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GRAD, F. P.
"COMPENSATING TOXIC
WASTE VICTIMS"
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New technologies
are available for dealing with America's
epidemic of toxic waste. But using them
effectively will require entirely new
managerial approaches.

The Missing Links: Restructuring Hazardous-Waste Controls in America

BY BRUCE PIASECKI AND JERRY GRAVANDER

THE image of America as a limitless reservoir for disposing of wastes has changed dramatically since Love Canal. Each month brings more reports of the never-ending battle to contain leaking landfills, and with clockwork regularity news of toxic poisoning and groundwater contamination reinforces the public's distrust of land disposal.

Yet land disposal remains America's dominant method of managing toxic waste. Secured landfills, industrial lagoons, deep-well injection systems—each relies on America's time-worn trust in the resilience of its soils. The Environmental Protection Agency (EPA) reports that 57 percent of America's toxic wastes are now injected into deep wells, with another 38 percent kept in leaking industrial lagoons and surface storage tanks. A few firms have engineered efforts to improve land disposal. But policymakers often express despair, and citizens remain puzzled, over the prospects for adopting alternatives before the end of this century.

"We know we don't want our dumps expanded," says Keith Gowton, founder of the citizens' group Families United for a Safe Environment, "but we can't say at town meetings or in the courts what else might work." Similar statements echo through town halls from Philadelphia to Fairbanks. Yet Americans are not the first to investigate alternatives to dump-

ing. In fact, given our stubborn faith in the land as an ultimate sink, we might be among the last.

Fifteen years before hazardous-waste problems were publicly recognized in this country, several European nations had evolved regulatory and managerial systems that encourage alternatives to land disposal. In 1973, Denmark established the Kom-munekemi facility in Nyborg, which now destroys over 90 percent of the nation's hazardous wastes. This integrated treatment facility also recovers heat from its toxic-waste incinerators to supply Nyborg's 18,000 residents with 35 percent of their heating needs. West Germany has coordinated the construction of 15 treatment centers that destroy the bulk of the nation's worst wastes. Other European governments, including those of Sweden, Austria, Finland, and the Netherlands, are now following these early examples by minimizing access to dumping and requiring the use of recycling, incineration, and treatment technologies. (See "A Grand Tour of Europe's Hazardous-Waste Facilities," by Bruce Piasecki and Gary A. Davis, July 1984, page 20.) Europeans destroy the same toxic solvents, dyes, and organics that we dump into our soils and surface waters.

Once Americans acknowledge that there are practical alternatives to land disposal, a new series of questions arises. Can we build facilities based on European strategies that favor waste recycling and

Many U.S. landfills, such as this one near Los Angeles, are almost full. A new approach to managing toxic wastes must be adopted.

PHOTOS: FRED WARD, BLACK STAR

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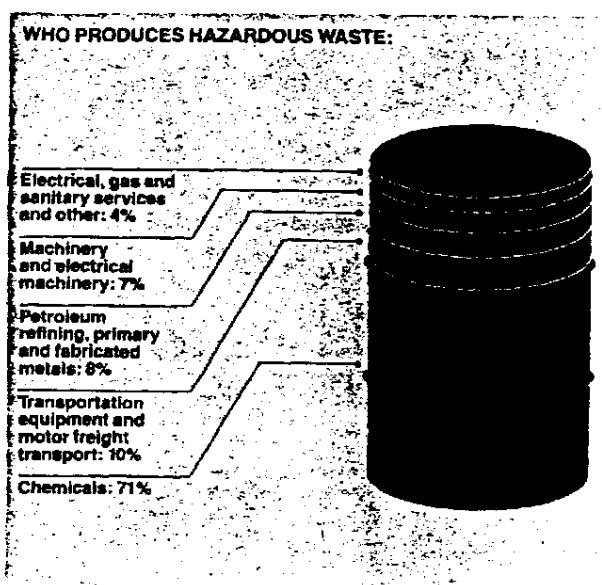
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Heart
tuner

Box
outlet

Toxic wastes originate from a variety of sources—industrial, municipal, and individual. Researchers are often unsure how specific wastes are linked to par-

ticular illnesses. However, they have no doubt that the growing amount of toxic wastes poses major health hazards to the American population.



treatment? Might we finance them with the same degree of government subsidy found in Europe? Is it feasible to operate U.S. waste-treatment centers on a European model of cooperation among government, industry, and the public?

The political systems of Denmark, West Germany, and the other continental innovators differ significantly from that of the United States. Not only do their socialistic institutions contrast sharply with the free-enterprise tradition of America; they also have a long history of centralized decision making that often precludes the degree of legal access and appeal that Americans demand. Nevertheless, the European example offers one incontrovertible lesson: land disposal of toxic wastes can be replaced by superior alternatives.

The United States has had its own successes in solving pressing problems of environmental management. Faced with massive flooding, deteriorating urban water supplies, and mounting municipal sewage, this country evolved, over its first 200 years, a cooperative public-works program to solve these problems. Federal, state, and local governments coordinated the construction of an infrastructure that includes dams, water mains, and sewers. Moreover, within the past 75 years, the agricultural extension service has been developed as a joint private-public venture to maintain the vitality of our farmlands.

Both initiatives offer uniquely American models for responding to ubiquitous environmental threats—models that could facilitate the transfer of European strategies for reducing, recycling, and treating toxic waste.

A Tragedy of the Commons

A willingness to conceive of the toxic-waste problem in a public-works context may prove the most important legacy of the European example, helping U.S. leaders see beyond their inherited institutional and ideological blinders. The various European approaches, while different in detail, have three pivotal factors in common:

- ☐ A willingness to stabilize a waste-treatment market through comprehensive regulatory reforms, rather than through financial incentives that encourage individual changes in private business practice.
- ☐ A knack for cooperative financing and managing liabilities jointly between regional governments and private industries.
- ☐ A profound distrust of land disposal, despite engineering advances in constructing and monitoring landfills and lagoons.

These factors clash with some longstanding American biases. Perhaps the most crucial is the prejudice that favors upgrading existing technologies and resists adopting foreign-based innovations. In less than a decade, the United States has poured millions of dollars into patching up dumps and improving land disposal techniques. In willful defiance of thermodynamics and common sense, we have built up our dumps with precipitation caps, double liners, restraining walls, and collection systems for leaching wastes. Despite these technical reforms, the EPA estimates that we have less than 17 years of landfill capacity left in the continental United States.

Only recently have we realized that the flaw is in our thinking, not our machines. Managers first became alert to the indirect results of environmental neglect through Garrett Hardin's popular "Tragedy of the Commons." By showing that the net benefit to the individual in adding cattle to the commons also represents a hidden cost to each of the other users, Hardin exposed the insidious logic of overuse. At the heart of our current approach to toxic wastes is timidity. Each individual's fear of new responses to toxic wastes—particularly to a plant slated to be

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Traditional methods dominate disposal of toxic wastes in the United States. Many European nations, by contrast, use modern technology to de-

stroy their wastes, and hence greatly reduce their health hazards. The U.S. must devise techniques for using these alternative disposal methods.

built nearby—together with a reliance on a familiar use of the land, leads to the present tragic costs to the commons. The fear is most forcefully evident in our communal failure to site safe detoxification facilities.

With over a billion gallons of PCB-contaminated oil inside a variety of electrical components in this country, the need for PCB treatment of waste oils is clear. In fact, when Congress banned further production of PCBs in 1977 and began monitoring their disposal, a number of companies designed chemical neutralization techniques.

Sun Ohio Co. was first to market, with a device in a 40-foot truck that can reduce PCB contamination from 10,000 parts per million to less than 2 parts per million. The system uses metallic sodium to strip the chlorine from the PCBs and convert it to a form of common table salt. Acurex Corp., a builder of similar dechlorination trucks, boasts innovations that can even treat contaminated soils. Pleased by the timely emergence of these trucks, the EPA has granted interstate licenses and operating permits to their builders. However, even though these devices were ready to roll as early as 1980, the last five years have seen minimal use. From Massachusetts to Nevada, town officials have ignored the EPA's assurances that the systems are safe and have opted not to use them.

Earlier this year, Environmental Services Co. (ENSCO) of Little Rock, Ark., built a portable rotary kiln that could reach temperatures high enough to incinerate PCB-contaminated soils beyond the 99.9999 percent efficiency required by law. The system was successfully tested in Tampa on a non-PCB sludge, and the EPA has contracted to use it on PCB-contaminated soils in Jacksonville. But ENSCO executives fear that their multimillion-dollar investment might be booted into early retirement because of unfounded suspicions about the system's safety.

Right now, citizens of Bloomington, Ind., are fighting over the best ways to use \$64 million won in a consent decree against Westinghouse for contaminating six landfills with PCBs. The decree represents the largest toxic-waste settlement in history and requires that the money be spent to diminish risks to the public. To do this, the town has offered to zone public land for building a treatment center, and Westinghouse has agreed to provide technical assistance in setting one up. "But the effort has remained in limbo for several years," notes Lynton

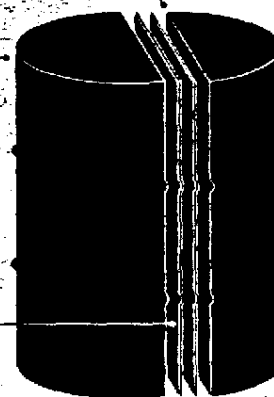
HOW HAZARDOUS WASTE IS DISPOSED OF:

Surface Storage: 38%

Underground injection (deep burial): 57%

Landfill: 3%

Land treatment and other: 2%



Caldwell, father of the environmental impact statement and a leading citizen of Bloomington. Because of local opposition to the proposed treatment center, Caldwell says, "There is now talk of simply covering the PCB-laden soils with plastic restrainers." Mayors often prefer delay over actions that cause controversy among blocks of constituents. But when it comes to toxic contamination, short-term political compromise often denies the possibility of long-term managerial solutions.

Whether the location is dioxin-stained Times Beach or the ribbon of developments stretching out from most cities, the core of the siting controversy remains the same. While the entire public shares in the benefits from a hazardous-waste treatment center, residents near the center incur the risks. Yet each time an effort to move beyond land disposal is thwarted, each of us pays the cost. PCBs, for example, do not biodegrade; the carcinogen concentrates in fatty tissues as it moves up the food chain.

The irony is that siting criteria often favor land disposal in insidious ways. In New York State, the Department of Environmental Conservation (DEC) published a set of 14 weighted criteria for evaluating sites for hazardous-waste treatment facilities. The criteria are designed to prevent the selection of sites that would contaminate groundwater and surface water.

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However, since there are considerable differences among the regions that generate waste, the DEC allows a committee of field investigators to adjust the weights according to local conditions. Under this guise, the tragedy of timidity resurfaces. Efforts to choose land-disposal sites have received the most lenient adjustments, while attempts to establish treatment and recycling facilities have faced consistently stiffer resistance. This is not the result of a quirk but an attitudinal blindspot. The adjustments favor the maintenance costs of continued land disposal over the new costs inherent in alternatives. The known, however inadequate, is easier to calculate and defend than "uncertain" innovations.

Across the nation, similar discrepancies reign. The Internal Revenue Service, for example, precludes the use of municipal bonds to finance construction of toxic-waste recycling and treatment centers. This preference for land-disposal methods for treating waste cannot be explained only by the strength of the landfill lobbies. Despite the influence of the National Solid Waste Management Association and the Chemical Manufacturers Association in Washington, the more fundamental fault is the nation's refusal to acknowledge the tragedy to the commons.

The Limits of Liability

Americans traditionally overcome differences among entrenched positions by recourse to the courts. In the case of environmental hazards, citizen groups and government regulators have pursued legal battles with unprecedented singlemindedness, finding business liability to be their most powerful weapon. However, while this strategy is often the best means to a particular judicial end, it has been of limited use in shifting the nation beyond dumping.

There are several reasons for this. No matter how many times astute lawyers win cases against land-disposal firms, the victories are not prescriptive. Liability judgments may block specific cases of dumping but do not promote safe alternatives. Chemical companies drained of their surplus capital from suits are seldom equipped to invest \$25 million in new rotary-kiln incinerators. Waste handlers, justly fined in case after case, often walk a tightrope between spending so little that they achieve only marginal improvements and spending so much that their capital is exhausted. Indeed, bankruptcy threatens many of the larger land-disposal companies now repre-

sented by the National Solid Waste Management Association.

Liability also fails to provide adequate and comprehensive compensation, for ultimately it can go only as deep as the pocket of the violator. Just the largest companies can afford to spend up to \$30 million to completely clean-up each toxic-waste site. EPA's Superfund program, officially called CERCLA (the Comprehensive Environmental Response, Compensation, and Liability Act), is designed to change this situation: the 1980 law provides EPA with the authority to finance the cleanup of 30 years of managerial mistakes. But whether this mechanism will encourage waste-treatment reform remains uncertain: most of the CERCLA wastes recovered have merely been redrummed and shipped to other landfills.

Of course, the threat of liability does encourage some significant reform. Companies such as 3M, Dow, and Kodak are recycling and incinerating their worst wastes, even though federal rules do not yet require that they do so. "Pollution prevention pays," says Don Huisingsh, an environmental analyst at North Carolina State University at Raleigh, "but the trick is making most American companies click onto the concept."

Once Americans acknowledge that legal tools are a necessary but insufficient force in a nation's search for superior waste management, the European example assumes a heightened relevance. Western Europe made its shift toward treatment with minimal legal costs. Denmark and West Germany struck their critical agreements without recourse to the higher courts. The difference centers on the approach to rule making.

Bargaining over Risks

In the United States, regulatory rule making involves at least four basic steps. First, before the EPA proposes a rule, each interest group lobbies informally for its position. As in the recent debates over ocean incineration of toxic waste, citizens, industry, and government are pitted against one another early in an atmosphere of mutual distrust.

Second, the EPA publishes its announced notice of proposed rules (ANPRs) and holds public hearings to enable the public to respond. Opposition to the proposed regulations is often fierce and entrenched within the first few days. In the ocean-incineration



Several European nations try to destroy their toxic wastes totally. Most of the industrial wastes produced in the West German state of Bavaria are incinerated in facilities such as the one in Ebenhausen. Left: A crane operator feeds liquid and solid wastes to the furnace. Before wastewater from the plant can be released into the Paar River, it must keep guppies alive for 24 hours (inset).



Hazardous wastes found in long-abandoned dump sites keep cleanup crews busy. Above: illegally buried drums at a site near Swartz Creek, Mich. contained cyanide, PCBs, acids, and pesticides, among other toxins. Ironically, most of the toxic wastes removed through the EPA's Superfund program have been re-drummed and buried elsewhere.

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Compensating Toxic-Waste Victims

BY FRANK P. GRAD

Our society has not decided how to dispose of hazardous waste harmlessly, and we do not quite know how to deal with injuries from exposure to it. The two sets of issues are related, and their resolution is hindered by uncertainties in both technology and law. If a safe and technologically and economically efficient way to dispose of toxic waste were established, the legal problems would eventually disappear, and lawyers, industry and insurance companies would no longer have to worry about victim compensation. Because no such system of disposal is about to emerge, the problem will continue to trouble industry, insurers, and lawyers for plaintiffs and defendants.

Victim compensation has remained a public issue since Congress debated the Superfund law in 1980. But despite mounting evidence of the health dangers from toxic waste, very few victims have brought claims, and even fewer lawsuits have gone from claim to judgment. This has led industry and insurers to assert that there is no problem, or that proponents of victim-compensation legislation greatly exaggerate it. Unfortunately, the problem is enormous, even though it is

difficult to predict how many people will ultimately be affected.

The victims of exposure to toxic waste are in the same position today as victims of exposure to asbestos about 30 years ago: there were few acknowledged cases of asbestos-related disease because many of the thousands of people who had been exposed showed no symptoms. Industry and insurers asserted that there was no problem.

Illness from exposure to toxic waste is even harder to deal with because it is more variegated and diffuse. People are mainly exposed to asbestos in the workplace, and the substance causes a small number of recognizable diseases, such as asbestosis, that can be only attributed to it. Exposures to hazardous waste, on the other hand, are ubiquitous, and the variety of substances involved makes it difficult to establish the specific causes of disease. Often we do not know to what extent illness is dose-related, or related to the synergistic effects of many substances from a single disposal site.

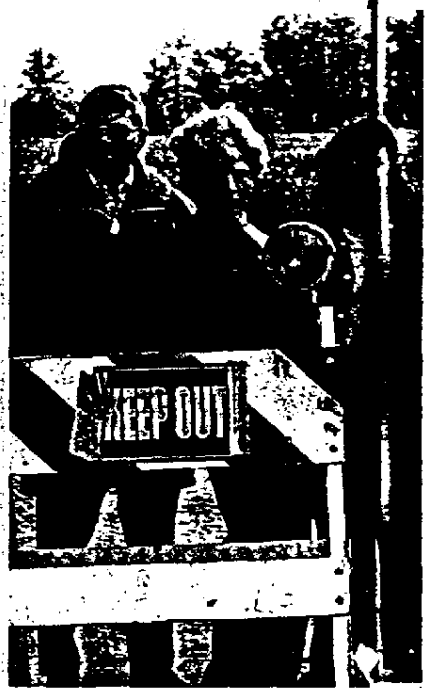
To estimate the size of the exposed population, we must know how many disposal sites exist. But experts cannot agree on that number. An industry-sponsored study in the

early eighties found 4,802 such sites nationwide, while a government-sponsored study found 50,000. And more sites are being discovered regularly.

The public's exposure to toxic waste also depends on the density of population near disposal sites, and on the path of exposure. Unfortunately, toxic waste percolates through groundwater slowly, and its movement underground is difficult to track. We can drill test wells to monitor this movement, but not without risking further contamination. Monitoring the health of the population itself is just as troublesome, because many people have already been exposed to high concentrations of chemicals in industry or from nature.

In sum, we know that thousands of people are exposed to hazardous waste, but we cannot assess its effects until we have better data on exposure and its relationship to illness. Our experience with workplace exposure to hazardous chemicals suggests that many cause latent illnesses, including cancer, and mutagenic effects that will emerge in persons as yet unborn.

Nevertheless, alleged victims are beginning to bring claims. These suits have a



number of common elements: They often involve multiple plaintiffs, aim at multiple defendants, and seek large damages. In *Kennedy v. Scientific Inc.*, in New Jersey, for example, 95 plaintiffs are suing 667 defendants for millions of dollars. In *Johnson v. E.I. du Pont de Nemours & Co.*, another New Jersey case, 22 plaintiffs have filed a class ac-

hearings, experts representing various groups testified about anticipated damages to the fishing industry, coastal recreation, and tourism. Jack Ravan, EPA assistant administrator for water, called for an entirely new research protocol because the ANPR received such severe criticism from both industrial and environmental groups.

At stage three, the proposed regulatory package reaches the desk of the top government policymaker. By this stage, most of the public comments in the

docket are virtually written in blood. Finally, after trying to accommodate as many of these requests as possible, the administrator establishes the agency's regulations. But once the new rules are published in the *Federal Register*, any of several entrenched groups may sue the agency for neglectful disobedience of their expressed needs in the public docket, and the vicious cycle continues in the courts.

This rule-making process has a long and distinguished career in the United States and probably



tion on behalf of some 80 homeowners who live near the well-known Price's landfill. In Harris County, Tex., 39 plaintiffs are pitted against 26 companies and allege that hundreds of thousands of people who live near certain dumpsites could also be plaintiffs. In *Anderson v. Crayovac* in Woburn, Mass., some 20 plaintiffs maintain

Local residents gather at Michigan's abandoned Swartz Creek dump. Gaining compensation for damages from such dumps is legally complex.

that wellwater pollution caused by three companies has led to cases of childhood leukemia.

Most of the pending suits

will never come to trial or judgment because the parties will settle out of court. Legal uncertainties make plaintiffs willing to settle for less than they might have received rather than risk dismissal of their case. Defendants—generally large firms—are not only afraid of large verdicts against their deep pockets. They also want to avoid establishing legal precedents that would make it easier for other victims to prove causation and joint liability.

In the only case that has gone to judgment, a New Jersey jury awarded about \$16 million in damages against the owners of the Jackson municipal landfill, from which toxic wastes had allegedly entered nearby residents' water supply.

In that case, *Ayers v. Township of Jackson*, 339 residents sued the township, alleging nuisance and improper and negligent conduct. The damages awarded were for impairment of quality of life, emotional distress, and the costs of medical surveillance for cancer. The New Jersey Supreme Court, on June 5, 1985, affirmed the judgment for \$5.6 million for impairment of quality of life, but did not allow the damages for emotional distress—barred in actions against

townships under the New Jersey Torts Claims Act—and for medical surveillance, considering these too speculative. Further appeals are likely.

Causation has emerged as a primary issue in injuries stemming from hazardous wastes. Although we know that exposure to certain kinds of toxic chemicals will cause health problems, proving the cause of personal injuries requires more than showing statistically that so much exposure will give rise to so many injuries. To recover damages against Jones Disposal Corp., Plaintiff Smith must show that his chloracne or cancer was caused, at least in part, by the particular toxic waste that Jones disposed of at a site. The mere fact that the Smiths live near the site is not enough unless they can show the path of exposure and a definite causal relationship between the exposure and the injury.

Another recurring issue in toxic-waste litigation is deciding which defendant is responsible. Toxic-waste sites often change hands frequently, and firms deposit a variety of chemical wastes in each site. Even if all possible defendants are made parties to the litigation, the plaintiff must show that each had

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represents the best overall approach in many situations. Yet the level of controversy tends to divert attention from establishing a comprehensive program for managing wastes.

For example, while high-temperature incineration of wastes is a step in the right direction, incineration at sea may be the wrong choice. Every time the EPA permits a new ocean-going incinerator to operate, it will severely delay efforts to reduce waste at the source, to recycle wastes regionally, and to incinerate

wastes near their site of generation. Nevertheless, now that the battle over ocean incineration has begun, all the interested parties feel impelled to pursue it to a final decision. Industry has already spent more than \$150 million to build ocean vessels for its test burns, while a single citizen group, the Gulf Coast Coalition for Public Health, spent \$50,000 in fiscal 1984 alone to fight these fleets. The stakes are simply too high for either group to back off. In many ways, toxic-waste rule making resembles a Chinese finger-

COMPENSATING TOXIC-WASTE VICTIMS

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some share in causing the illness before damages can be apportioned.

The obstacles are even greater when the illness has a long latency period. In the 20 or 30 years between exposure and illness, the plaintiff will have suffered other exposures, and the waste site will have changed ownership and uses, greatly increasing the difficulty of proving causation. In 12 states, moreover, the statute of limitations provides that the period when a lawsuit may be started begins to run at the time of exposure. In one jurisdiction with a three-year statute of limitations, plaintiffs who discover illnesses 25 years after exposure will have lost the right to sue 22 years before.

Hazardous-waste injuries, like other so-called toxic torts, require an array of medical, toxicological, and other sophisticated and expensive expert witnesses. The cost may be prohibitive unless the plaintiff is very wealthy or the potential damages are so large that an attorney is willing to work for a contingent fee. One solution is for several plaintiffs who have suffered injuries from the same source to join their lawsuits against the same responsible party, or for a large number of plaintiffs to bring a class action. However, the courts have been reluctant to allow class actions because even if all plaintiffs are exposed to the same disposal site, a 40-year-old professional will have dif-

ferent damages from a 23-year-old homemaker or a 5-year-old child. Even so, the number of such cases, whatever the joinder device used, will cast an enormous burden on the courts, with uncertain outcomes following lengthy delays.

No-Fault Compensation

Three years ago, the study group created under Section 301(e) of the Superfund legislation called for a no-fault compensation system giving victims compensation for medical expenses and for the full amount of their lost earnings, up to \$3,000 per month (amounting to the equivalent of \$36,000 per year before taxes). Under such a system, plaintiffs could claim compensation far more easily than in court actions, because proof of causation would be eased considerably. The plan would not provide for damages for pain and suffering or punitive damages. But plaintiffs who received awards could also bring full lawsuits—although they would have to reimburse the plan out of any damages they recovered.

The compensation plan would draw on an expanded Superfund, which now finances the cleanup of waste sites with money from a federal tax on crude oil and chemical feedstocks. The fund would recover some of the money it paid out by bringing its own suits against

the firms responsible for injuries from waste sites.

Congress has discussed the study group's recommendations for the last two years, and several bills have been introduced. Some incorporate the compensation remedy, while others create a new federal right to sue for toxic-waste injuries. Unlike other tort actions for nuisance, trespass, or negligence, which are brought in state courts, the new federal cause of action would apply only in the federal courts. Although hearings were held on some of the bills, no further legislative action is expected.

California and Minnesota have enacted laws for compensating the victims of toxic waste. However, the Minnesota law merely creates a new cause of action without easing the problem of proving causation. And while California has actually created a limited-compensation remedy, it applies only in cases where there is no available defendant. Though the statutes have been on the books for almost two years, no victims have brought cases under either.

Potential industrial defendants have opposed all proposals to make compensation easier to obtain. They argue that such proposals are premature because the courts can handle the few cases that have been brought under the ordinary rules of the common law of torts. Of course, these are the very defendants that have an interest in preserving

the difficulties of proving a toxic-waste claim.

Plaintiffs' lawyers do not object to setting up a compensation remedy for small claims—under \$50,000 or \$100,000—which they do not want to handle anyway. For the large claims, they see existing common-law court actions as providing the best chance to recover large damages, including punitive damages and those for pain and suffering. Of course, the lawyers would then be able to collect large contingent fees.

Insurance firms share industry's point of view, with one added concern: they believe that in the absence of claims experience for hazardous waste injuries they cannot set insurance premiums for an efficient compensation system. Apparently, both industry and insurers would accept a compensation remedy if the government were willing to pay out of general public funds—which is what the asbestos industry proposed after the Johns Mansville bankruptcy.

It seems that we will not provide a humane, economically sound, and prompt legal remedy for victims of exposure to toxic waste until the number of the cases reaches substantial proportions. That will happen soon enough. □

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UPL 0365

*The EPA could
team up citizens and industries to select
better ways of managing wastes.*

box toy: the harder you attempt to pull your finger from its noose, the tighter the clamp becomes.

European rule making for toxic wastes differs from the U.S. model in important ways. Disagreements among interest groups are arbitrated rather than adjudicated, with the various groups openly discussing the options before the process of promulgating specific rules begins. Thus, both citizens and industry identify preferred managerial options before they have reason to disagree in public, and hence lessen the burden of proof placed on the federal government to defend its regulations. In contrast, the U.S. system forces polarization among experts called to testify for each side—especially concerning legal and technical outcomes and among the lawyers representing various groups. According to Sheila Jasanoff, an attorney doing research at Cornell University's Program in Science, Technology, and Society, U.S. law restricts the flexibility of the rule-making process by rigorously defining the governmental role and delineating agencies' decision-making functions.

Is it possible to adapt the European strategy to American needs? Establishing a formal process by which the EPA acts as an arbitrator before publishing its rules would be an important first step. This is the announced preference of the new EPA administrator. "When I was in the hazardous-waste program," Lee Thomas has said recently, "we talked about alternatives to litigation for Superfund cleanups—concepts like mediation and arbitration." The EPA has so far used these techniques, which attempt to secure government-industry memos of understanding without threats of bankruptcy or lawsuits, only with great reluctance. But Thomas has indicated that he plans to apply these strategies to other EPA efforts in an attempt to formalize the flow of information from all groups, and to prevent the possibility of sweetheart deals favoring one constituency. In particular, Thomas intends to employ European arbitration techniques to upgrade the standards for toxic-waste storage facilities, and to encourage construction of a new generation of treatment plants.

Critics of the EPA's regulatory process who feel that the agency already bargains over risks too often will undoubtedly oppose Thomas. For them, the EPA is debilitated by compromise, captured by special interests, and subjected to severe business pressures. To these critics, formalizing a means of compromise will only reinforce the existing system of producing

and dumping toxic wastes.

Yet EPA's predicament is far more complex than these critics acknowledge. The agency's many broad mandates impel it, in the face of recent cutbacks in funds and technical and legal staff, to design regulatory programs capable of "self-enforcement." These programs are designed to achieve broad compliance with a minimum of EPA-initiated suits and administrative actions. Toxic-waste programs developed by the Reagan administration are therefore diluted from the start, and this informal self-enforcement model has not been very effective. According to a recent report by the General Accounting Office, only 22 percent of the companies that manage America's most active hazardous-waste facilities comply with EPA regulations.

The EPA could restore public confidence by instituting a formal process whereby citizens and industries team up to select superior methods of managing waste. Citizens might well be willing to bargain over sites for recycling and treatment centers, with compensation for their communities, if they were assured that government and industry were unified in their efforts to phase out land disposal. Moreover, innovative industries that wish to reduce their liabilities from land disposal might agree to regulations requiring waste destruction and outlawing sloppy handlers.

The U.S. Search for Solutions

Several recent U.S. examples show the feasibility of adopting a European approach to managing toxic waste. Under Governor Jerry Brown, California initiated an aggressive program to phase out land disposal of cyanides, strong acids, PCB liquids, and all halogenated organics. A task force that included representatives from Dow Chemical, Friends of the Earth, and various academic institutions devised a schedule for this phaseout. California also provides low-interest loans for builders of integrated treatment centers through its Pollution Control Financing Authority. And the state has expanded the California Waste Exchange, a clearinghouse operated by the Department of Health that helps waste generators identify recycling opportunities.

Major firms such as Dow, 3M, and DuPont already treat some of their own waste on site. But many links must be forged to create a comprehensive waste-disposal system. Few firms have the capability

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Toxic-waste extension agents could help firms comply with regulations.

of large chemical companies to process the poisons they produce, and even fewer local authorities know that treatment plants are practical or desirable.

The European example shows that utilities for treating waste must be set up to coordinate government requirements, regional needs, advanced technologies, and industrial skills in a public-private partnership. U.S. electric utilities, especially the Tennessee Valley Authority (TVA), according to Gary A. Davis, an attorney and chemical engineer, are American precedents for the types of agencies that can invest capital to fulfill public objectives.

Many producers of hazardous waste also have immediate needs for information about how to deal with it. Amendments passed last November considerably broaden the scope of the Resource Conservation and Recovery Act, closing a longstanding loophole that exempted small generators of hazardous materials from regulation. The EPA will now have jurisdiction over 795,000 more companies by 1986—including many gas stations, dry cleaners, textile industries, small paint and leather manufacturers, and electroplating shops. Yet these small firms will have trouble complying with the new law.

Their predicament is similar to that confronting farmers early this century. Agricultural techniques were clearly failing from overuse and inexperienced soil management, but thousands of farmers lacked the information they needed to upgrade their equipment and improve the handling of their land. Congress responded by passing the Smith-Lever Act of 1914, which created the Agricultural Extension Program. The act linked the federal Department of Agriculture with state land-grant universities and county governments, and it put county extension agents into the field to educate farmers about new techniques.

A toxic-waste extension service could similarly help America's small and middle-sized generators. Extension agents could secure voluntary compliance with regulations and help companies avoid future liability from wastes. The service might first provide selected waste-handling firms—those with the most reliable equipment and best record—with information on how to set up a service to collect the newly regulated wastes from small generators. The European example shows that such collection partnerships are quite successful on a regional basis. The Danes, for instance, even collect household poisons, spent medicines, and old batteries at transfer stations in an all-out effort to keep hazardous materials from

entering their drinking water.

The extension program could serve as an arm of major universities, channeling the skills and research of faculty to the pressing needs of business. The list of clients for such information across the United States is growing, and includes major utilities, local and regional hospitals, and industrial parks.

A pilot hazardous-waste extension service is already under way at the Georgia Institute of Technology. A \$75,000, two-person operation in its first year, the service helps businesses employing up to 50 people to develop individual plans for handling toxic wastes. According to Kevin Kamperman, the staffer who makes on-site visits, the program helped "55 plants the first year, with over 400 barrels of wastes receiving proper analysis and thereby better treatment." The service, whose funding will rise above \$200,000 in its second year, is confidential, with no threat of EPA involvement. Moreover, compliance with the recommendations is voluntary.

This pilot program suggests that confidential consultation, custom services, and a process that enables the small firm to develop a capability to manage its own waste are important ingredients for success. There is no reason why we cannot set up similar programs across the country based on this experience. Such an effort would probably fare best if coordinated by the federal government, for without it the tragedy of land disposal will continue.

Of course, a toxic-waste extension service is merely a transitional device. The search for more pervasive solutions must continue. Waste reduction, recycling, and treatment are fundamental ideas whose time has come. Yet at a deeper level, they also are transitional. Ultimately Americans must revise their view of nature itself. America's 200-year-old myth of the unending resilience of its soils will die only with great difficulty, as this last decade of trauma over toxic wastes forcefully attests. Gaining a more robust understanding of nature's limited capacity to assimilate waste takes time, and a new view of humanity's place in the global commons.

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