

Controlling Pollution by Individuals and Other Dispersed Sources

by Daniel A. Farber

Editors' Summary: Because many of the factors that make it difficult to control pollution by individuals also apply to small businesses and farms, Prof. Daniel Farber argues that individuals and owner-operated businesses should be considered as part of the same universe of dispersed sources. Effectively dealing with such dispersed sources will involve many techniques, some of which avoid the need to rely on motivational mechanisms. Nevertheless, the motivations of such "mini-polluters" must be explored, and lessons from the corporate world are quite instructive in this regard. Pressure from outsiders seems to play an important role in motivating environmentally friendly corporate behavior. Thus, Professor Farber recommends putting similar pressure on mini-polluters by increasing the availability of critical information to surrounding communities. Alternatively, the problem of controlling mini-polluters could be "outsourced" to large firms experienced with influencing consumer behavior.

I. Introduction

We are accustomed to picturing large factories and refineries as the sources of pollution. Yet a host of consumer decisions and individual practices also cause serious pollution—the contribution of cars and sport utility vehicles to urban air pollution needs no explanation.¹ Unfortunately, conventional methods of regulation are better geared for large corporate polluters than individuals. Other potentially effective methods, such as pollution taxes, seem to be politically unacceptable as applied to individuals.² How can we effectively deal with pollution caused by millions of individual actors? The task seems all too much like the proverbial exercise in herding cats.

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1. Numerous examples are presented in Michael P. Vandenbergh, *From Smokestack to SUV: The Individual as Regulated Entity in the New Era of Environmental Law*, 57 *VAND. L. REV.* 515 (2004) [hereinafter Vandenbergh, *From Smokestack to SUV*].
2. Michael P. Vandenbergh, *Order Without Social Norms: How Personal Norm Activation Can Protect the Environment*, 99 *Nw. U. L. REV.* 1101, 1103 (2005) [hereinafter Vandenbergh, *Order Without Social Norms*].

One promising approach is to encourage voluntary measures through the pressure of social or internalized norms. This is no easy task, however. Research on recycling indicates that environmental norms are markedly less effective in changing behavior than making the behavior more convenient or providing financial incentives such as bottle deposits.³ Nevertheless, if we are to address individual behavior as a source of pollution, we need to find ways to achieve behavioral change.

In addressing this problem, it is useful to consider individuals as part of a larger category of dispersed sources. As this Article explains, many of the factors that make it difficult to control pollution by individuals also apply to small businesses and farms. Thus, it may be best not to draw a bright line between individual and firm behavior; instead, individuals and owner-operated businesses (including family farms) should be considered as part of the same universe of dispersed sources.

Dealing with a host of these "mini-polluters" seems more difficult than controlling larger pollution sources. Yet as we confront the issue of dispersed pollution sources, some promising avenues do exist in the search for effective strategies. In trying to control dispersed sources, we can learn something from the growing literature about voluntary corporate compliance. Understanding why corporations comply with the law or sometimes do more than the law requires can help us understand how to motivate individuals and small firms. This Article demonstrates that pressure from outsiders—investors, customers, and communities—seems to play an important role in motivating corporations.

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3. See Ann E. Carlson, *Recycling Norms*, 89 *CAL. L. REV.* 1231 (2001).

The Article next discusses methods of bringing similar pressure to bear on mini-polluters by increasing the availability of critical information to communities. Dispersed sources have been controlled so poorly in part because they have been so hard to monitor, but this may well be changing. As a result of emerging improvements in monitoring technologies, community policing may become an important part of control strategies. Bringing to bear new evidence about the localized impacts of pollution also may help heighten motivations and enlist community support. For example, the effect of releases on the children of a particular neighborhood may be much more motivating than the contribution those releases might make to global warming. The government may be able to foster these efforts at community pricing.

Another approach is to “out-source” the problem of controlling mini-polluters. When possible, the government should enlist large firms in the enterprise of controlling dispersed sources. This Article therefore discusses the possibility of eliciting the help of large firms who can in turn reach out to dispersed sources. For example, the manufacturer of a product may be in a better position than the government to influence the behavior of the buyers. Rather than trying to directly influence buyers, the government may want to give the manufacturer incentives to do so.

Controlling dispersed sources will not be easy. Undoubtedly, an array of approaches will be needed. The approaches discussed in this Article are at best only part of the answer. But there is a more fundamental point, going beyond the specifics of these techniques. If we want to influence individuals and other mini-polluters, direct efforts by the government will have only limited impact. We also need to mobilize intermediaries such as neighborhoods and corporations. In short, one might say, “it takes a village” to control dispersed sources.

II. Problems Posed by Dispersed Sources

The need to address dispersed sources is clearest with respect to water pollution. Early efforts at pollution control focused on major sources such as industrial plants and municipal waste disposal plants. As these major sources of water pollution have come under control, nonpoint source pollution has loomed larger. Consisting of urban and agricultural runoff, nonpoint source pollution has proved resistant to effective control measures.⁴ A similar story can be told about toxic air pollution, where small businesses such as dry cleaners and individual activities such as backyard burning of trash now account for a significant share of the problem.⁵

It is tempting to consider individuals as a unique category of polluters, quite different from businesses that cause pollution. As this section will demonstrate, however, it is better to think of individuals as a subcategory of dispersed sources for several reasons. Monitoring and controlling the performance of dispersed sources is difficult, yet it is sometimes

possible to finesse these difficulties. When doing so is not feasible and when conventional regulation or economic incentives are not available, the behavior of dispersed sources must be influenced in other ways.

A. Individual Polluters—A Unique Category or Type of Dispersed Source?

It is tempting to consider individuals to be in a class of their own as polluters. The distinction between an “individual”—in the sense of “a person acting in a private capacity, not in the course of employment”⁶—and all other entities has some appeal, but it also obscures some important commonalities. A commonsense difference certainly exists between people’s private lives and their workplace activities. For some purposes, this difference is obviously important—certainly where the purpose is to document the importance of non-workplace activities as a source of pollution.⁷ But when we think in terms of control strategies, this distinction may be less relevant. For purposes of devising control strategies, individuals may not be so different from small businesses, family farmers, or other dispersed sources.

The practical limits on command-and-control regulation have more to do with numbers and monitoring than with whether an activity is “economic.” When pollution comes from a small number of easily monitored sources, it is relatively easy to design and implement regulatory limits. When sources cannot be monitored effectively or when there are a very large number of sources, regulation becomes more difficult:

When numerous people must act to solve a collective problem and lack the economic incentive to do so, traditional government regulation, such as formal law, may be infeasible, ineffectual, or politically difficult. The costs of monitoring and enforcement can be prohibitively expensive or may raise privacy concerns. Many environmental problems are illustrative: air pollution reduction through carpooling, stormwater pollution prevention, energy conservation.⁸

Due to enforcement difficulties, the problem is particularly severe when a large number of sources are involved and when the most feasible form of regulation would be a performance standard rather than an output limit.⁹ For example, regulating the daily activities of backyard gardeners as part of a campaign to control runoff would pose insuperable enforcement problems.

Regulations or taxes on individuals are clearly more difficult politically than many regulations of businesses.¹⁰ But this kind of political resistance is not limited to regulations of individual activity. The noneconomic nature of the activity is only one factor in determining populist appeal. Farmers have done quite well in obtaining exemptions from

4. See Water Quality Planning and Management and NPDES Programs, 65 Fed. Reg. 43586, 43587 (July 13, 2000) (listing agriculture, modification of streams, and urban runoff/storm sewers as the major sources of nonpoint source pollution).

5. Prof. Michael Vandenbergh reports that “backyard burning of garbage . . . now accounts for roughly 60% of all dioxin emissions in pollutants.” Professor Vandenbergh also reports that “motor vehicles, consumer products, and other small, non-industrial sources now contribute 76% of all air toxics.” Vandenbergh, *Order Without Social Norms*, *supra* note 2.

6. Vandenbergh, *From Smokestack to SUV*, *supra* note 1, at 539.

7. See *id.* at 541-84.

8. See Carlson, *supra* note 3, at 1235.

9. For a general discussion of the benefits and drawbacks of such standards, see Cary Coglianese & David Lazer, *Management-Based Regulation: Prescribing Private Management to Achieve Public Goals*, 37 LAW & SOC’Y REV. 691 (2003).

10. See Vandenbergh, *From Smokestack to SUV*, *supra* note 1, at 597-608.

regulation, though their activity is profit-oriented. Small businesses have also received exemptions for similar reasons. In short, dispersed sources have a broad enough base to pose political problems, whether the sources are individuals or firms.

An appealing but ultimately misplaced argument for considering individuals to be a unique type of pollution source is that firms are profit-driven while individuals in their private lives are not. To some extent this is true by definition—for these purposes, individual activities are defined as those that do not provide monetary reward. But this does not answer the question of whether noneconomic norms such as environmental values can influence behavior in firms or the workplace. The picture of the purely profit-oriented business may seem plausible for major corporations but less compelling for owner-operated organizations where the owners may not leave their personal values at home each morning. Moreover, some of the pressures that work against businesses may also be effective against individuals.

Of course, the owner of a small firm may have to pay a price for satisfying her environmental values, trading off lower profits for satisfaction of environmental norms or community reputation. No doubt this provides a limit to how much environmental norms will influence the conduct of a small business or family farm. There is, after all, no free lunch. But this is also true of all individuals—it may cost time or money to be “green,” and the individual must resolve the resulting trade off. If we assume that small business owners are sometimes willing to sacrifice time or effort in the interests of the environment outside of working hours, there seems no reason to assume they are entirely unwilling to make sacrifices for environmental benefits when they are at work. If there is a difference, it may relate more to the size of the economic sacrifice than to its location—running a green business may cost more money than running a green household.

This is not to say that the difference between “individual” and “economic” activities is wholly unimportant. Psychologically, perhaps people are more prone to view their individual activities as an arena for virtue and good citizenship—a fancy label for this might be “role separation.” And perhaps there is less political resistance to imposing restrictions, even equally costly ones, on profit-making activities than on consumption. But these relatively subtle differences should not obscure the much greater similarities involved in controlling all types of activities involving a large number of entities that are not easily monitored. If we can figure out how to make the owner of a dry cleaning business exercise care to prevent environmental harm due to pesticide use in her garden, we can probably make her more environmentally sensitive at the store—and vice versa.

For these reasons, without abandoning the distinction between for-profit and individual activities completely, it may be more useful to focus on the dispersion, number, and observability of the sources. Dispersed sources are likely to present different issues than concentrated ones and to require more reliance on motivational mechanisms than on conventional sanctions or economic incentives.

B. Control Strategies

Effectively dealing with such dispersed sources will involve many techniques, some of which avoid the need to rely on

motivational mechanisms. Sometimes we can avoid the need to modify the conduct of dispersed sources by regulating larger entities. For instance, rather than trying to influence consumer buying behavior, we often impose restrictions on suppliers. Pollution standards for new cars are the obvious example: it’s much easier to tell manufacturers what kinds of cars to sell than to influence buyers to favor cars with low emissions.

Rather than appealing to environmental norms to trigger improvements in conduct, we may also be able to appeal to other motivations. Sometimes, we can modify incentives, making garbage disposal more expensive in order to encourage recycling,¹¹ or subsidizing mass transit to get people out of cars. Both of these techniques avoid the difficulties of trying to mobilize environmental values as a key to behavioral change.

Another approach to changing behavior is to impose design requirements, for example, by requiring green spaces near streams or limiting nonpermeable surfaces in new construction.¹² These design requirements have the advantage of being more easily monitored than behavioral restrictions, and they can often be incorporated into existing regulatory processes such as construction permitting. Environmental law and land use planning may increasingly merge together in this context.

Particularly in the case of small businesses, it may be possible to take advantage of existing municipal involvement in licensing and inspection. The most obvious way to do so is simply to augment the substantive requirements for licensing. But we may also want to leverage on existing procedures in terms of disclosure. For example, in some parts of California, besides merely having to pass health inspections, restaurants also receive grades (A, B, C) for their hygiene, which must be displayed to the public. Thus, restaurants have an incentive to do more than simply meet minimum requirements. It is easy to imagine extending such a scheme to include pollution control.

Upstream regulation, incentive schemes, and design requirements are all appealing methods of dealing with dispersed sources. What they have in common is that they avoid the need to monitor the daily behavior of the sources or to appeal to environmental norms (community or individual) as a source of motivation. For these reasons, these approaches are often preferable. But they may not be in some situations.

The possibility of using conventional regulations or economic incentives to deal with dispersed sources should also be kept in mind. Consider the issue of automobile pollution. A gasoline tax would undoubtedly do a great deal to help with emissions (including greenhouse gases), and the fact that this is politically infeasible at the moment does not mean that the idea should not be raised in the future. Inspection and maintenance programs are unpopular, but they do exist in significant parts of the country. When regulation or incentives are feasible, there is no reason not to use them.

11. See Peter S. Menell, *An Economic Assessment of Market-Based Approaches to Regulating the Municipal Solid Waste Stream*, at <http://repositories.cdlib.org/boaltwp/126/> (last visited Aug. 23, 2005).

12. These techniques are explored in the context of nonpoint source water pollution in Amy J. Wildermuth, *Running on Empty: Why It’s Time to Revise the Clean Water Act and How*, at http://www.law.berkeley.edu/centers/envirolaw/selected_pprs/running_empty.pdf (last visited Sept. 2, 2005).

Often, however, one must rely on more subtle ways of influencing the day-to-day activities of large numbers of small sources. But how can people be motivated to “clean up their act”? Appeals to their goodwill only go so far. Alternative methods to dealing with dispersed sources and to influencing individual behavior must therefore be explored.

III. Motivating Environmental Improvements: Lessons From the Corporate World

In considering how to deal with dispersed sources, a better understanding of conventional polluters and their motivations is important. In particular, we need to understand “voluntary” efforts at pollution control by corporations.¹³ This is not because voluntary corporate compliance is a panacea but because other methods of compliance are less available when dealing with dispersed sources.

A. Voluntary Corporate Compliance—An Oxymoron?

Of course, one must be realistic about the strength of the motivations for voluntary corporate efforts. Because corporate ownership and operation are separated, the managers who make the day-to-day decisions may have limited scope for implementing environmental norms. For this reason, there is considerable controversy over the scope of voluntary compliance.

It is easy to make the case that environmental goals are foreign to the business world. Although surveys show that business leaders are pro-environmental in the abstract, Prof. Rena Steinzor has argued that this environmental support has little practical relevance.¹⁴ Many managers view their own company’s environmental compliance costs as unduly high, and also view environment-related positions to be career dead ends. Thus, their abstract support for the environment does not translate into concrete business decisions.¹⁵ Moreover, Professor Steinzor reports, corporate accounting systems do not link environmental costs and benefits in an effective way with day-to-day operating expenses, relegating them to the category of overhead.¹⁶ In the heavy industries most affected by environmental regulation, managers often feel embattled and victimized by regulations rather than supportive of them.¹⁷

As Professor Steinzor also admits, notable exceptions do exist. But, she says, these exceptions involve extraordinary leadership “at the highest levels in a corporation by people who possess a far-sighted vision of how to position their

firms strategically in response to economic and social trends,” a kind of visionary leadership that can hardly be created by government fiat.¹⁸

Professor Steinzor’s view may be too pessimistic. Visionary leadership is a scarce commodity, but the prospects for voluntary environmental improvement may be more hopeful. Some notable efforts have been made to foster voluntary action by firms.¹⁹ One is “Responsible Care[®],” the American Chemistry Council’s program for reducing pollution. The program was adopted in response to a catastrophic toxic release in Bhopal, India, and to the increased disclosure requirements for toxic releases under federal law. It stresses pollution prevention linked to a program akin to “total quality management” for increasingly rigorous control of accidents. Although the program is ambitious, the results are as yet unclear.²⁰ Another example is EPA’s 33/50 program, a voluntary scheme to reduce emission of toxic chemicals by 33% in the first phase and 50% in the second phase.²¹ Emissions for the chemicals in question fell twice as much as those for other toxic chemicals.²² Finally come schemes in which the government uses inspections and other means to help inform firms of how to improve their practices instead of punitive methods; at least some of these schemes have apparently had some success.²³ Non-coercive motivations for compliance, therefore, sometimes seem to work.

B. Why Do Corporations Comply?

Contrary to what some might expect, businesses are not motivated purely by the fear of sanctions in improving their en-

13. In this setting, “voluntary” means that the conduct is not motivated by direct fear of enforcement, but the motivation need not be purely public-spirited either.

14. Rena I. Steinzor, *Reinventing Environmental Regulation: The Dangerous Journey From Command to Control*, 22 HARV. ENVTL. L. REV. 103, 157 (1998).

15. Professor Steinzor calls attention to a probing study of corporate culture by Robert Jackall in the 1980s. Jackall found that corporate managers faced an unstable system that stressed loyalty to patrons and avoidance of blame for mistakes. In this highly stressful environment, middle managers could not afford to take a long-term view but focused instead on dealing with more immediate business issues. *Id.* at 159-61.

16. *Id.* at 167. This problem is explored in more depth in Timothy F. Malloy, *Regulating by Incentives: Myths, Models, and Micro-markets*, 80 TEX. L. REV. 531 (2002).

17. See Steinzor, *supra* note 14, at 162.

18. *Id.* at 163. Like Professor Steinzor, Clifford Rechtschaffen stresses the ideological opposition to environmental regulation by most business leaders who do not view environmental regulations as having the same legitimacy as laws designed to protect the integrity of the marketplace. Clifford Rechtschaffen, *Deterrence Vs. Cooperation and the Evolving Theory of Environmental Enforcement*, 71 SO. CAL. L. REV. 1181, 1195 (1998). Although firms seek to avoid tort liability and hope to obtain “important benefits from being publicly perceived as environmentally responsible entities,” *id.*, he doubts that “these considerations by themselves will result in widespread compliance with environmental laws.” *Id.* at 1196.

19. For additional examples, see John R. Ehrenfeld, *Cultural Structure and the Challenge of Sustainability*, in BETTER ENVIRONMENTAL DECISIONS: STRATEGIES FOR GOVERNMENTS, BUSINESSES, AND COMMUNITIES 234-42 (Ken Sexton et al. eds., 1999).

20. Bradley C. Karkkainen, *Information as Environmental Regulation: TRI and Performance Benchmarking, Precursor to a New Paradigm?*, 89 GEO. L.J. 257, 305-09 (2001).

21. See U.S. Environmental Protection Agency, *Other Federal TRI-Related Programs*, at http://www.epa.gov/triinter/programs/other_federal.htm (last visited Aug. 22, 2005).

22. Thomas P. Lyon & John W. Maxwell, “Voluntary” Approaches to Environmental Regulation: A Survey, in ENVIRONMENTAL ECONOMICS: PAST, PRESENT, AND FUTURE (Maurizio Franzini & Antonio Nicita eds., forthcoming); Karkkainen, *supra* note 20, at 350; Arora Seema & Timothy N. Cason, *An Experiment in Voluntary Environmental Regulation: Participation in EPA’s 33/50 Program*, 28 J. ENVTL. ECON. & MGMT. 271 (1995). A similar Canadian program reported even greater success. See Karkkainen, *supra* note 20, at 352-53.

23. See Mark Seidenfeld, *Empowering Stakeholders: Limits on Collaboration as the Basis for Flexible Regulation*, 41 WM. & MARY L. REV. 411, 497-98 (2000) (Occupational Safety and Health Administration inspections); Karkkainen, *supra* note 20, at 354-56 (Massachusetts program). A particularly interesting aspect of the Massachusetts program is the creation of a “peer inspectorate” of nongovernmental consultants. See Michael C. Dorf & Charles F. Sabel, *A Constitution of Democratic Experimentalism*, 98 COLUM. L. REV. 267, 380 (1998).

environmental performance.²⁴ Environmental compliance (and “overcompliance,” in the sense of exceeding government regulations) has been the subject of considerable recent research by environmental economists. Professor Steinzor may be right that the personal environmental values of managers do not translate directly into corporate conduct, but there are other motivations as well.²⁵ The evidence indicates that investors react negatively to disclosures of higher-than-expected toxic emissions, perhaps because of fears of future liability; firms respond to environmentally induced investor pressure by improving their environmental performance. Notably, larger firms are more likely to undertake voluntary efforts. Corporate voluntary actions are affected by the perceived level of future government regulation and by the strength of community, environmental, and industry pressure.

Internal corporate culture is also a significant factor. For instance, a study of homebuilders found that code compliance was influenced both by fear of enforcement and by the builder’s trust in the inspection process, concern about reputation, and belief that code compliance was important to maintain quality.²⁶

A recent study of the chemical and electroplating industries has some particularly revealing findings. This study showed that senior managers placed importance on protecting their “social license,” the permission and support provided by the community to their operations.²⁷ The differences between large and small firms were striking:

Informal pressure from local or national environmental groups was not reported to have much if any impact on the environmental behavior of smaller electroplaters or chemical companies. Such firms perceived themselves (accurately it would seem) as “beneath the radar” of community or environmental activities. Only a minority expressed any concern about adverse publicity.

In contrast, larger chemical corporations reported that social pressures, reputational concerns, and avoiding bad publicity were primary drivers of their environmental behavior. . . . Violations of their “social license,” these large enterprises believed, could damage their relationship with local communities and land-use authorities, resulting in serious economic damage such as difficulty in obtaining necessary approvals for plant expansion.²⁸

Thus, findings that voluntary worker protection programs are less successful with small firms are not surprising.²⁹ The

question of how to put smaller firms and even individuals “on the radar screen” will be addressed later in this Article.

Public disclosure is critical to most of these “nonlegal” motivations for firm behavior. The most striking example of the effectiveness of disclosure is provided by the toxic release inventory (TRI) under the Emergency Planning and Community Right-To-Know Act (EPCRA).³⁰ Under EPCRA, industrial facilities must disclose releases of a long list of toxic chemicals, and the TRI results are then made available to the public online. Between 1988 and 2000, reported releases of these toxics “have dropped by nearly half, with the sharp downward trend continuing steadily year after year. . . . According to one EPA survey, some seventy percent of TRI reporting facilities indicated that they have intensified their waste reduction efforts under the influence of TRI.”³¹ When the TRI was introduced, many top managers were surprised by the scale of their facilities’ toxic releases.³² Of particular interest is the way that the TRI empowered community groups:

Environmental and community organizations are among the principal users of TRI data, employing it in conscientious efforts to pressure firms to raise environmental standards. . . . Community groups use this information to educate and recruit community residents into local anti-pollution efforts, and to organize local campaign seeking “good neighbor” commitments from polluting firms to reduce releases. And even where community residents do not explicitly put forth such demands, firms may self-regulate to preempt potentially costly and damaging efforts at informal regulation.³³

Thus, studying corporate compliance teaches us two lessons: disclosure is a critical factor; and community-based pressure matters. For purposes of this Article, the effectiveness of these factors need not be compared with the more familiar methods of “command-and-control” regulation. Rather, the problem is how to proceed when command-and-control or economic incentives are infeasible. In those situations, disclosure and community pressure are important tools which, so far, have not operated as effectively against dispersed sources as against large businesses.

IV. Mobilizing Communities to Deal With Dispersed Sources

Communities, including grass-roots organizations and municipal governments, may play an important role in dealing with dispersed sources. This is no surprise—after all, they are much closer to the problem than state or federal regula-

smaller firms were more likely to respond to accidents in a “blinkered” way).

24. See Wayne B. Gray & Mary E. Deily, *Compliance and Enforcement: Air Pollution Regulation in the U.S. Steel Industry*, 31 J. ENVTL. ECON. & MGMT. 96, 110 (1996) (finding that, controlling for firm characteristics, compliance was also influenced by corporate “attitude”).

25. See Lyon & Maxwell, *supra* note 22.

26. Peter J. May, *Compliance Motivations: Affirmative and Negative Bases*, 38 LAW & SOC’Y REV. 41 (2004).

27. Neil A. Gunningham et al., *Motivating Management: Corporate Compliance in Environmental Protection*, 27 LAW & POL’Y 289, 310 (2005). An international study of paper and pulp mills by the same researchers also found that the “social license” was a central factor in determining levels of compliance or overcompliance. See NEIL GUNNINGHAM ET AL., *SHADES OF GREEN: BUSINESS, REGULATION, AND ENVIRONMENT* 51-60 (2003).

28. Gunningham et al., *supra* note 27, at 310-11.

29. Sidney A. Shapiro & Randy Rabinowitz, *Voluntary Regulatory Compliance in Theory and Practice: The Case of OSHA*, 52 ADMIN. L. REV. 97, 132-33 (2000). See also *id.* at 128 (study showing that

30. 42 U.S.C. §§11001-11050, ELR STAT. EPCRA §§301-330.

31. Karkkainen, *supra* note 20, at 287-88.

32. *Id.* at 297. For more discussion of the TRI and related programs, see Madhu Khanna et al., *Toxics Release Information: A Policy Tool for Environmental Protection I*, 36 J. ENVTL. ECON. & MGMT. 243 (1998) (TRI data caused firms to have statistically significant stock market returns the day after disclosure). California’s toxics disclosure requirement, Proposition 65, had an additional effect on emissions, over and above that of the TRI. See Clifford Rechtschaffen, *The Warning Game: Evaluating Warnings Under California’s Proposition 65*, 23 ECOLOGY L.Q. 303, 350 (1996) (“reductions in air emissions of Proposition 65 listed chemicals from 1987 to 1993 has been greater in California than in the rest of the country”).

33. Karkkainen, *supra* note 20, at 318-19.

tors. As research on corporate compliance indicates, the availability of information is critical to the ability of communities to influence polluters. Such information has often been lacking about dispersed sources. This section considers some possibilities for filling that gap.

A. Getting on the Radar Screen

As demonstrated earlier, one reason that small businesses do not worry about community pressure is that they view their pollution as being “beneath the radar” screen. The same must be even truer for individuals. As Ann Carlson has explained, information about individual behavior is important in fostering cooperative behavior:

[I]ndividuals seem to share a norm of cooperation that governs their behavior if they perceive that others too are cooperating. The feedback mechanisms, which demonstrate to individual households how they measure up to others, work best for those who are not carrying their weight. When households learn they are cooperating less than their neighbors, a norm of cooperation may trigger increased cooperative behavior. Alternatively, households may feel competitive with other households and want to best, or at least equal, their neighbor’s performance. Either way, feedback seems to work.³⁴

With regard to both individuals and small businesses, however, the problem has been that pollution has been difficult to monitor.

New technology, however, may change this situation. Experiments in the use of “bucket brigades” in California and Louisiana are a promising example. As one study explains:

Bucket brigades are groups of residents who live in industrial zones and are recruited to monitor air, using low-cost grab samplers, near oil refineries, chemical factories, and power plants. They are deployed on the front-lines of efforts to improve environmental monitoring and reinvigorate environmental enforcement. Bucket brigades attempt to meet such objectives by coupling new strategies for air monitoring with sophisticated analysis, cross-referencing of data sources, and deployment of information.³⁵

The first bucket brigade was developed in a community in northern California that was represented by Edward Masry and his assistant Erin Brokovich.³⁶ Subsequent work allowed community members to build their own air samplers and deploy them. The apparatus consists of a plastic paint bucket containing a nonreactive plastic bag. A cheap pump forces air out of the bucket, creating a vacuum, and when the valve to the bucket is opened, a three-minute air sample flows into the plastic bag, which can then be sent to labs for analysis.³⁷ The bucket brigades have had some success in improving enforcement efforts by state agencies and in prompting voluntary efforts by oil and chemical refineries.³⁸ Hopefully, continued improvements will make the technology cheaper and more readily available.

34. Carlson, *supra* note 3, at 1289-90.

35. Dara O’Rourke & Gregg P. Macey, *Community Environmental Policing: Assessing New Strategies of Public Participation in Environmental Regulation*, 22 J. POL’Y ANALYSIS & MGMT. 383, 385 (2003).

36. *Id.* at 388.

37. *Id.* at 389-90.

38. *Id.* at 401-02.

This technique may be particularly useful in alerting residents to small neighborhood pollution sources—which may be small in the sense of their individual contribution to overall ambient pollution levels but significant in terms of air quality in the immediate vicinity.³⁹ This technique also may be useful for some small businesses. It may even be revealing for citizens to see air analyses near outdoor trash burning or outside houses with badly smoking fireplaces. Research suggests that general information about the effects of outdoor burning can help to reduce its prevalence⁴⁰; presumably, individualized information relating to a specific neighborhood would be even more potent.

Community policing is also valuable outside the context of air pollution. Citizen monitoring has a longer history and a high participation in the area of water pollution:

In the late 1980s, the federal EPA gave a tremendous boost to such volunteer monitoring programs by officially approving the quality assurance plan of the Chesapeake Bay Citizens Monitoring Program and deciding that states could use volunteer monitoring data to prepare their biennial water quality reports. Today, most citizen monitoring groups provide high quality data.

Citizen monitoring organizations have grown dramatically over the last decade. According to the federal EPA, there are now “literally too many to count.” The Izaak Walton League hazards a guess that approximately 12,000 citizen volunteer monitoring groups currently exist and that new groups continue to spawn at a rate of hundreds per year. The organizations vary tremendously in size, ranging from a handful to thousands of volunteers. The vast majority of volunteers are lay members of the public, with little or no prior experience in field work or data collection.⁴¹

Various river keeper and bay keeper organizations are especially well known for performing this function. Potentially, the same methods could be applied to urban water bodies such as creeks, lakes, and sewer intakes (particularly with large water pollution sources like golf courses).

Citizen monitoring may be useful not only because of the results that it can produce but also because it helps mobilize elements of the community and increases their environmental awareness. Community pressure may influence both small businesses and individuals, and such pressure is more likely when community groups are actively involved in environmental issues. We know that repeated face-to-face interaction is important in achieving cooperation,⁴² and thus

39. As Professor Vandenbergh points out, the figures may have more dramatic impact when reported on an annual rather than daily basis. See Vandenbergh, *Order Without Social Norms*, *supra* note 2, at 1123.

40. *Id.* at 1160.

41. Barton H. Thompson Jr., *The Continuing Innovation of Citizen Enforcement*, 2000 U. ILL. L. REV. 185, 218.

42. According to Carlson:

Game experiments do provide some evidence, however, that under the right circumstances participants will cooperate to provide public goods on a more sustained basis. One of the most striking findings is that if players are allowed face-to-face contact and communication between rounds of play, the level of cooperation increases dramatically, by more than 45%. The same level of cooperation does not occur if participants communicate only via computer. Human contact thus seems to induce cooperative behavior.

Carlson, *supra* note 3, at 1249.

neighborhoods are important arenas for addressing dispersed pollution sources. Mobilizing communities is therefore an important element of effectively controlling dispersed sources.

Because of the useful role that community groups can play in monitoring pollution, governments should consider providing financial support for these activities. Doing so may ultimately be cheaper than adding to the government's own monitoring efforts since the groups rely on volunteer labor.

B. Highlighting Localized Harms

Diffuse sources make individually small contributions to large-scale environmental problems. No one car or truck has any significant impact on air quality in Los Angeles. This presents difficulties in motivating a community response. In contrast, it seems to be easier to utilize norms to resolve "large-number, large-payoff problems like smoking and [acquired immune deficiency syndrome] reduction."⁴³ To the extent that the effects of dispersed sources can be shown to have concentrated impacts on those nearby, the small payoff problem begins to look like a large payoff problem for those affected. By addressing the pollution, they are no longer involved in making an almost unmeasurable contribution to a national or regional problem but to eliminating an acute small-scale impact.

By upping the perceived payoff, the concept of micro-environments may be useful in addressing dispersed sources. Recent research shows that air pollution exposure is often keyed to the immediate environment. For example, school buses and other vehicles following diesel trucks may have highly elevated particulate levels.⁴⁴ Similarly, children in schools near highways are exposed to elevated pollution levels.⁴⁵ The impact of local air quality on individuals can be dramatized through "measurement of personal breathing space over a period of several days," using a backpack that samples air around the person's nose and mouth.⁴⁶ The lesson of these studies is that

land use in many ways dictates public health. If you live by a freeway, you are exposed to exhaust—among other waste by-products of vehicle traffic—if you live by a manufacturing facility, you are exposed to the waste by-product of that manufacturing process. If you live by both, well we still don't really know the health impacts of cumulative exposures, but it's hard to imagine they are benign.⁴⁷

43. *Id.* at 1236.

44. See UCLA INSTITUTE OF THE ENVIRONMENT, SOUTHERN CALIFORNIA ENVIRONMENTAL REPORT CARD 2004 (2005), available at www.ioe.ucla.edu/news/rc04/htm (last visited Aug. 23, 2005). The author would like to thank Professor Carlson for alerting him to this research. See also Vandenbergh, *Order Without Social Norms*, *supra* note 2, at 1111 n.43 (noting that air quality behind vehicles is typically worse than ambient air quality).

45. UCLA INSTITUTE OF THE ENVIRONMENT, *supra* note 44.

46. *Id.*

47. Stephanie Pincetl, Land Use and Air Quality: The Path Toward Public Health Protections, Presentation to the California Air Resources Board Study Session on Relationship Between Location of Sensitive Receptors and Air Pollution Sources (Oct. 4, 2004), available at <http://www.ioe.ucla.edu/academic/Fall2004/m164/PincetlPresentation.pdf> (last visited Oct. 8, 2005).

As monitoring technology becomes cheaper and more widely available, documenting these impacts may become a dramatic way to motivate neighborhoods. True, a neighborhood cannot solve the impact of freeways on air quality. But residents can take steps to help address the impacts. For example, by following trucks with high particulate levels, the parents of school children could use monitoring equipment to identify which companies are most responsible for exposing their children to particulates. At least some of those companies might be responsive to bad publicity, community pressure, and increased attention from enforcement agencies. An alternative would be to require trucking companies to report total emissions from their fleets as part of a TRI-type disclosure, which could be made available to the public. It might also be possible to identify driver/owners of some of the offending trucks, bringing pressure to bear directly on them.

Similarly, measuring water quality near discharge points may make it clear that individually small sources nevertheless have dramatic localized impacts. Those who use water bodies for recreational purposes (or whose family members do) may be motivated to combat local pollution sources. What looks like an insignificant pollution source when water flows into the Mississippi River may be quite significant in terms of the small stretch of a tributary where the pollution is released. A "small" polluter may loom large when one focuses on the local environment.

Even where tracing back to a particular source is impractical, the micro-environment approach may be critical in creating community awareness. For example, evidence of changed air quality on days when many people in a neighborhood are using fireplaces could lead to social pressure to reduce fireplace use. Neighborhood-specific evidence is likely to be much more compelling than published research findings in this regard. Similarly, monitoring water quality near outflows during storms may mean more to people in the area than endless brochures about urban runoff. Given modern technology, it should not be difficult to make this information available to communities.

The micro-environment approach is most likely to be effective in mobilizing community pressure on somewhat larger sources of pollutants—small printing or manufacturing companies rather than individual fireplaces; golf courses rather than front yards. But there may also be an indirect contribution to reducing pollution from individuals. Once the level of awareness about local pollution has been raised in a neighborhood, there is likely to be greater attention to individual sources as well. This effect could increase the impact of the "individual TRI" advocated by Prof. Michael Vandenbergh.⁴⁸ This is one reason why it is useful to focus on dispersed sources as a group rather than merely on individuals in devising strategies.

V. Using Large Firms to Influence Dispersed Sources

Whether we are dealing with small businesses or consumers, motivating changes in behavior is likely to be challenging. This is a somewhat new and untried venture for regulators. They are far more experienced, however, in regulating the behavior of large firms. One possibility that is worth exploring is whether agencies can leverage regulations of

48. Vandenbergh, *Order Without Social Norms*, *supra* note 2, at 1148-64.

large firms to change behavior at the individual level.⁴⁹ After all, firms have a great deal of experience and success in influencing consumers—that's why they spend huge sums on advertising. Can regulators get the firms to do the work of changing consumer behavior rather than trying to do so directly? Firms may well be more adept at triggering consumers' environmental norms than the government would be. Indeed, this may be the most effective way of trying to reach individual consumers who may be less amenable to other techniques than other dispersed sources.

Steve Sugarman has made some interesting proposals along these lines in health-related rather than environmental contexts. He has proposed that cigarette companies be ordered to reduce smoking levels of their brands by 50% over a seven-year period. These reduction quotas could be transferred between companies like marketable pollution permits.⁵⁰ Sugarman has made a similar proposal for the obesity problem.⁵¹ Under this proposal, "the strategy should be to focus on those products that are recognized as key contributors to obesity, such as high-sugar drinks, empty-calorie snack goods, and goods containing excess fats."

Consider how such a system might apply to the Coca-Cola Co., for example. Assume for the moment that Coke has been assigned a certain childhood obesity reduction target. To do its part responsibly and to avoid financial penalties for failure, Coke might take direct action such as reducing the size of its standard soda can, changing its ads to make them less appealing to minors, or encouraging minors to drink Diet Coke rather than the calorie-laden variety.

Yet Coke may discover that establishing more bike paths, subsidizing physical education classes in schools, providing grants for school obesity-reduction programs, or helping parents create diet plans for their children would more effectively reduce childhood obesity. Under a system that focuses on ends rather than means, Coke would be free to explore different options.⁵²

Such a system would be most feasible for pollution problems where sellers market chemically distinct products such as patented pesticides and herbicides.⁵³ Runoff, whether from urban or agricultural sources, could be monitored, with the contribution of different vendors distinguished. The manufacturers could then be assessed a charge based on the contribution of their products to runoff. They could reduce their charge by limiting sales or by teaching farmers or homeowners to use the products so as to restrict runoff.

Similarly, manufacturers of dry cleaning chemicals or equipment could be charged for the toxics emissions of their

retailers who use their products. Such a scheme would provide them a strong incentive to find ways to help customers to reduce emissions. These efforts could be a useful supplement to more formal regulatory techniques. The suppliers are more likely to know their customers and to be trusted as sources of information about methods for reducing emissions. For this scheme to work, however, we need to be able to link pollution by customers with specific manufacturers.

When it is not feasible to establish such linkages, creating incentives for firms to contribute to a campaign against dispersed pollution becomes more complex. Any incentive has to be based on the efforts of the entire industry, thereby creating an incentive to free ride. If it is only possible to measure the industry's contribution but not the contribution of individual firms, firms may not find it worthwhile to invest in reducing pollution from dispersed sources. Why should any one firm invest in a campaign to reduce pollution by dispersed sources when doing so benefits competitors at least as much as itself?

Free riding is not necessarily an insuperable problem. In highly concentrated industries, firms may be able to internalize enough of the benefit of an industrywide reduction to make the effort worthwhile, or they may be able to informally coordinate on reduction efforts. Alternatively, firms could delegate the task of addressing dispersed sources to a trade organization, with the expenses financed by industry members in proportion to sales. This would make it possible to provide an industrywide incentive rather than requiring a linkage between specific firms and pollution levels. For example, a tax on diesel fuel in a locality could be tied to the level of diesel-produced particulates, encouraging an oil industry trade association to influence drivers to reduce particulate levels. For this system to work, the tax would not have to be large enough to cause a reduction in diesel use. Rather, a smaller, less controversial tax might be sufficient to induce oil companies to make the effort in a particular locale.

Another incentive scheme would allow firms to use decreases in pollution by customers or the public as offsets for their own pollution. For example, a firm could receive a credit toward its own water pollution mandates through a program aimed at nonpoint sources. The difficult problem here is to ensure that the decreases in pollution from dispersed sources are actually attributable to the efforts of a specific firm. We should not allow credit for decreases that would have happened without the intervention of the firm.

An alternative approach would be to provide incentives to firms that use "best practices" with respect to their customers or work with environmental groups to develop a program for influencing individual consumers. One possible incentive might be to subject nonconforming firms to more rigorous inspections of their own operations.

A gentler way of giving firms an incentive to influence their buyers would be to add "life-cycle" emissions to TRI disclosures. For example, a refinery producing diesel fuel would have to report on the estimated amount of particulates released as the result of using its product. Obviously, the better the estimates are, the more useful the disclosure will be. Even if such disclosures were not part of the TRI, they might still be useful. Imagine an official report every year detailing by brand of vehicle the amount of pollution and health impacts of trucks in the Los Angeles area. This information could be obtained relatively easily by simply sam-

49. Large firms have also shown an interest and ability to impose environmental standards on their chain of supply. See Cary Coglianese & Jennifer Nash, *Policy Options for Improving Environmental Management in the Private Sector*, 44 ENV'T 11, 15 (2002) (Ford Motor Company and General Motors Corporation requiring their suppliers to implement environmental management systems (EMS)). Small firms have been resistant to adopting EMS, in part because their environmental performance is not an issue for customers. *Id.* at 16.

50. Stephen D. Sugarman, *Tobacco Suit: Order Firms to Reduce Rate*, NAT'L L.J., Feb. 7, 2005, available at <http://www.nlj.com>.

51. Stephen D. Sugarman, *A New Diet Plan*, LEGAL TIMES, Jan. 10, 2005, available at <http://www.legaltimes.com>.

52. *Id.*

53. Surveys of customer practices might offer an alternative method of obtaining information, though ensuring reliability could pose challenges.

pling vehicles and their emissions.⁵⁴ This would surely give manufacturers an incentive to find ways to induce truck owners to reduce their pollution levels through improved maintenance and other measures.⁵⁵

VI. Conclusion

Individuals and other dispersed sources such as small businesses and farms present difficult problems in pollution control. Attention to these problems is long overdue. It is obviously important not to lose sight of the larger scale sources that we already regulate or to allow attention to dispersed sources to become an excuse for “letting the big fish off the hook.” But society must also address dispersed sources. Given the difficulties of controlling dispersed

sources, it would be unrealistic to expect that any control strategy will have immediate, huge effects. But even modest effects on a subset of dispersed sources may be significant in terms of their overall impact, given the large number of entities involved.

We already know that disclosure and community pressure can be important in determining control levels by large sources. Yet smaller, dispersed sources have escaped scrutiny. In addressing this problem, a key step is to put dispersed sources “on the radar screen.” The use of community bucket brigades is one way of doing so, particularly if coupled with attention to micro-environments where even small sources may have a significant impact.

Moreover, in seeking to influence these dispersed sources, we may be able to leverage on our influence on large firms. Those firms may have more skill in manipulating their customers’ attitudes than do government agencies, more expertise about how to address pollution problems relating to their products, and more ongoing interactions with the users of the products than regulators.

These techniques will only be part of the ultimate toolbox for addressing dispersed pollution sources. Conventional regulation, economic incentives, public education, and other techniques are also needed. The important thing is not to identify the ideal set of techniques but to get started on the problem. Experience rather than theory will teach us the most about what techniques work.

54. One possibility would be to age-adjust the results. Otherwise, companies that entered the market early would be at a disadvantage compared with more recent entrants, since more of their older, more poorly controlled vehicles would still be on the road.

55. As an intermediate between pure disclosure requirements and an elaborate regulatory trading scheme, tort law might be used to give firms incentives to reduce pollution by their customers. For example, consider the problem of pesticide runoff. Conceivably, the manufacturers might be subject to suit on a public nuisance theory. Or perhaps fertilizer manufacturers could be held liable for damage to fisheries or other natural resource damages caused by excessive algae growth. The threat of such liability would give the industry an incentive to prevent overuse or misuse of fertilizers by farmers.