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Information Disclosure and Environmental Performance

By all accounts, industrial corporations today take their environmental performance seriously. Increasingly, corporate managers believe that people care about the way companies affect the environment, and they recognize the need to show due regard for the health of the communities in which they have a facility. As a result, many companies of widely varying size and across every industrial sector regularly tout their green credentials in print advertisements and television commercials. Many of them also highlight their environmental achievements and aspirations on company Web sites and in annual reports to shareholders.

The popular press has reported favorably on these developments, often celebrating the greening of industry in general and the environmental accomplishments of companies whose green credentials have been seen as particularly impressive, including General Electric, S.C. Johnson, Johnson Controls, Duke Energy, DuPont, and Wal-Mart. At the community and state levels, the media similarly report on environmental milestones of local businesses, such as the use of cleaner methods of production, reduction in hazardous waste that is produced, improved energy efficiency, reduced greenhouse gas emissions, and the creation of "green jobs" through the manufacture or installation of products such as wind turbines and solar photovoltaic panels. Skeptics are quick to charge that much of the new green promotion is "greenwashing," or a corporate public relations gimmick, while business as usual continues. Yet recent years have brought a palpable shift in corporate environmental behavior that merits serious consideration.[1]

Consistent with these new beliefs and commitments, corporations release a great deal of technical information that documents their environmental performance and meets new public expectations for transparency and social responsibility on the part of corporate managers. At least some of that information can help to inform surrounding communities

of public health and other risks associated with the activities of manufacturing facilities. By coming clean in these ways, the facilities' managers not only acknowledge the pollution associated with their manufacturing activities but stand to learn from the process, possibly finding new ways to reduce their environmental footprints while improving their economic bottom line. In this book we seek to understand just how this process of information disclosure works and the effects that it has on environmental performance within companies and on the communities within which their facilities are located.

The potential for information disclosure or provision to achieve these lofty goals is of special interest at a time when public and corporate confidence in conventional regulation has waned.[2] For nearly four decades, environmental protection policies in the United States have required that industrial facilities meet certain targets for release of chemicals to the air, water, and land. Many of these policies have mandated the use of specific technologies and forced industry to achieve the maximum improvement possible, and more than a few have specified in exceptional detail which chemicals were to be managed and how. The goal was to provide a degree of certainty that businesses would indeed achieve the new standards and that the implementing agencies, particularly the U.S. Environmental Protection Agency (EPA), would not have so much discretionary authority that they could thwart the will of Congress.

By one recent account, some 15,000 pages of federal regulations are needed to provide instructions for companies and other entities covered by the laws, and "an elaborate system of reporting, inspections, and penalties exists to make people follow the rules" (Fiorino 2006, 1). This description applies to all of the major national environmental protection policies: the Clean Air Act, Clean Water Act, Resource Conservation and Recovery Act, Safe Drinking Water Act, Toxic Substances Control Act, Comprehensive Environmental Response, Compensation, and Liability Act (Superfund), and Federal Insecticide, Fungicide, and Rodenticide Act—and their later amendments. In some cases, Congress made those amendments, such as the 1984 revision of the Resource Conservation and Recovery Act, even more detailed and demanding than the original statutes because it grew increasingly distrustful of the EPA (and the White House) and sought to ensure that the agency would proceed on course. The collective reach of the laws is astonishing and their implementation is a daunting task. The total number of facilities whose environmental performance has been regulated by the federal government or

the states in the 1990s and 2000s includes an estimated 40,000 stationary air sources, 90,000 facilities with water permits (which cover about a half-million sources), over 425,000 hazardous waste facilities, 400,000 underground injection wells, and 173,000 drinking water systems (U.S. EPA 1999).

As might be expected, setting and enforcing regulations to carry out and comply with the core federal pollution control statutes on this scale is not cheap. In recent years the nation has likely spent more than $200 billion annually; most of that money, nearly 60 percent, comes from corporations seeking to meet their regulatory obligations.[3] The cumulative expenditures since the 1970s obviously are very large. At the same time, there is little question that the dominant command-and-control regulatory policies of the past four decades have produced real and important improvements in environmental quality and in public health, the values of which have exceeded the costs of regulation. For example, the EPA estimated that the cumulative benefits of clean air regulation between 1970 and 1990 ranged between $5.6 and 49.4 trillion, with a mean estimate of $22 trillion. In contrast, the direct compliance costs were estimated to be only $0.5 trillion (U.S. EPA 1997). Moreover, annual reports to Congress by the Office of Information and Regulatory Affairs regularly find that the value of benefits produced by new environmental protection regulations exceed the costs, often by wide margins.[4]

The evidence of improving environmental conditions also is clear and fairly well documented by the EPA and the states. For example, the nation's air and surface water are cleaner, drinking water is safer, hazardous chemicals are better managed, and the release of toxic chemicals to the environment has been significantly reduced. All of this has been achieved while the nation's economy, population, and energy use have grown substantially. The data on air quality are particularly striking and often cited as a major sign of such progress. The EPA reports that emissions of the principle pollutants controlled by the Clean Air Act decreased by 60 percent from 1970 to 2008 even while the nation's economy grew by 209 percent, the population rose by 44 percent, vehicle miles traveled increased by 163 percent, and overall energy consumption grew by 49 percent (U.S. EPA 2008). Although debate continues over precisely how best to measure changes in environmental conditions and how to document improvements systematically in light of significant gaps in data collection and reporting, this broad and impressive set of accomplishments is noteworthy. Some would add that had the EPA been more fully funded over the years and had the agency more aggressively enforced the

laws, the environmental outcomes likely would have been even more striking (Eisner 2007; Kraft 2011; Portney and Stavins 2000).

Nonetheless, many critics today believe that continued progress in corporate environmental performance cannot be assured through reliance on the core statutes of the 1970s, no matter how well implementation goes. There are a number of reasons for this conclusion. First, most of the large sources of pollution have already been identified and controlled, and most major corporations are in compliance with existing regulations; thus there are important limitations on how much more can be easily achieved through the regulatory process. Second, as tougher standards are considered over time, the costs of compliance can rise substantially because of the higher marginal costs of improvement in environmental performance; thus substantial economic barriers to progress can arise. Third, many of the remaining sources of pollution are far less amenable to command-and-control regulation, and they call for different approaches. An example is surface water pollution, where the remaining problems are attributable largely to nonpoint sources, such as urban runoff and agriculture, which cannot easily be regulated. Much the same could be said about the millions of mobile sources of air pollution, such as passenger vehicles, trucks, and buses. Further regulatory requirements to improve gasoline formulation or the use of additional pollution control equipment may be less appropriate in the future than the provision of incentives for developing alternative technologies, including hybrid, electric, and fuel-cell powered vehicles.

Beyond these constraints are the long-standing criticisms directed at the environmental regulatory system itself. As one recent appraisal put it, the policies that have contributed to the notable environmental outcomes described just above have been widely viewed as "heavily bureaucratic, prescriptive, fragmented in purpose, and adversarial in nature" (Durant, Fiorino, and O'Leary 2004, 1). Businesses and other critics have long complained as well about the overall complexity and rigidity of rules and regulations, the high costs of compliance with policy requirements, the focus on remedial rather than preventive actions, the difficulty of using management strategies that cut across different environmental media, and the lack of incentives for companies to innovate or go beyond compliance with regulatory standards to achieve better environmental results (Davies and Masurek 1998; Eisner 2007; Fiorino 2006; Schoenbrod 2005). More recently, another important line of criticism has been advanced. This is the inability of the various statutes, singly or collectively, to steer the nation toward the essential long-term goal of sustain-

able development, which requires a far more comprehensive and integrated approach to environmental problem solving than possible with existing environmental laws (Mazmanian and Kraft 2009).

In addition, the EPA has long suffered from variable but limited public and policymaker support, which arguably is essential for the regulatory process to succeed. The American public clearly is concerned about pollution and has long favored tough regulation to protect its health. Yet generally people pay little attention to the EPA and its decisions, and they have little awareness of the substance of environmental policy. The issues are rarely salient enough to stimulate most people to become more informed or active, for example, to contact the EPA or the states on regulatory standard setting or enforcement actions (Guber and Bosso 2010).[5] Public action of this kind comes more often from the organized environmental community rather than from the citizens themselves. The business community, on the other hand, is highly attentive to such agency decisions, often is sharply critical of them, and may lobby intensely for less demanding and less costly regulations (Kraft and Kamieniecki 2007).

This is an impressively long list of significant weaknesses or failures in four decades of U.S. environmental policy. It is hardly a surprise, therefore, that at least since the early 1980s an expansive and varied, though often ill-defined, agenda for environmental policy reform has emerged and that policymakers, analysts, and scholars have advanced and discussed such reforms extensively (e.g., Dietz and Stern 2003; Durant, Fiorino, and O'Leary 2004; National Academy of Public Administration 1995 and 2000; Sexton, et al. 1999).

Sadly, despite all of the concern, critiques, deliberation, and occasional experiments with new approaches, very little has changed in the prevailing environmental policy regime, especially at the federal level. The first generation of environmental regulatory policies from the 1970s, with its many, well-documented flaws, largely continues in force in part because of persistent political stalemate over precisely what kinds of changes to make and uncertainty over who would gain or lose as a result. Business groups and political conservatives have favored one set of solutions, including greater use of market incentives and flexible regulation. Environmental organizations have feared that opening the core statutes for consideration of such fundamental changes risks losing many of the gains of the previous decades. Each has been powerful enough to block the other's policy proposals. The EPA itself has experimented with many different approaches to regulatory flexibility and voluntarism, particularly during the 1990s and early 2000s (Dietz 2003; Mazurek 2003). In

the end, however, the agency found itself hobbled by existing statutes, congressional reluctance to grant it more discretion, and its own organizational culture, which has not accorded policy and administrative reform a high priority (Eisner 2007; Fiorino 2006; Marcus, Geffen, and Sexton 2002).

To be sure, one finds many important and often innovative policy changes at the state and local level, and indisputably significant elements of change in federal administrative rules and procedures, court decisions, and congressional funding actions even if Congress has remained mired in gridlock on the major statutes (Klyza and Sousa 2008; Kraft 2010; Vig and Kraft 2010). In a few striking cases, members of Congress have agreed on substantial legislative changes that incorporated elements of the reform agenda. The Clean Air Act Amendments of 1990, and especially the cap-and-trade program for control of acid rain, and the Food Quality Protection Act of 1996 (which modernized regulation of pesticides) are examples. Moreover, it is equally evident that many corporations have launched major environmental and sustainability initiatives on their own, undeterred by the failure of federal policymakers to chart the way (Esty and Winston 2006; Press 2007; Press and Mazmanian 2010). So while it is clear that this conversation over a new generation of environmental policy will continue for many years to come, the need for action has hardly gone unnoticed.

Much of the discussion about new directions in environmental policy has focused on the likely effectiveness, efficiency, or public and political acceptability of alternatives to federal command-and-control regulation. Many alternatives that have been identified, appraised to some degree, and endorsed by a diversity of policy actors. These include a plethora of voluntary initiatives by business and voluntary public-private partnerships (Potoski and Prakash 2009; Prakash and Potoski 2006); more frequent use of market incentives (Freeman 2006; Olmstead 2010); flexible regulation based on environmental results or performance (Fiorino 2004); greater involvement of citizens and other stakeholders in regulatory decision making, particularly through more open and collaborative processes often termed "civic environmentalism" (Abel and Stephan 2000; Agyeman and Angus 2003; John 2004); further decentralization of environmental responsibilities to the states and local or regional governments (Rabe 2010); and greater use of information disclosure (Hamilton 2005).

Critics of existing environmental policies suggest that in many different ways such new approaches can supplement, and perhaps eventually

replace at least some of the command-and-control regulation now in place (Durant, Fiorino, and O'Leary 2004; Fiorino 2006; John 2004; Schoenbrod, Stewart, and Wyman 2009). They may well be correct, but often it is difficult to know with any certainty. This is in part because there have been relatively few careful assessments of how such approaches have worked in practice or what their potential may be for the future even if those that have been completed suggest the considerable value of such analysis (Borck and Coglianese 2009; Coglianese and Nash 2001, 2006a, 2006b; Dietz and Stern 2003; Harrington, Morgenstern, and Sterner 2004; Harrison 2003; Morgenstern and Pizer 2007; Wilbanks and Stern 2003). We hope our study of environmental information disclosure and its impacts on corporations and communities can speak to these concerns and also stimulate further inquiry into the promise of a new generation of environmental policy.

We are not so naïve to believe that information disclosure by itself, no matter how well designed and implemented, can work miracles. But we believe that it can be an important element in a comprehensive and multifaceted approach to environmental protection. Thus we want to understand its potential and limitations, and the factors that influence its success in different corporate, community, and governmental contexts. In designing this kind of study, we follow in the footsteps of a growing body of recent scholarship that also has sought to analyze new policy approaches through use of a rich variety of complementary methods to better understand their achievements and potential (Layzer 2008; Lubell 2004; Mazmanian and Kraft 2009; Prakash and Potoski 2006; Sabatier et al. 2005; Weber 2003; Weible and Sabatier 2009).

Information Disclosure Policies

Our study began with a focus on the federal Toxics Release Inventory (TRI), established by Congress in 1986, in part because the TRI was the first major federal environmental protection program based not on adversarial command-and-control approaches but rather on industry self-disclosure of environmental performance information. Even though many state agencies use the TRI data as part of their regulatory efforts—and the reporting of TRI data are mandatory for the affected facilities—it is nonetheless accurate to characterize the federal program as nonregulatory in its design and implementation. As our research unfolded, we expanded our investigation to consider environmental performance as measured by changes over time in TRI data. Although our analysis

concentrates on TRI data, we believe the study's findings have implications for many other kinds of information disclosure policies as well as for other alternatives to regulation that continue to be debated. As for information disclosure policies themselves, they are found increasingly at all levels of government, and there is every reason to think that public demand for information about corporate and government actions will continue apace.[6]

Consider the variety of policy areas in which some form of information release is a central component (Weil, Fung, Graham, and Fagotto 2006; Weiss and Tschirhart 1994). Federal campaign finance reforms of the past several decades are at heart based on making public the contributions given to candidates for federal office and the sources; public knowledge of the sources of funding is thought to make elections more open, honest, and accountable. Following the scandalous actions in the early 2000s on the part of Enron, Tyco International, WorldCom, and many other large corporations, Congress imposed enhanced financial disclosure requirements for publicly owned companies as part of the Sarbanes-Oxley Act of 2002. The financial meltdown of late 2008 and early 2009 served as but the latest reminder of the ongoing need for full and accurate disclosure of such information if financial markets are to operate effectively—as well as of the need for sustained governmental oversight and regulation of these markets.

Similarly, long-standing food labeling requirements, such as calorie counts and fat and protein content, give consumers at least some of the information they need to make smarter choices about their food purchases. Estimates of new vehicle fuel efficiency, prominently displayed on rear windows, have long given automobile buyers a good idea of what to expect in fuel consumption in city and highway travel; buyers eagerly sought out that information when gasoline prices escalated rapidly in 2008. Comparable energy efficiency labels on household appliances such as washers, dryers, refrigerators, and water heaters provide similar information.

From drug safety product labels and packaging inserts to community drinking water quality reports (required by the 1996 amendments to the federal Safe Drinking Water Act) and notices about pesticide residues in food (required by the federal Food Quality Protection Act of 1996), the public's appetite for such information continues unabated. Indeed, it is extending into new territory. Increasingly people want to know about the quality of care they can expect from hospitals and physicians, the training and reliability of other professionals, and the quality of public

schools and universities. Consistent with these trends, many organizations have issued "report cards" on performance in an effort to respond to the public's desire to know more (Gormley and Weimer 1999).

Demand is also rising for information about corporate and institutional carbon footprints as the nation and world begin to take climate change seriously. In 2007, the Carbon Disclosure Project, a small nonprofit organization based in London, was ranking companies on their carbon emissions, and another group, Climate Counts, sought to provide similar information to consumers about how fully companies disclose their carbon footprints (Deutsch 2007). Recent reports about corporate responses to such voluntary carbon disclosures suggest that companies are persuaded to alter their energy use and set new environmental performance targets well before governments choose to intervene with regulatory requirements (Kaufman 2009b). In addition, by late 2007 a coalition of state treasurers, pension fund leaders, environmental groups, and institutional investors petitioned the SEC to demand new regulations regarding company reporting of financial risks associated with release of greenhouse gases. The coalition argued that the information was vital to investors and should be disclosed under current laws; it has not been common practice to do so.[7] This kind of information will soon be far more visible in light of the EPA announcement in September 2009 that it would begin requiring the nation's largest emitters of greenhouse gases (about 10,000 industrial sites and suppliers of fossil fuels) to track their emissions and report them to the federal government starting on January 1, 2010 (Kaufman 2009a).[8]

These varied public expectations and government mandates have a great deal in common. In a series of papers and several books, the Transparency Policy Project at Harvard's Kennedy School of Government analyzed government mandated actions that are designed to provide the public with information "to improve public health and safety, reduce risks to investors, minimize corruption, and improve public services."[9] In addition to many of the examples cited above, the project team noted the importance of international systems that track infectious disease reporting, labeling of genetically modified foods, and international financial reporting (Graham 2002; Fung, Graham, and Weil 2007). These scholars find that transparency systems have comparable components and dynamics and that their success depends on similar factors. They also find that such systems are difficult to design and maintain over time, particularly as economic markets change and information that is disclosed may become difficult to interpret.

Most of these information disclosure policies emerge from a similar normative argument that is rooted in ideas about the public's right to certain information and the government's obligation to ensure that the information is made available so that citizens can make sensible choices. Sometimes the action is taken to correct market failures, a classic example of which is the lack of sufficient information to maintain competition or to permit consumers to make appropriate choices. Requirements for information disclosure also may be seen as essential to promote equity or fairness as evident, for example, in concerns over environmental justice: the impact of environmental problems on poor and minority communities. The provision of information about toxic chemicals, hazardous wastes, or others kinds of risks can stimulate corrective action by individuals, communities, and corporations themselves. Indeed, early accounts of the TRI program tended to emphasize its potential to empower citizens and communities to bring about improvement in industrial performance through some form of public pressure on companies. The EPA itself continues to celebrate the program's effectiveness in helping to bring about sharp reductions in the release of toxic chemicals, and the program has become something of a poster child for the efficacy of environmental information disclosure requirements.

There is a less positive picture of disclosure requirements of this kind and of the TRI program itself. Even nonregulatory policies that mandate the compilation and release of such information can impose substantial costs and burdens on businesses. It is often difficult to calculate or estimate certain values, to compile the information, and to report it in the form that is required by government agencies. Similarly, despite the best of intentions, the information may not be easily understood by those it is designed to reach. Thus they may not be able to use it as intended (Gormley and Weimer 1999; Hadden 1986 and 1991; Herb, Helms, and Jensen 2003). As we will see later, a major limitation of the TRI program throughout most of its existence has been the metric on which it has relied—the amount (in pounds) of toxic chemicals released to the environment. The quantity of a chemical released is at best only a rough indicator of its risk to public health. It is a surrogate measure of what most people really want to know: how does this chemical or this facility's releases affect my health and do I need to take some action to lower the risk?

For these and many other reasons, information disclosure policies may fall short of their promise. Nonetheless, such policies are an intriguing, potentially effective, and relatively efficient way to manage some kinds

of environmental and health risks. Hence they merit the attention and consideration of scholars and policymakers as one of a variety of alternatives to conventional regulation.

The Federal TRI Program: Origins and Impacts

The federal TRI program predates many of the other information disclosure policies noted above, but its origins are rooted in the same kinds of concerns about the public's right of access to critical information. The program can be traced most directly to a catastrophic industrial accident in Bhopal, India in December 1984. An American owned Union Carbide pesticide manufacturing plant there suffered a massive leak of methyl isocyanate, a highly toxic and irritating chemical, which exposed thousands of people in nearby neighborhoods. As a result, nearly 3,000 people were killed outright and at least a hundred thousand more suffered disabling injuries; many assessments of Bhopal put the death toll within one month at over 15,000. It is widely described as the worst industrial accident in history, with more than 500,000 people affected to some extent by the gas leak. Decades after the accident, its effects are still evident. Hundreds of tons of hazardous wastes remain at the site, pesticide residues at high levels have been found in neighborhood wells, and a variety of health effects are thought to be linked to the plant's chemicals (Crabb 2004; Sengupta 2008).[10]

The Bhopal incident shocked people around the world who were stunned to learn that industrial facilities could pose such an enormous risk to nearby communities and their residents. Later they learned that less dramatic chemical releases were fairly common. Indeed, less than a year after the accident, another Union Carbide plant in Institute, West Virginia that also produced methyl isocyanate suffered a leak and gained considerable media attention. In the language of agenda setting, the Bhopal accident became a focusing event or catalyst that stimulated additional media coverage of such risks, helped to build public awareness of the threat, and moved environmental activists and policymakers to press for new legislation (Birkland 1997; Hadden 1989). In terms of John Kingdon's (1995) model of the agenda-setting process, which we discuss in chapter 3, the result was a merging of the problem, politics, and policy streams that had not quite come together on the national scene before that time.

Within three months of the Bhopal accident, bills in Congress merged the right-to-know concept with reauthorization of the Comprehensive

Environmental Response, Compensation, and Liability Act of 1980, better known as Superfund. As one participant in the process put it, "The Bhopal train was leaving the station, and we got the kind of legislation we could put on the train" (Kriz 1988, 3008). Members of Congress hinted that they were also responding to a perceived reluctance of both the U.S. EPA and the Occupational Safety and Health Administration to regulate chemical hazards sufficiently, and to the limited capacity of these agencies to do much in light of substantial budget cuts they suffered in the early 1980s. The political climate at the time, particularly congressional frustration with the Reagan administration's unenthusiastic support of environmental regulation (Cohen 1984; Kraft 2010; Vig and Kraft 1984), led both the House and Senate in October 1986 to approve the final legislation, the Superfund Amendments and Reauthorization Act (SARA) by overwhelming margins.

The revised law included a new Title III, the Emergency Planning and Community Right to Know Act (EPCRA), which created the Toxics Release Inventory program. By 2009, the TRI program mandated that thousands of industrial facilities provide detailed information on nearly 650 toxic chemicals they release to the environment or transfer on or off site. In the Pollution Prevention Act of 1990, Congress further required that additional data on waste management and source reduction actions by industry be reported under the TRI program as well. The EPA also has expanded coverage beyond the initial manufacturing industries, and most recently added requirements to report on releases of persistent, bioaccumulative, and toxic (PBT) chemicals.

During the debate over the 1986 act, critics argued that Title III was unnecessary because Bhopal-like accidents were exceedingly unlikely in the United States. Yet just a few years later, a 1989 report to the EPA found seventeen Bhopal-like disasters in the nation over the previous 25 years, that is, where there was a release of deadly chemicals in volume and at levels of toxicity equal to or exceeding those in the Bhopal accident. The report tallied 11,048 accidents between 1982 and 1988 involving toxic chemicals, resulting in 11,341 injuries and 309 deaths. That the toll was not higher, the report said, was attributable to either good management or sheer good luck (Shebecoff 1989).

Even before Bhopal and congressional action in 1986, similar right-to-know laws began appearing at the state and local level as a result of many other factors, which eventually also affected the national policy agenda and subsequent legislative developments. Chief among these were continued growth in scientific knowledge of chemical and other risks

(Covello and Mumpower 1986; Hadden 1989), increasing affluence and education among the public that fostered new attitudes toward acceptable risk and a desire for greater emphasis on safety (Slovic 1987; Wildavsky 1988), and the surging memberships, resources, and effectiveness of environmental and consumer groups. These groups were now better able to mobilize a concerned public and lobby policymakers than had been the case in earlier years (Berry 1997; Bosso 2005). Perhaps equally important was a widely shared belief during the 1970s and 1980s that businesses, and particularly manufacturing facilities, should be held responsible for any harm they inflicted on the public, especially where the risks to public health were unknown to those exposed, not readily observable, had delayed effects, or were potentially substantial (Bardach and Kagan 1982; Fiorino 2006; Lowrance 1976).

The push for right-to-know laws began in the 1970s, and by 1980, Connecticut, New York, Michigan, Maine, and California had enacted laws giving workers and sometimes communities access to information about chemicals used at local manufacturing facilities. In 1981, Philadelphia adopted a right-to-know law, and several cities in California followed, as did Cincinnati in 1982. As of 1984, seventeen states and sixteen municipalities had such laws, and by mid-1985, twenty-eight states had them (Hadden 1989; Kriz 1988). By 1985, the focus shifted to the federal government in part because, as noted, Congress was considering reauthorization and broadening of the Superfund program. Industry looked with favor on such federal action because it hoped to preempt the growing number of state and local laws with a consistent national policy. Yet EPCRA specifically does not preempt state and local governments from requiring additional information from manufacturing facilities, and many do so.

Despite the federal initiatives, the states continued to approve right-to-know legislation, reflecting strong citizen concern and a belief that the states could act independently of any federal programs. Perhaps the most notable action took place in California, where in November 1986, only one month after Congress enacted EPCRA, voters approved a ballot initiative, Proposition 65, the Safe Drinking Water and Toxic Enforcement Act of 1986. It requires that citizens be informed when there is a reasonable risk of exposure to chemicals classified by the state as toxic. The act's popularity was evident in the margin of approval, 63 to 37 percent, despite intense opposition mounted by the initiative's opponents and a spending ratio by opponents over proponents of six to one.

In light of these political, economic, and social changes during the 1970s and 1980s, it is not surprising that a "risk-free" environment came to be seen as a moral issue as well, and that environmental, health, and consumer groups continued to emphasize a right to clean air and clean water, a safe working environment, and safe food and consumer products. As many students of regulatory policy have observed, the new social regulation of the era reflected a deep distrust of the business community, a desire to open the administrative process to public scrutiny, and a determination to foster increased public participation and transparency in rulemaking. A belief in the right to know about environmental pollution and other hazards emerged as part of this broader set of changes in public expectation for business and governmental decision making (Eisner, Worsham, and Ringquist 2006; Hamilton 2005; Harris and Milkis 1996).

Many policy actors were explicit in describing such a right and acknowledging the implications for the power of citizens to protect themselves. For example, former Representative James Florio of New Jersey, an author of EPCRA, said at a Senate oversight hearing in 1988 that "community right-to-know provisions will give us vital information on what it is that is out there. . . . If knowledge is power . . . those three little words—that is, 'right-to-know'—are going to be extremely powerful" (Kriz 1988, 3007–3008). Industry representative spoke in similar terms. Randal Schumacher of the Chemical Manufacturers Association (later renamed the American Chemistry Council), for example, said "I think the law [SARA] has fangs . . . . Information in the hands of the democratic society is very, very powerful." The federal law, he noted, gave the people "authority and power to change" society (Kriz, 1988, 3008).

Responding to public concern over chemical safety, in 1988 the U.S. chemical industry itself sought to improve its image and its capacity for safe manufacturing practices through adoption of a new Responsible Care initiative, borrowing elements of a similar program already operating in Canada. Over time the Responsible Care program was strengthened and eventually integrated with the environmental management systems used by companies that have adopted the International Organization of Standardization (ISO) 14001 series guidelines for environmental performance. As we will discuss later in the book, for the chemical industry the effects of the Responsible Care program and those of the TRI are somewhat hard to disentangle, but the relationship speaks to what we presume to be an important synergy of mandatory information disclosure and corporate social responsibility initiatives.

After more than two decades, what can we say about the TRI program's successes and impacts? What does its track record imply for other kinds of information disclosure programs? And what does this history say about the broader debate under way about viable alternatives to command-and-control regulation and how best to stimulate improved environmental performance?

Information Disclosure: What Do We Know?

The annual TRI reports from 1988 to the present paint a picture of substantially improved environmental performance by American industry taken as a whole. In early 2009, the EPA released data for the 2007 calendar year, and reported that for the period 1988 to 2007, total on- and off-site disposal or release of TRI chemicals decreased by 61 percent or 1.83 billion pounds.[11] These kinds of comparisons of necessity take into account only changes in the so-called core chemicals in the original industries covered by the program that have been reported on over the entire period, so they do not provide as comprehensive a measure of performance improvement as desired. Nonetheless, a 61 percent reduction in the core chemicals is impressive, as is the EPA's report on changes between 2001 and 2007. For this six-year period, the data indicate that total on- and off-site disposal or other releases of TRI chemicals decreased by 27 percent (or about 1.55 billion pounds). So the reduction in disposal or release of TRI chemicals continues, although at a lower rate than what prevailed in the early years of the program. To put these changes in chemical releases into perspective, the U.S. economy grew substantially from 1988 to 2007 (by over 95 percent in real terms), so reductions of this magnitude in release of toxic chemicals are all the more striking.

The TRI reports also include accounting for total production-related waste (TPRW). This measure refers to the total of all waste generated at a facility, or the sum of waste that is recycled on- or off-site, recovered through energy production on- or off-site, treated on- or off-site, and disposed of or otherwise released on- or off-site. For 2007, the TPWR reported under the TRI program was 24.2 billion pounds, of which 37 percent was recycled on- and off-site, 34 percent was treated on- and off-site, and 12 percent was burned for energy recovery on- and off-site. Some 18 percent (or 4.4 billion pounds) was disposed of or otherwise released on- or off-site. The amounts have changed only slightly since 2001 (U.S. EPA 2009).

Reduction in some of these toxic chemical releases is also mandated by EPA regulatory programs, such as the Clean Air Act Amendments of

1990, which included new requirements for reducing the health risks from toxic air pollutants.[12] Moreover, by one count in 2006, at least 225 industrial facilities in the United States chose to reduce their use of hazardous chemicals largely in reaction to the terrorist attacks of September 2001; environmentalists applauded the move and cited it as further evidence that such reduction in use of toxic chemicals was possible (Lipton 2006b).[13] The Bush administration also endorsed legislation before Congress in 2006 that could achieve much more. It would impose some requirements on companies to develop security plans and standards designed to limit the risk posed by possible terrorist attacks on chemical plants and other industrial facilities. According to the Department of Homeland Security, a terrorist attack on a chlorine tank, for example, could lead to more than 17,000 deaths, perhaps 10,000 injuries, and 100,000 hospitalizations. As a result of such legislation, some companies would likely consider switching to less hazardous chemicals (Lipton 2005, 2006a).[14]

The impressive reductions in toxic chemical releases shown in the TRI reports in particular help to explain why so many observers, from the EPA itself to industry groups, environmentalists, and policy scholars, have celebrated the TRI program's success. The impact of this information disclosure program is indeed remarkable, putting aside for now questions of causality. At the same time, the annual TRI reports also tell us that industries continue to release very large quantities of toxic chemicals to the environment—about 4.1 billion pounds a year from nearly 22,000 facilities across the nation; about 1.3 billion pounds of the chemicals are released to the air. Hence success measured by reduction in quantities of chemicals released over time is not altogether comforting even if it suggests the power of information disclosure to bring about meaningful change in corporate environmental performance.

It should be said that for a new category now covered by TRI reports, the EPA says that the disposal or other releases of persistent, bioaccumulative, and toxic (PBT) chemicals also remains substantial. In 2007, facilities disposed of or released some 496 million pounds of lead and lead compounds (which accounts for about 98 percent of chemicals in the PBT category), 6.9 million pounds of mercury and mercury compounds, 1.4 million pounds of polycyclic aromatic compounds, 2.1 million pounds of polychlorinated biphenyls (PCBs), and 144,729 grams (about 319 pounds) of dioxin and dioxin-like compounds. Similarly, some 835 million pounds of TRI chemicals that are known or suspected

carcinogens were disposed or released, most to land disposal (U.S. EPA 2009).

If the numbers summarized above suggest that many, if not most, U.S. industrial facilities are getting cleaner all the time, there is another, somewhat less rosy, picture to paint that is consistent with the overall high level of continuing releases of toxic chemicals to the environment. A BP-owned Texas City, Texas refinery, where 15 workers were killed in an explosion in 2005, reported that it released three times the amount of toxic chemicals, including ammonia and formaldehyde, into the air in 2004 than it did the previous year. If correct, the *Houston Chronicle* argued that this estimate "belies industry claims that U.S. plants are growing steadily clean with each passing year."[15] And if the estimate is not correct, it raises serious questions about the reliability of the information industry reports via the TRI system.

In light of the data on continuing releases of large quantities of toxic chemicals and periodic questioning of the accuracy of the TRI data, as the example of the BP refinery illustrates, one might ask just how successful the TRI program has been. We address that question in detail in chapter 3. But we also have other questions that are worth asking even if the program merits the generous praise its supporters have offered. We think these questions have received far less attention than they deserve, and addressing them is critical to understanding both the potential and limitations of disclosure policies of this kind.

How does information disclosure actually affect the level of toxic chemical releases? That is, what are the mechanisms by which release of information about toxic chemicals brings about improved environmental performance at facilities across the country? There are several ways in which this might happen (which we explore in detail in chapter 2). It may be that the release of such information changes community and/or corporate knowledge and attitudes, and these changes in turn affect the management of toxic chemicals. Communities somehow communicate to local industry their desire to see reduced exposure to the chemicals, and industry takes these concerns seriously. Or, by compiling the data, industry learns something new about its manufacturing processes and changes them to improve its environmental performance. Media coverage of the reports also may make a difference; early TRI reports were often covered extensively by the local press even if coverage declined considerably in later years.

These kinds of responses also might vary from one industry to another and from one community or state to another, depending on available

technologies, ease of changing production processes, the state or local economic and political environment, and community pressure. It is evident, for example, that not all facilities or all communities saw the extent of change in toxic releases captured in the summaries of annual TRI reports. So there may well be different kinds of explanations for the changes in TRI releases over time, some of which fit some industries and some communities and states but not others.

Government agencies, industries, environmental organizations, and community organizations have all made use of TRI data in many different ways to shed light on corporate environmental performance and to track community exposure to toxic chemicals (U.S. EPA 2003). Scholars have taken a keen interest in the TRI program as well, and have probed its origin, history, administration, politics, and impacts (Atlas, 2007; Graham 2002; Hadden 1989; Hamilton 2005). As a result, we know much about TRI releases over time as well as the aggregate environmental performance of thousands of industrial facilities located across the nation, and at least some of the reasons for community and industry actions and their effects. Yet many important questions remain, both about the TRI program itself and the use of information disclosure as a policy tool.

We focus on some of these relatively neglected questions. We want to know what effects the TRI program has had on communities and on the corporate facilities themselves. That is, what have been the consequences of adopting and implementing the program? For example, what difference has it made for communities that are exposed to toxic chemical releases? Are citizens better informed? Do they have a sense of empowerment? Do they communicate their concerns to local industries? If so, how have industries responded to their expressions of concern? Perhaps most important of all, are communities now exposed to fewer toxic chemicals and to the risks associated with them than was the case ten to twenty years ago?

Similarly, what difference has the TRI program made for the facilities that have to manage toxic chemicals? What transaction costs has the program imposed on business, such as the time needed to compile and report the information? What have corporations gained from the experience, such as new knowledge of their manufacturing processes and a capacity to reduce pollution releases, or the creation of better environmental management systems? What do they hear from the community in response to the release of information, say from individual citizens or from environmental or community organizations? What do they hear

from the press, or from local or state government agencies? With the substantial variation from one community to another and from one industrial facility to another, we also want to know what factors most influence a facility's management of its toxic chemicals, and especially what accounts for the differences between environmental leaders and laggards. In particular, why do some corporations do so well in reducing their toxic releases and the risks associated with them while others show few signs of progress?

We believe the answers to such questions are important for the TRI program itself and to any possible policy redesign to make it more effective in informing the public, efficient in its operation, and equitable to communities and corporations. We also believe the answers speak to the broader question of the potential for using information disclosure to achieve environmental protection and other social goals, such as community health and well-being, environmental justice, and sustainable economic development. As noted earlier, we want to know about the extent to which such policy tools can supplement conventional regulation and foster not just compliance, but performance that goes beyond compliance. If the potential is real and substantial, how might information disclosure policies be designed to ensure effective implementation by government agencies? To keep the burdens and costs imposed on industry to an acceptable level? To provide the most useful information to the public?

In chapter 2, we explore the theoretical underpinning of information disclosure policies and we offer two analytical models that seek to improve understanding of how the TRI and similar program actually work. One of them focuses on the mediating factors that affect responses to the disclosure of TRI data, both within industrial facilities and within communities, such as a community's capacity to use information that is disclosed. The other, drawn from game theory, portrays the environmental performance dilemma that facilities face as they take into account the transaction costs associated with improving their management of toxic chemicals, especially going beyond compliance with environmental laws. In this chapter we also set out our major research questions, and discuss the mix of qualitative and quantitative methods we used to gather and analyze the data. In chapter 3, we focus on the history, legal requirements, implementation, and overall impacts of the TRI program. In particular, we report on the quantitative analysis of our data, which focuses on changes over time in releases of TRI chemicals and the risks associated with them. We offer several different ways to measure

environmental performance, and we introduce and explain the key dependent variables that we use in subsequent analysis. One of our key findings is that although facilities have on average reduced releases and risks, there is substantial variation across the nation, from one facility to another and across the fifty states.

The following chapters turn to a more refined assessment of the impacts that the TRI program has had to date. In chapter 4, we emphasize the variability in our measures of environmental performance across the 50 states and the thousands of companies that report through the TRI program. States provide a comparative setting to examine how information disclosure and environmental performance are influenced by political and policy variability. We find that companies (and the states in which they are located) range widely in their performance over time. Some merit the "green" label while others are clearly "brown" or showing little or no improvement in performance. Among the most significant variables explaining the differences are state political conditions (such as having a strong environmental group membership), robust environmental regulations, and innovative pollution prevention policies. All help to stimulate stronger facility environmental performance.

In chapters 5 and 6, we search for explanations for why some companies and facilities are leaders and others are laggards, a question of great interest in environmental protection policy. The data we have available permit both a quantitative and qualitative review of the effects of the TRI program. Here we report on the qualitative data from our surveys, interviews, and illustrative case studies that help to explain how information disclosure actually works to bring about changes in corporate environmental behavior and in community decision making. Chapter 6 builds on this analysis by examining the distinguishing characteristics of corporate leaders and laggards. Finally, in chapter 7, we discuss the policy implications of the findings and offer a number of recommendations that we believe can strengthen the TRI program as well as comparable information disclosure policies. These are particularly appropriate in light of efforts made in recent years to address concerns raised by the business community that reporting requirements are unreasonably burdensome and costly.[16]

As these chapters make clear, we find that the TRI program and its effects are much more complex than imagined or typically described in news accounts and previous policy assessments. Release of information by no means necessarily creates an informed citizenry or a more capable community; indeed, we find that most facilities report hearing very little

from citizens or community groups concerned about toxic chemicals. We also find a highly diversified set of actions by corporate America in managing its toxic chemicals. Many companies have made real progress in managing these chemicals while many others have not. Similarly, a cluster of states seems to be able to foster a higher than average level of environmental performance among the facilities located within them. Our survey data as well as analysis of the TRI data themselves speak to why these variations occur and the factors that account for the difference between corporate leaders and laggards. The findings, we believe, have significant implications for the TRI program and help to address the broader questions set out in this chapter about the potential for information disclosure and the search for a new generation of environmental policy.