually reduced. Under this approach, a generator that could reduce its disposal of waste subject to the "allowance" requirements at a faster rate than its supply of allowances decreased could even profit by selling its surplus "allowances" on the open market.

122. Such a system of automatic approval absent EPA objection has proved workable in evaluating fuel additives under the Clean Air Act, 42 U.S.C. § 7545 (1990).

mer. First, it would force EPA to address the issue of which wastes pose the most serious dangers - an issue that has proved all too easy to avoid in the past. Second, it would force EPA to focus on all wastes, not just individual waste streams. Third, by placing the burden on individual generators to show that land disposal of wastes would not increase environmental dangers in the long term, generators would have an added incentive to treat their wastes and to provide EPA with information on waste and waste disposal that EPA currently lacks.

The major aim of this economic-based system of regulation would be to change waste disposal behavior in order to prevent long-term environmental degradation. A tax based system, as opposed to an "allowance" approach, would also raise revenue for the federal government. Although the success of the program in reaching its environmental objectives would not depend on using the proceeds for environmental ends, the money could be used to correct defects in the present system. In particular, if all waste disposal posing long-term environmental dangers were subject to a tax, there would be no need to preserve one of the most troubling features of the current CERCLA - the imposition of liability on waste disposed of in accordance with all regulatory requirements. As RCRA originally contemplated, that liability could be repealed and replaced by a federal cleanup authority, thus providing assurance to those who properly dispose of wastes today that they have shaken off liability for good. If the tax raised enough money, it could also be used to fund a new and more adequate post-closure fund to care for RCRA facilities after the thirty years addressed in existing law have elapsed.