

**INCENTIVES FOR
ENVIRONMENTAL IMPROVEMENT:
AN ASSESSMENT OF SELECTED INNOVATIVE PROGRAMS
IN THE STATES AND EUROPE**

**A Report to the
Global Environmental Management Initiative**

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August 1996

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Executive Summary

A. Introduction

In April, 1996, the Global Environmental Management Initiative (GEMI)* sponsored three independent, related studies. The first examined corporate attitudes about the environment, changes in environmental behavior, and corporate responses to incentive-based health and safety programs. The second reviewed five major environmental and safety programs managed at the federal level of the United States (Project XL, the Common Sense Initiative, the sulphur dioxide emissions trading program, the OSHA STAR program, and the 33/50 Program). The third assessed selected new environmental programs in Western Europe (the Netherlands, Sweden, and the United Kingdom) and programs managed by American states (Minnesota, New Jersey, Massachusetts, and Colorado). This document summarizes the findings of those three studies.

GEMI had several purposes in funding this research:

- ¥ to identify incentives which seem most promising in terms of encouraging the private sector to get to the next level of environmental protection. To achieve this aim, incentives would have to be strong enough to influence corporate behavior and would have to lead to measurable environmental benefits.
- ¥ to determine the extent to which recent innovative programs launched by the federal government, the states, and European countries have demonstrated the utility of incentive-based programs; and
- ¥ to make available findings of this research to appropriate decisionmakers.

GEMI's premise is that well-structured incentive programs can be very effective in advancing environmental objectives and making pollution control more efficient for the private sector. GEMI also believes that incentive-based programs have tremendous promise for advancing continuous improvement and total quality environmental management in corporate programs. Results from the studies (which came to remarkably similar conclusions) do not prove that the current array of Federal incentive programs support the GEMI premise. Neither do the studies dispute the GEMI *concept* that incentive approaches offer tremendous future promise. Most Federal programs are relatively new, still being refined, and in need of more systematic evaluation. The experience of state and European efforts to date is more positive. This up to date information about cooperative and flexible incentive-based programs will inform the many discussions about environmental regulation taking place outside of GEMI.

The three studies were undertaken during a five-month period. Relatively little quantitative data exists which documents either explicit economic or other benefits of voluntary programs to the private sector or environmental accomplishments--due in large part to the recent

* GEMI is a not for profit organization of 21 leading corporations dedicated to helping business achieve environmental, health and safety excellence.

initiation of the environmental programs reviewed, though also to the limited public and private commitment to program evaluation. Researchers relied on data that was available as well as extensive literature reviews and interviews with program designers and participants.

B. Findings

This paper summarizes the findings of all three reports using the following format: 1) factors which appear crucial to voluntary program success or failure; 2) conclusions about the future use of incentives; and 3) other conclusions.

1. Factors in Program Success or Failure

Programs that either *are* working well (such as the Dutch covenants, Sweden's permitting program, and the New Jersey pollution prevention/facility-wide permit project) or *appear* to be successful thus far (Minnesota's programs, the Integrated Inspection Program and Printers Project in Massachusetts, the Integrated Pollution Control program in the United Kingdom; at the federal level, at least to some extent: OSHA's Star Program and EPA's 33/50 and SO₂ trading programs) share some common features. Successful programs have objectives that are relatively simple and clear both to government and business and enable participants to have a major voice in the establishment of goals. All these programs grant significant flexibility to business to engineer the means for implementing program objectives. In apparent recognition of the environmental sophistication of industry now, compared to 25 years ago, these programs mandate performance goals rather than technology. A third common element in successful programs is trust among the participants and stakeholders. Literally every interviewee in the European programs, the New Jersey program, and designers of the Minnesota programs noted the importance of the mutual respect and cooperative spirit shared by participants in program development; interviewees from these and other programs also saw important benefits in improved relationships with regulatory agencies. The evidence is mixed as to whether these innovative programs are sacrificing strong enforcement, particularly in the case of federal initiatives.

Several other, more specific considerations should be noted about successful programs. To the extent success is defined in environmental terms, it should be measured. Evidence exists from both third-party evaluators and interviewees that New Jersey's program contains environmental benefits; indicative data is also noted to support the benefits of the United Kingdom and Dutch programs. From the industry perspective, these and related programs work because the incentives for industry to participate were clear and substantive: participants see economic benefits (reduced transaction costs), competitiveness advantages (faster time-to-market), and, in the case of 33/50, the flexibility to choose the means to achieve reductions. Finally, it is perhaps important that almost every successful state program was supported by state legislation.

Less successful programs also share common features. Some are the reverse of positive factors noted above: lack of clear, shared program objectives between government and business (and even between levels of government-- many states seem to believe that XL is about

alternative compliance while EPA insists facilities must go *beyond compliance*); over-control by government in establishing program objectives, combined with pervasive mistrust among the participants; uncertainty about either business or environmental benefits of the program; and absence of a statutory base. This latter feature deserves particular attention.

The lack of a statutory basis for environmental initiatives or programs always foreshadows difficulty. Because of congressional, court, public interest, and other pressures, civil servants tend to spend their time--rightly--on programs grounded in law; other initiatives have lower priority. Also, without a legal mandate, decisions must be made by some sort of consensus, which is rarely efficient or effective in an atmosphere as contentious as environmental management. The lack of a statutory base can be ameliorated by clear objectives, maximum participation in developing those objectives to ensure buy-in and flexible implementation tailored to the self-interest of the participants. Absent these process commitments, non-statutory programs almost always fail.

Business participants note another major problem with the CSI and XL programs. The incentives for program involvement are weak to begin with, and risks of litigation and other failures are high. Against this backdrop, companies are increasingly discouraged by the unexpectedly high transaction costs of participation. Investment of staff time can be enormous. There is frustration over the length of the project review process and confusion over the role of stakeholders; facilities receive conflicting signals from different levels of EPA staff; and EHS staff are having difficulty convincing other corporate executives of the tangible benefits of the programs. Costs of participation, in other words, are beginning to outweigh incentives.

2. Conclusions About Future Use of Incentives

The following principles should guide the use of incentives in future voluntary programs:

- ¥ Key stakeholders need to agree on clear, specific, measurable environmental objectives.
- ¥ Given agreement on performance objectives, entities responsible for implementation should have the freedom to design plans that take advantage of pollution prevention, process modification, and other innovative alternatives to mandated end-of-pipe controls.
- ¥ Clear procedures should be established for open stakeholder participation in the design and implementation of programs. At the same time, these processes need to be linked to the achievement of program objectives.
- ¥ Incentives for participation in programs of this kind need to be *tangible and significant*. At a minimum, they should offer reduced transaction costs, such as less duplicative reporting requirements or quicker permitting. To be more attractive, programs will provide direct economic incentives which mitigate the future costs of pollution control.

For business, however, incentive-based programs must also be leveraged with other major drivers of corporate environmental performance. These include: performance-based management goals; cost-reduction objectives; industry sector characteristics; and reputation value.

3. Other Conclusions

Regarding the federal voluntary or incentive-based programs studied in this report, we cannot show that these programs have made a major contribution to either environmental improvement or to lowering the cost of the pollution control system. The sulphur dioxide emissions trading program--different in kind from the other four analyzed--may be an exception to this in mitigating costs for participating companies.

This is not to say that the *concepts* undergirding these programs are flawed. Companies welcome economic incentives and they are willing to exchange these benefits for greater commitments to environmental protection. Despite the cynical expectation, private sector support for incentive programs is not only economic: many of those interviewed believe that well-designed incentive programs are more beneficial for the environment. The problem for current federal programs seems to be in the need for better implementation: broader stakeholder participation in program design; clearer incentives and environmental protection objectives; a shared sense of purpose among federal, regional, and state government officials; and, probably, in the need for a statutory base.

The record of new state (and European) programs, though still uncertain given how recently these initiatives have been started, is more positive. States have been more effective in making facility managers feel involved in design and implementation. Trust and cooperation between government and the private sector is much higher in the state programs. Companies identify clear existing or potential benefits, mostly economic, but others as well. Where data exists, as in New Jersey and the United Kingdom, it suggests that measurable environmental benefits can be gained from properly structured incentive programs. The more successful programs are supported by legislation.

A likely shortcoming of the state programs, and the federal initiatives as well, is that both environmental and economic achievements will turn out to be marginal. As these experimental programs continue and are improved, consideration should be given to simply making them bolder--environmental objectives need to be made clearer and more measurable, and existing incentives for participation should be made more significant.

EXECUTIVE SUMMARY

Among the range of innovative efforts in the states and in Europe there are programs which contain incentives effective enough to be spurring at least some environmental quality improvements.

On incentives, most industry interviewees for programs reviewed note actual or likely future economic savings, particularly in transaction costs. Many company representatives cited advantages of operational flexibility and speedier time-to-market for products. Pollution prevention also appears to be yielding economic returns. Other incentives for continued participation were frequently mentioned as well: improved relationships with regulatory officials and with local communities in which facilities are located.

A striking finding of this report is that almost all private sector interviewees in both the United States and Europe spoke appreciatively of the spirit of trust and cooperation between government officials and the private sector that attends these new programs. Civility and mutual respect appear to matter and are a welcome replacement for confrontation. The implication is that this new spirit will lead to more efficient problem-solving and better environmental results. In New Jersey, the most frequently voiced sentiment was something like: we have, for the first time, one point of contact for everything, and he seems to be leaning over backwards to help us make things work. Company representatives in Europe said: Here, unlike in the United States, we are treated with respect. We solve problems together with the government; we are not viewed with constant suspicion.ⁱ Nor is there anything like the same level of complaint about poor planning, poor buy-in, and other administrative difficulties that beleaguer current federal innovation programs. A conclusion here might be that confrontation and litigation have outlived their usefulness, and that civilized negotiation is becoming a more effective problem-solving tool.

Regarding environmental quality benefits, results are much more speculative principally because there is so little data. Where there is data, it is positive: serious studies in New Jersey and in the United Kingdom support the premise that programs are improving the environment as well as achieving cost savings for participating companies.

Looking broadly over the state and European programs (and with the important caveat that this document is based on extensive literature reviews and interviews, but could unearth only limited quantitative information), the report draws four other conclusions.

- 1. As currently structured, incentive-based programs are likely to have only marginal environmental or economic benefits.** No industry interviewee mentioned significant direct cost benefits beyond transaction efficiencies, and more amorphous benefits, such as improved image, were mentioned as frequently as economic value added. To increase private sector participation in programs of this kind, incentives will simply have to be made bolder.

2. Clarity about program objectives is a serious problem among the states.

States are unclear about what flexibility means for XL-like programs and other cooperative ventures with regulated entities. With the absence of definition about environmental quality objectives, many state programs seem to be designed for alternative compliance rather than going beyond compliance. Minnesota officials use the phrase superior environmental achievement for instance--but what does it mean?

3. Successful programs are supported by law. This is true for all state and European programs.

4. Evaluation is very weak. This situation obtains for both government agencies sponsoring programs and for entities participating in them. The lack of commitment to systematic evaluation of these programs is not just an academic inconvenience: governments currently have little means for knowing whether they are advancing environmental protection, and companies have little basis for recommending improvements to corporate environmental performance.

I.I. INTRODUCTION

A. Objectives of the Study

In March, 1996, a group of large companies called the Global Environmental Management Initiative (GEMI) agreed to fund three related studies. The first of these examines the evolution of Environmental Health and Safety (EHS) attitudes and management systems in large companies and corporate responses to incentive-based environmental initiatives. The second evaluates five environmental initiatives at the federal level. This study assesses programs in four states (New Jersey, Minnesota, Massachusetts, and Colorado) and selected programs in the Netherlands, Sweden, and the United Kingdom.

The premise for this study is that many of these environmental program initiatives in the states and in Europe create effective incentives for business to take actions which improve the environment beyond a level that would have been achieved through compliance with existing law and regulation. Hence, the key questions for the study are: Which programs create such incentives, and why? In particular, are the incentives to business based on economic value added to the company or companies involved? Are the improvements beyond compliance measurable?

With regard to selection of states and countries for study, it would have been theoretically possible to pick almost any state and all of Northern Europe. Environmental reform is rampant throughout the states: regular reading leads one to suspect that some secret peer group pressure exists which is prompting state commissioners to outperform each other with new initiatives. Northern Europe is also spawning a myriad of alternatives to the United States model of command-and-control.

This study concentrates on the states of New Jersey, Minnesota, and Massachusetts simply because programs in these states have been around for a longer time, offered the promise of greatest information for evaluation, and are representative of most of the new thinking in other states. For example, New Jersey's pollution prevention/facility-wide permitting program extends over two political administrations in the state and enjoys about 50% implementation among the targeted pilot companies. A wide range of innovative approaches has been underway in Minnesota for over five years. The Printers Partnership and integrated inspections programs in Massachusetts also have a relatively long history. Colorado was selected because the *proposed* program there would involve an unusually direct package of economic incentives for participating companies. The South Coast Air Quality Management District (SCAQMD) component originally proposed for this study was dropped in deference to similar analytic work on emissions trading performed by Davies et al. in their report.

Overview of the States

The title of a March guest editorial by Mary Gade, the current Director of the Illinois Environmental Protection Agency and President of the Environmental Council of the States, is: The Devolution Revolution Has Already Occurred. ⁱⁱ In the article, she argues that as far as environmental protection programs are concerned, many have already devolved to the states, and Washington's enthusiasm for the idea may, in fact, be a case of rhetoric catching up with reality. ⁱⁱⁱ What does Ms. Gade mean by this assertion?

As background, it is useful to remember that federal environmental law establishes certain responsibilities for the states, and implementation of the law over the past 25 years has led to a kind of natural devolution of authority. Once federal regulation is in place, responsibility for management of many programs--like the Resource Conservation and Recovery Act and parts of the Clean Air Act--is delegated to the states. States are traditionally responsible for permitting and for most enforcement and compliance functions.

But during the last several years, there has also been an explosion at the state level of environmental legislation, programs, and other initiatives which might generally be described as attempts to find more efficient and less adversarial methods for at least achieving, if not surpassing, environmental objectives mandated at the federal level.

While any generalization across 50 states is risky, two perceptions seem to be shared by almost everyone at the non-federal level. First, in the future we will have to find more economically attractive methods if we are to continue to improve environmental quality. States believe sustainable development means that companies, as well as the environment, should prosper. Second, to the extent feasible and responsible, trust and cooperation with regulated entities should replace litigation as a problem solving technique.

One might classify all these new state programs in the following five ways (though there is overlap among these categories).

1. Permit reforms

Initiatives here take the form of multimedia or integrated permitting schemes, speeding up the permit process, and, increasingly, pilot programs which replace permitting altogether with various kinds of self-certification programs. New Jersey, Massachusetts, California, Oklahoma, and Washington are among the leaders in this area.

2. Enforcement/compliance reforms

Examples include self-auditing legislation, the Clean Break program in Illinois, the state and local compliance partnership in Oregon, and voluntary clean-up programs for solid and hazardous waste in many states.

3. Expansions of the use of risk analysis

States are increasingly using risk analysis to establish priorities of various sorts. Almost all states have now undergone a stakeholder-based process for comparing risks among the prevalent problems within their boundaries. Texas and Minnesota, among others, are explicitly using risk as a basis for determining the extent of corrective action for hazardous wastes. Florida has enacted new legislation establishing a Risk Council.

4. Internalizing environmental objectives

States are trying out a variety of incentives for encouraging regulated entities to internalize environmental performance objectives in manufacturing or other operations. Nearly every state has its own pollution prevention program aimed at accomplishing this. Many states, such as Colorado, California, Mississippi, Wisconsin, and Pennsylvania are exploring how they can use internal company Environmental Management Systems like ISO 14000 to encourage superior performance. Colorado has an innovative proposal for offering direct financial benefits for incentivizing companies to go beyond compliance.

5. Expanding non-federal authority for environmental decisionmaking

The obvious example of this is the National Environmental Performance Partnership Program, which has just been given renewed life in a policy memo from EPA's leadership.^{iv} But many states--Washington, Oregon, Arizona, Wisconsin, Utah, and Florida--have already taken the next step through plans for extensive decentralization to regional and local jurisdictions.

So Mary Gade seems absolutely correct in saying there is a lot going on outside of Washington. The purpose of this report is to ask the next question: Will these initiatives make a difference? Do they contain sufficient, and the right kind of incentives such that we can say, in the years ahead, we have found a better, cheaper way to go beyond our current expectations for environmental quality?

With reference to international programs, this study selected the Netherlands for examination both because of its long experience with covenants between government and industry and because of the obvious impact Dutch programs are having on the development of new federal efforts (Common Sense Initiative, Project XL) and state-level reforms (New Jersey and elsewhere). Sweden is Europe's acknowledged leader in permit reform. The United Kingdom is implementing an integrated environmental management program. As with the states, many other countries and the European Union itself are trying out new ideas which might have been intriguing to study.

B. Methods

Likely because of the recent development of most of the programs reviewed for this study, the author was not able to locate many systematic, quantitative evaluations of effectiveness for these programs. (Though the reluctance on the part of both governments and the private sector to invest in evaluation is not just an academic mistake. This overall study tries to get at industry incentives; political decisionmakers will be equally interested in demonstrations of environmental quality improvements when they consider new approaches.) Some are underway. New Jersey is preparing a report to its legislature that is due imminently but is currently embargoed. Various analyses are underway of the European programs, including the performance reviews by the Organization for Economic and Community Development (OECD). In lieu of data-based evaluative reports, this study relies on review of the available literature and interviews.

While the literature available on these four state programs and three countries could probably fill a small room of the Library of Congress, this study used about 150 publications (see attached bibliography). Most of these publications describe programs; many are academic, from the World Bank, or offer other analyses. About 70 people were interviewed, perhaps half of whom are government officials responsible for designing and implementing programs, slightly less than half company officials with a mixture of responsibilities, and the remainder analysts or other commentators. Based on these materials and interviews, this report describes the intent of the new environmental programs and how they are in fact working--then summarizes views of the regulators and participating regulated parties.

II. STATE PROGRAMS

A. New Jersey

This section of the report on New Jersey has two parts: description of the program, and assessment of the program.

Description of the Program

Built on some imaginative thinking in New Jersey, further inspired by a trip of New Jersey officials to the Netherlands, and ratified by New Jersey legislators willing to codify a daring departure, New Jersey's pollution prevention program contains all the components theoretically necessary for success. The beyond compliance goal is 50% reduction over five years in the use, discharge and generation of hazardous substances. ^v Procedures are established for enforcing the program. Two key economic incentives (as well as several softer potential benefits) for business participation are built in. Here is how the program works.

Effective August 1, 1991 the Pollution Prevention Act became law. The (at that time) Department of Environmental Protection and Energy (Department will be used in this report to refer to environment agencies in the states and Europe) adopted rules for implementing the Act on February 1, 1993. The law is quite clear in purpose: it is designed *solely* to prevent

pollution by reducing the use and discharge of hazardous substances at certain industrial facilities. ^{vi} Owners and operators of these facilities are required to prepare pollution plans (but *not* submit them to the state for approval: plans are to be kept on site. Owners and operators, in other words, are required to prepare plans, but implementation of the plan is voluntary). Owners are obligated to submit plan summaries and annual progress reports to the Department. A key feature of the law is the broadening of the authority of an existing Office of Pollution Prevention in the Department to administer the program. The new office is given statutory responsibility independent of traditional environmental duties in the state. The Act further mandates that plans, summaries, and progress reports focus on targeted industrial processes and sources ^{vii} rather than emission points. It also authorizes the Department to provide up to 15 pilot facility-wide permits.

The Legislature stated its intention to transform the current system of pollution control to a system of pollution prevention ^{viii} based on two assumptions. First, the traditional system of separately regulating air pollution, water pollution, and hazardous waste management constitutes a fragmented approach to environmental protection and potentially allows pollution to be shifted from one environmental medium to another. ^{ix} Second, the legislature clearly believed that pollution prevention pays; that in fact industry can save money through a more efficient and rational use of hazardous substances, or through the use of less hazardous substitute substances or processes less prone to produce pollution...without adversely affecting the State's economic health or the livelihood of those employed by industries... ^x

The requirement in the Act to prepare pollution prevention plans, plan summaries, and annual progress reports applies to about 700 industrial facilities in New Jersey. Plans and summaries must be updated every five years and involve significant detail. Plans must include such information as:

- ☒ Certification by the top facility official that he intends to achieve the goals set forth in the plan;
- ☒ Identification of all production processes and total units of production;
- ☒ Chemicals and amounts manufactured, stored, or used at the facility, and the amounts used in production as well as generated as non-product output;
- ☒ Amounts of waste generated and released by each process and non-product output generated at each source;
- ☒ Amounts of each hazardous substance released to any media;
- ☒ Comprehensive analysis of the costs associated with the use and release of each substance, as well as analysis of savings from pollution prevention and the more efficient use of raw materials, the cost of treatment and disposal of hazardous waste, and the cost of liability insurance ^{xi};

- ¥ Calculation of the increase or decrease in use of each substance after implementation of the plan, compared to use of substances in the prior year;
- ¥ Explanations of methods used to achieve reductions;
- ¥ Statement of goals for reducing use of each substance during each process, and for reducing non-product waste output;
- ¥ Analysis, for each process or source, of potential options for reduction of use or generation of hazardous substances, including a full-cost accounting of these options and a description of these options; and
- ¥ A quantitative description of the impact that individual pollution prevention techniques have had on post-treatment multimedia environmental releases of hazardous substances, reported by medium. ^{xii}

Plan summaries and annual progress reports, while less detailed, do obligate the facility to report to the Department in quantitative form success in achieving pollution prevention goals, and explanations for success or failure.

Having mandated all of the above, the Act then authorizes the Department--with almost no other confining language--to designate 10-15 facilities as pilot projects for the facility-wide permit program which is the principle focus of this report. The Department designed rules for implementation of the program over the next 18 months.

The premises behind the Department's development of the permit program extend the logic captured in the original Act. The objectives of a single permit are to minimize cross-media transfers of pollution and thereby reduce overall risk, to encourage facilities to incorporate pollution prevention objectives in the redesign of production processes and in other daily business decisionmaking, and to achieve more efficiency in the administration of environmental programs. ^{xiii} The linking of these three objectives is imaginative. The intention of the permit program is to combine two potential environmental benefits (minimizing the well-known pollution transfers which occur with our current single-media statutory framework, and realizing the expected gains from replacing end-of-pipe emissions control approaches with pollution prevention at the source) with two potential economic benefits to facility managers (increased operational flexibility and reduced transaction costs, and the financial benefits assumed inherent in pollution prevention). The hope, in other words, is to provide sufficient incentive for facilities to go beyond compliance through pollution prevention.

Implementation of the facility-wide permit program began (more or less) simultaneously with both the Department and the facility. For its part, the Department created permit teams which included permit writers from the air, water and waste programs *led by a member of the new Office of Pollution Prevention* (thereby immediately introducing a new, more cooperative method of operation with the regulated facilities). These teams are cross-trained and function increasingly from a multimedia perspective.^{xiv} The teams initially toured plants, reviewed TRI data for each facility, and developed expertise in materials accounting for use in balancing inputs

and outputs at each site.^{xv} In another useful action, the Department hired outside consultants at its own cost to provide engineering and financial analysis assistance, if desired, to pilot facilities.

At the same time, facility owner/operators began by using their pollution prevention plans as the basis for designing their permit. Freed from the technology requirements for end-of-pipe, point source control, the facility looks for innovative and cheaper means to reduce or prevent pollution in terms of overall hazardous materials use and waste. Federal statutory requirements must still be met--they essentially form a minimum baseline--but otherwise facilities can construct their own internal integrated approach to achieve or exceed the requirements. The eventual single permit becomes a summary document which describes how the facility will accomplish overall reductions in pollution emissions. As of this writing, six facilities have been granted a facility-wide permit; decisions on several more applications are imminent.

Assessment of the Program

It is worth taking a minute to focus on results of the Act as a whole before turning to assessment of the facility-wide permit component because the premise of the permit component is pollution prevention. The Act assumes that pollution prevention programs, *inherently*, will be beneficial for both the environment and economic self-interest of companies. Based on preliminary findings, that appears to be true for the New Jersey program.

The New Jersey Department of Environmental Protection performed on-site reviews of 42 of the approximately 400 facilities in the state that were required to submit plan summaries by June, 1994. (Please note that this review covers different facilities than those participating in the pilot program, so numbers are not comparable with those on p. 18.) In addition to an examination of the facility operations themselves, the review involved analysis of the plan summary and a questionnaire filled out by the facility. The objectives of the review were to assess, using materials accounting, reductions in hazardous substance use and non-product waste output, as well as to determine the costs and benefits to facilities of pollution prevention planning and implementation.

Summarizing from the Department's report, the average direct cost (for consultants, etc.) to facilities for preparing the pollution prevention plan was about \$26,000.^{xvi} For facilities which estimated the amount of time spent by all personnel involved, the average numbers of workdays involved was 60.7. In terms of benefits to the 42 facilities, 29 (69%) predicted net cost savings as a result of pollution prevention techniques identified through the planning process. The Department estimates a total net benefit to the facilities of about \$6.3 million per year. To put it another way, the preliminary analysis shows that for every dollar spent on the entire process (including transaction costs, facility costs for compliance, and capital costs for implementation of pollution prevention techniques), facilities project net savings of \$5 to \$8. ^{xvii}

A Rutgers University economist's more detailed analysis appears (based on an interview) to bear out this conclusion.^{xviii} Under any reasonable scenario, up-front administrative costs are paid back through net gains to facilities in very short time periods--one to two years. And while the returns are not huge, they are not trivial either. ^{xix} The economist notes that the numbers involved in his analysis are statistically very solid.

Addressing environmental benefits, the Department estimates, on the basis of plan summaries, reductions of approximately 24 million pounds per year in the *use* of hazardous substances against a base of total annual statewide usage of 4 to 5 billion pounds per year. For non-product (or waste) output, the state estimates a reduction of 13 million pounds per year from a baseline annual generation of about 320 million pounds. (By far the largest reduction in both the use and waste categories springs from the determination of facilities to find alternatives to 1,1,1-trichloroethane.)^{xx} Furthermore, another contractor study found that facilities have not yet picked all of the low-hanging fruit and that significant environmental and economic gains are still available to these facilities.^{xxi}

Turning now to the facility-wide permitting program in particular, the question is what Environmental Health and Safety (EHS) and other officials from the facilities themselves say about the utility of this initiative. Representatives from six facilities which have received single permit approvals were interviewed, as well as people from several companies which were either rejected or chose not to apply.

On the positive side, all six facilities remain optimistic that their participation in the program will eventually provide important benefits to their companies. All six facilities commented on two key drivers or reasons for participation that they are confident will be borne out in time: the single permit will **reduce transaction costs** and will provide significantly **increased operational flexibility**.

Substituting one permit for the existing system is dramatic for these facilities. In one case, 100 air permits have been consolidated; in another, 75 permits for all media are now combined; in still another, 60 air permits have been exchanged for one comprehensive agreement. It is not surprising, therefore, that facilities expect to see major efficiencies in the amount of time spent on permit preparation in the future. Facilities welcome the opportunity to change their production processes without waiting for permit modification approvals either because they can save money or because, for four of the companies, they can speed up the time it takes to get new products to market.

Three other benefits were mentioned by two or more of the facilities. 1) Several facilities seemed surprised to note that they have, in fact, realized pollution prevention savings through use of alternative substances in manufacturing, especially alternatives to currently used solvents. 2) Four facilities anticipate major savings in either reduced monitoring costs at each point source or reduced permit fees. 3) Most of the interviewees remarked on the importance of improved relations with the Department, citing approvingly the new spirit of cooperation and assistance provided to them under the permit demonstration program.

Some of the criticisms of the program were perhaps predictable, others surprising. Most participants (in the facility-wide pilot permitting program, contrasted with the broader pollution prevention program) believe that program has very high initial administrative costs. In one case, for instance, the facility estimates it has invested \$1.5 million and 5000 professional hours.^{xxii} The Department has been slow in implementing the program, and there is less than total buy-in from employees in offices other than Pollution Prevention. Most interviewees said that the

success of the program would be seriously undermined if Title V of the Air Act were not included (which, at the time of this writing, is still in negotiation). Two facilities wish the facility-wide permit program were complimented by an integrated inspection program.

Two other comments are worth particular note. All six facilities complained about reporting issues. Part of the reason for this lies, no doubt, in general problems of duplicative or unnecessary reporting requirements by federal and state agencies--nearly every private sector interview undertaken for this report conveys annoyance with reporting requirements. New Jersey probably also has a special problem--there are not yet accepted procedures for integrated reporting which would be congruent with the integrated permitting program. Finally, and a bit uncomfortably, facility representatives--echoed in the European interviews--observed that a *sine qua non* for the likely success of the demonstration program was the rather limited role throughout of public environmental organizations. These interviewees valued highly the openness and cooperation of the Department and believe that formal environmental group participation in the process would have curtailed the trust and risk-taking necessary for facilities to try this experiment.

In sum, the New Jersey model seems to be promising for broader United States application. While the difficulties and cost of initial administration for both the Department and the companies are intimidating, and only a few rather large facilities are involved thus far, this demonstration project appears to be achieving the twin objectives of improving environmental quality beyond what current federal law requires and doing so with sufficient non-regulatory incentive for the private sector. Three key questions should be addressed, however, if this model is to be implemented more broadly. First, how can this approach be made to work with fuller stakeholder participation in design and implementation? Second, will the program work for a broader mix of small, medium, and large scale facilities? Third, could the program itself be expanded beyond the multi-media permit incentive to include such opportunities as integrated reporting and inspections?

B. Minnesota

Reviewing environmental innovation and business incentives in Minnesota requires an unusual approach. The challenge is not to assess any single program, but a whole package of initiatives Minnesota has put in place over the past five years--and the culture change within the environment Department that goes with the package.

This section of this report will summarize six of the more important new programs begun in the state since 1990. It is possible to treat these programs as a package because they generally share the same four features: 1) they are all based on the initial premise in Minnesota that enforcement comes first, ^{xxiii} which describes the intention of agency officials to insure baseline compliance to all applicable federal and state law; 2) each program contains direct economic or other, softer incentives to encourage voluntary participation by the private sector; 3) every program stipulates as an objective equal or greater environmental benefit than its

command-and-control alternative; and 4) all programs express Minnesota's culture change commitment to innovation and cooperation with regulated parties.

The basis for this section of the report is review of dozens of program description publications, two days of on-site interviews with literally all senior program managers in the state environment Department and six representatives of regulated industries, and telephone interviews with several other Minnesota industry officials.

Description of the Programs

Minnesota's remarkable change in approach to environmental protection began with the appointment of a new commissioner for the environment a little over five years ago.^{xxiv} He appears to have come to his new job with four absolutely basic articles of faith:

- ¥ About 85% of Minnesota's regulated parties *want* to be, and be seen as, environmental good citizens; they are generally in compliance with environmental law; and the bulk of enforcement and compliance resources should be directed to the other 15% of firms who either do not understand or are deliberately avoiding their responsibilities.
- ¥ For those 85% of good environmental citizen companies, voluntary incentive programs will be more efficient in achieving both environmental gains and economic savings than traditional regulatory approaches.
- ¥ It is possible to negotiate cooperatively and in good faith with these companies in the development of incentive-based programs.
- ¥ Given time and the full opportunity to participate in specific new program design, civil servants in the environment Department will realize the value of innovation and cooperation, and will themselves become the originators of better ways of doing business. (In this regard, the commissioner--who recently left his position--was almost completely successful.)

Six of the more significant innovations spawned during this period are summarized below.

1. The Environmental Auditing Program

Of the one-third or so of the states which have in place programs or legislation on environmental audits, Minnesota has found a most attractive balance between potential environmental benefits, industry incentives, and information disclosure. Like all audit programs, the purpose is to encourage companies to evaluate their compliance with local, state, and federal regulations and to correct any problems they may discover. The Minnesota project was started on August 1, 1995 on a four-year pilot basis.

Reflecting the spirit of trust, the materials describing the program state the Department's belief that most businesses in Minnesota take seriously their responsibility to protect the environment. Also, firms that conduct audits are likely to take the necessary actions to clean up or correct problems they may find before the problems develop into major environmental or public health issues.^{xxv} Incentives to business to participate include: 1) the intent of the program is to focus on the goal of achieving measurable environmental results, not on fines or other penalties^{xxvi}; 2) confidentiality of information-- while Department staff can obtain access to audit results, persons other than the government cannot use audits in legal proceedings if the company complies with the corrective action schedule; and 3) the more cooperative relationship formed between the company and its regulators (there is also a public recognition component: the company obtains a Minnesota Green Star emblem).

In an interview, one of the program's leaders from the Minnesota Attorney General's Office saw as principle benefits of the program building a culture of prevention and defining environmental performance as a continual improvement process.^{xxvii} He also believes strongly that information disclosure is a false issue: audit programs can be constructed with sufficient incentives to override the natural reluctance of industry to expose itself to increased litigation or fines. Preliminary results from an application of the self-auditing law to small businesses in Minnesota seem to be bearing out program hopes: 40 out of 45 audits completed thus far are first-time audits for those companies.^{xxviii}

2. The Landfill Cleanup Program and the Voluntary Investigation and Cleanup Program

Minnesota's Landfill Cleanup Program was created by the 1994 Landfill Cleanup Act and is an alternative to Superfund as a way to address mixed (hazardous and non-hazardous) solid waste at municipal landfills.^{xxix} (An aside here: it is worth underlining that almost all of Minnesota's new programs are supported by new state law. The legitimacy provided by statute is, one suspects, of immeasurable benefit both to the agency staff who implement the programs and in promising stability to companies who decide to take advantage of them.) The legislature enacted this legislation out of frustration with the protracted, expensive legal activity which seemed to be the principal outcome of Superfund-led landfill cleanup.^{xxx}

The design of the program is simple. The Act gives the agency authority to initiate cleanup and/or closure actions, take over long-term care at the facilities, and, in certain cases, reimburse eligible parties for their past cleanup costs. The state currently targets 106 landfills for cleanup and at those, all federal involvement has been terminated unless an environmental emergency occurs. To start action, the state enters into a Binding Agreement with a landfill owner/operator or other responsible party group. After requirements in the agreement are met, the state stipulates that compliance has been achieved and assumes the cost of any remaining cleanup work as well as the expense of operating ongoing environmental protection systems at the landfill.^{xxxi} Funding for the program (which has a current balance of about \$15 million, having spent about \$6.3

million over the past year) comes in roughly equal portions from a solid waste assessment fee, 10-year state bonds, and private insurance company payments.

While the landfill program was created in part to speed up environmental restoration and save the state money in actual cleanup, the program also has two obvious, significant benefits to potentially responsible parties. One is that quicker cleanups means a quicker end to ongoing liability burdens. The other important benefit is compensation of landfill operators or other parties who incurred cleanup costs. The Act promises to reimburse both persons other than the owner or operators who carried out response actions under a *federal or* (italics mine) state directive and owner operators until all eligible claims have been met.^{xxxii}

To compliment its existing state Superfund program, Minnesota's legislature in 1992 enacted the Land Recycling Act, which in turn gave rise to the Voluntary Investigation and Cleanup Program (VIC). This award-winning program for cleanup and restoration to productive public or commercial use of hazardous waste sites became the principal precursor to EPA's brownfields initiative.

The aim of the VIC is to provide what might be termed liability insurance. The program reviews the adequacy of site investigations and approves clean-up plans. By obtaining (state) approval...landowners, lenders, and potential developers can be reasonably confident that they know the extent of any environmental problems on the property. They can then (reliably)...estimate the cost of the cleanup needed to satisfy statutory requirements...and make financial decisions about development. ^{xxxiii} The program completed work on 118 sites in 1995 for this purpose, leading (in perhaps the most famous example) to construction of such facilities as a hospital on a former Superfund site.

For those (possibly deranged) individuals who follow closely the arcana of federal waste cleanup law and regulation, it is interesting to note that Minnesota's implementation of its own landfill and hazardous waste law, in lieu of federal statute, gives the state at least limited policy freedom. For instance Minnesota, far more than EPA, emphasizes risk based corrective action. As senior officials in the state's hazardous waste program said, we are able to demonstrate a paradigm shift away from the absolute prescriptions of federal regulation. For example, if we know that a 200 foot section of contaminated groundwater is not now, and likely never will be used, we can simply monitor it but otherwise leave it alone. ^{xxxiv} The potential economic benefit of this policy alone for both the state and regulated parties is not trivial.

3. Minnesota Toxic Pollution Prevention Act

Most of the provisions of this program are similar to pollution prevention initiatives in other states and at the federal level. The assumption is that while the environment will benefit, so will private industry through a variety of efficiencies achieved after careful review of polluting processes. What is perhaps unusual about Minnesota's program is the extent and detail of the Minnesota Technical Assistance

Program (MnTAP) publications and on-site consultations. These focus on specific industry sectors and manufacturing processes, and on concrete and particular changes which have demonstrated both environmental and economic benefits. To pick one example at random from the assistance materials, there is a lengthy explanation of how a county courthouse achieved a 46% cost savings by using reusable component forced air filters instead of disposable filters. The materials describe how this alternative works, how to implement it, specific environmental benefits, specific economic benefits, and up-front costs for installation.

The state has also evaluated the effectiveness of this program, finding that, as in New Jersey, benefits are not huge but not trivial either. Officials estimate that 90% of the economic efficiencies are to small and medium-sized manufacturers and result mostly from product substitution and increased process efficiencies.^{xxxv}

The Great Printers Project is a sub-component of Minnesota's pollution prevention program. This program is, however, very similar to the Printers Partnership in Massachusetts and will be discussed in detail in the following section of this report.

4. The Environmental Regulatory Innovations Act

Terry Davies et al., describe at length the federal Project XL in their portion of this report to GEMI; this Minnesota Act basically mirrors the federal program. What is of interest here is how the program is working this far in Minnesota (which is itself an XL project), particularly with regard to approval of the 3M XL proposal.

Based on an innovative air quality permit granted to its tape factory in 1993, the 3M proposal promises to cap pollution emissions below levels required by current statute in return for receiving a facility-wide or integrated permit, and commits implementing an integrated emissions reporting system based on mass balance outputs. According to the principal architect of the 3M proposal, the company anticipates the key benefits to be reductions in transaction costs associated with permit modification approvals, reductions in point source emission monitoring costs, and increased operational flexibility allowing the company to get its products to market more quickly.^{xxxvi} In addition to the promised reduction in pollution emissions, the state hopes to be able to demonstrate the utility of real time monitoring data through 3M's innovative reporting system. So how is it going thus far?

As of the time of this writing, Minnesota environment officials are, in the vernacular of the Midwest, fit to be tied. After many months of extensive negotiations with 3M, an elaborate stakeholder participation process, and innumerable conversations with EPA officials, the state expected to be able to approve 3M's proposal early this summer. At the last minute, the Department received a lengthy letter from EPA's Air Office (and an equally detailed critique from the Natural Resources Defense Council) raising serious questions about Minnesota's anticipated decision and imperiling the approval.

The issues in dispute appear to be common to the XL experiment: How should a current baseline for emissions be defined, and how should beyond compliance be defined. Minnesota officials themselves worry about the workability of the mass balance reporting system.^{xxxvii} There is one more concern specific to Minnesota: Who has the right to decide? As the only state selected for XL participation, agency officials resent last minute interference in what they believed to be their authority to proceed.

U.S. Filter Corporation expects to submit a second XL proposal soon for approval by the state. This proposal would significantly reduce hazardous waste releases in return for a redefinition of what is considered a waste release. The company is looking for savings in transaction costs and, as an environmental company, also wishes to be a leader in innovation.^{xxxviii}

5. The Point Source Improvement Initiative

In the summer of 1995, Minnesota's governor appointed a Blue Ribbon Task Force to begin thinking about how to apply approaches already being implemented for air and waste--voluntary incentives, increased cooperation with regulated parties in designing innovative solutions, a focus on risk-based solutions--to water quality problems. Following the original report of the Task Force, agency staff visited a number of other states in search of new ideas and are now completing work on a new strategy for the state. It will have three elements.^{xxxix}

First, the plan is to revise permit strategies by extending permit length to 10 years, issue cross-media permits, try out a host of alternatives to traditional facility-specific permits, and expand incentives for pollution prevention through the permitting process. Second, the strategy calls for revising compliance and enforcement procedures. Following Massachusetts' lead, the Department hopes to implement multimedia inspections. Third, Minnesota expects to develop accountability incentives through an expanded self-certification program, incentives for replacing end-of-pipe monitoring with ambient monitoring, and establishing an expedited permit issuance process.

The theory behind all this is to focus on risk-based problems and programs which result in mitigation of those particular problems. The incentives to do so for the regulated parties will consist of a set of permit process improvements.^{xl} While this theory represents an attempt to bring a similar kind of new thinking to water quality, the strategy is not far enough along to allow an assessment of its utility. What, for instance, are the specific incentives for environmental quality improvement? Risk-based strategies are far more difficult to implement in the ambient water quality context than for air; what are the concrete results to be achieved in this program?

6. The Lake Superior Basin Hazardous Waste Initiative

This program, only briefly touched on here, is a four-year old effort to identify hazardous waste generators in the Basin and to assist them, through education and compliance assistance, in reducing and properly managing their waste. ^{xli} It is worth

noting because it is, once again, a voluntary program in which the state, this time with soft incentives like education and targeted technical assistance, is attempting to work cooperatively with polluters to improve environmental quality. As with other pollution prevention efforts, this program is site-specific and concrete. For example, it is establishing a permanent collection system for rechargeable batteries (such as a countertop drop-box program for collecting button batteries with Proex Photo Systems Inc.) and has underway a program addressing thermostats with Honeywell.

The program began establishing baseline numbers on wastes generated in the Basin in 1995 so in the future it should be easier to examine explicit environmental benefits.

Assessment of These Programs

Perhaps the reader senses a certain enthusiasm in the descriptions of the Minnesota initiatives. It is difficult not to be affected by the spirit of innovation and openness on the part of all the leadership of the environment agency. The author conducted a number of interviews to determine whether there exists equal enthusiasm for the Minnesota reforms on the part of the regulated parties. Most of the interviews were set up by the agency itself. The interviews were particularly instructive because several of the interviewees, now managers in the private sector, were formerly senior officials in the Department.

Despite these potential biases in reporting, the picture that emerges is blurred. While interviewees do acknowledge economic and other benefits of the auditing, voluntary cleanup, XL, and other programs, they also describe a variety of issues that Minnesota's programs do not address in terms of necessary incentives for environmental improvement.

Most interviewees believe they are making both money and environmental gains through their participation in pollution prevention programs. One large company has become so successful in recovering, treating, and reselling waste chemicals that these sales are now the largest profit item in its business.^{xlii} A paper mill is also saving money through increased recovery of waste; still others are finding efficiencies in decreased use of energy. Both companies involved in the XL process are confident of the potential benefits of reduced transaction costs and operational flexibility. The construction of new facilities on former waste sites is obvious evidence of the success of the landfill and hazardous waste voluntary compliance programs. The continued participation of Honeywell and other major businesses in the Basin Initiative testify to the apparent utility of that program.

At the same time, interviewees raised disquieting issues about *why* they are participating. Over half of those interviewed mentioned (as did many of the agency staff) the culture of respect for the environment in Minnesota, and the need of companies to participate to maintain or improve their image--which is fine, but may not be an incentive equally transferable to other jurisdictions. Several company representatives view pollution prevention program participation

as mandatory and are less certain about economic value added. Only one interviewee was able to quantify economic benefits of participation in any of the programs.

Most interesting are the themes which emerged about unaddressed problems (themes defined as comments made by three or more interviewees). As in New Jersey, almost everyone commented on the costs associated with duplicative and unnecessary planning and reporting requirements (the assumption being that time spent here should be transferred to more environmentally productive purpose). The principal difficulty three interviewees, representing many more than three companies, identified was that the current regulatory structure does not account for, let alone encourage, growth. One association representative noted the impossibility of reducing emissions when businesses in his sector had grown by 4500% over the past several years.^{xliii} Another company is faced with the impossibility of reducing copper use and waste emissions when copper is the fundamental ingredient in its production process.^{xliv} Finally, from the person best positioned to know both the agency and overall business thinking in Minnesota: Businesses, when all is said and done, simply see environmental compliance as a cost center to be reduced. ^{xlv} As he and several others mentioned, the best way to do that is through more directed economic incentives such as tax benefits for capital and other environmental investments, and (as one company suggested) creation of a fund or other mechanisms which give small to medium-sized businesses easier access to loans for environmental purposes.

In sum, while the impetus for and implementation of reforms which improve environmental quality through incentive systems is exceptionally well developed in Minnesota, results are not yet clear. Little data exists to prove that environmental quality has significantly improved beyond what might have been expected with compliance with traditional regulatory approaches. While current incentive programs are engendering company participation, corporate representatives point to other problem areas which may offer even greater opportunities for environmental and economic improvement.

C. Massachusetts

This report reviews two Massachusetts programs: 1) Facility-wide Inspections to Reduce the Source of Toxics (FIRST), which in turn was based on a pilot effort called the Blackstone Project; and 2) the Environmental Results Program, an expansion of concepts first tested through the Printers Partnership.

Description of the Programs

The Massachusetts Department of Environmental Protection launched the Blackstone Project on a trial basis in 1989 as an attempt to advance environmental protection while making it more efficient and economically attractive to regulated parties. As with the facility-wide permitting program in New Jersey, the environmental objective is couched in pollution prevention language: to encourage source reduction in the use of toxic materials. The incentive to participate was the chance to join a multimedia inspection program which would require significantly less staff time and resources on the part of companies. These objectives were mandated by the passage of the Massachusetts Toxics Use Reduction Act in 1989.

This original project, as well as its successor FIRST, targets small and medium-sized businesses. Part of the reason for this limitation is the simple administrative difficulty of training one or two inspectors to be able to inspect a large, complicated facility. A former Assistant Commissioner of the Department articulates an equally compelling justification: I believe that the environmental risks posed by the range of commercial and industrial facilities which constitute the regulated universe in Massachusetts can be assessed as...a few large, one-of-a-kind facilities, each of which generates a significant amount of waste, and a much greater number of small firms who are similar to each other...While the individual pollution from each firm in the second group may be small, the total aggregate pollution and potential risk is vast...I believe there should be a more balanced distribution of (DEP) resources. ^{xlvi}

The Blackstone Project inspection team was trained to conduct air, hazardous waste, and water pollution inspections, identify source reduction opportunities during these inspections, then prepare detailed analyses of manufacturing processes with recommendations for source reduction-based enforcement strategies. ^{xlvii} (Note that, unlike the New Jersey model, pollution prevention objectives were not originally internalized by facilities in their own plans but are instead carried out by agency staff.) The first phase of the project targeted 180 firms. A report following implementation of this first phase concluded that the program was far more effective than the status quo...at achieving objectives that...are important to DEP's mission of protecting public health and the environment. ^{xlviii} In particular:

- ¥ Approximately 75% of the inspections turned up illegal or unregistered waste streams.
- ¥ Inspection staff identified specific source reduction opportunities at well over half of the facilities.
- ¥ A follow-up survey found that all but one of the facilities inspected were in favor of the multimedia inspection approach, principally because of savings in use of company personnel time.

Based on the perceived success of the Blackstone Project, Massachusetts officials moved in late 1994 to expand the approach statewide through the creation of FIRST. The objectives are roughly the same as with the Blackstone Project. The emphasis is on compliance solutions that reduce pollution at the source, rather than via add-on pollution control techniques ^{xlix} and an inspection process that focuses on the manufacturing *process* rather than point source emissions as a means for preventing pollution transfers in an economically efficient manner. Eight categories of inspections targets chosen for the new FIRST program were more explicitly based on perception of high relative risk to public health or ecosystems should non-compliance occur, though other targets were selected as well (such as new wastestreams).^l By the end of 1994, the Department had developed a standardized protocol for inspections based on a combination of specific waste stream and manufacturing processes, and the program has been in operation ever since.^{li}

A second general area of innovation in Massachusetts began with the Massachusetts Printers Partnership, a demonstration sponsored by the Environmental Defense Fund and others

in several states. The objective of the Partnership, as well as the later Environmental Results Program, is to substitute self-certification for a multiple permits process, and to increase environmental protection through increased compliance with key performance goals. The materials describing the program explicitly state the purpose is to improve the environmental practices and economic viability of the printing industry by promoting simplified and achievable environmental standards.^{lii} As with FIRST, the environmental agency focused on this collection of small sources because of their belief that aggregate pollution from this sector may be significant.

The Department started work with the printing industry to identify what turned out to be 40 key indicators for environmental compliance, involving mostly optimum chemicals use in the printing process.^{liii} These indicators form the basis for a compliance certification statement which printers can implement and sign in lieu of seeking permits. At the same time, the state jettisoned permit requirements which it decided had little or no environmental value. The certification process promises several economic benefits for small to medium sized print shops: for most cases, DEP will not enforce against past non-compliance; permit fees are greatly reduced; and the process takes only a couple of hours to complete. Again, the environmental assumption is that this simplified compliance system encourages both the state and the printing industry to concentrate on the most important opportunities for environmental quality improvement.

In the spring of this year, the Department started the Environmental Results Program which expands the facility-wide, performance-based compliance certification demonstration process to 25 new, non-printing companies.^{liv} Reflecting a Minnesota-like spirit of cooperation, environmental and engineering staff from the demonstration companies will form teams with agency permit writers to develop performance indicators and certification systems. These indicators will address particular industrial processes. Each process will then have its own performance standard, method for record keeping, compliance protocol written in plain English, and compliance assistance materials that explain the benefits of using pollution prevention to achieve compliance. If this broader program works, as with the Printers Partnership companies will be able to certify compliance and forgo the permitting process altogether.

A key issue for this program is how to construct the facility performance standards. The agency expects the certification to cover seven regulatory requirements ranging from New Source Performance Standards for air pollutants to performance standards for off-site waste recycling, and to contain incentives for pollution prevention.^{lv} The standards should address areas of greatest potential for environmental benefit. And by designing the compliance statement as a questionnaire intended to lead company representatives through an environmental self-audit, the connection between operational practices and performance standards will become evident and serve to reinforce good environmental management practices.^{lvi} The performance standards are expected to focus on results which can be verified through reports on facility operations, rather than on the use of control technologies. With this guidance, each team will have to come up with a statement of expected results which at least meets, and preferably exceeds, existing standards.

More than the Printers Partnership, the Environmental Results Program expects operational flexibility to be an important benefit for demonstration companies. Otherwise, transaction cost reduction objectives are the same.

Assessment of the Programs

At this date, little quantitative data is available which describes the relative environmental or economic benefits. Several studies are underway in Massachusetts, including a 600-person telephone evaluation being conducted by the Toxics Use Reduction Program and the University of Massachusetts.^{lvii}

Limited interview results (small company managers, usually not environmental experts, are much more difficult to get on the phone) are strikingly similar to those in New Jersey and Minnesota. All respondents appreciated economies in use of personnel time in the integrated inspections programs and self-certification programs. A third of the companies interviewed anticipate being able to get their products to market faster (for the small-sized facilities covered by the Massachusetts programs, one would not expect this to be a significant value). Nearly everyone complains about reporting requirements. About half of the companies interviewed mentioned the usefulness of the technical assistance components of the programs in helping them either get into compliance without penalties, or in saving them money through use of substitutes for toxics in production processes.

A recurring response is that companies participate in these programs as much for image reasons as for economic benefits--as one environmental manager for a company involved in both the integrated inspections and the environmental results program put it, it is easier to cooperate than to fight it. Other economic benefits are hoped for rather than demonstrated. As with the other states, this leads to the suspicion that while innovative programs like these in Massachusetts represent a sea change for regulatory agencies, the companies involved are more careful in their assessments. Benefits exist, but their extent is as yet uncertain.

The same can be said of environmental benefits: while there are a few indicators of progress, there is no extensive evidence yet of environmental quality improvement.

D. Colorado

Colorado was selected for inclusion in this study not because of its innovative program--the program is not implemented yet because the enabling legislation is still under discussion--but because of its innovative proposal: to reward superior environmental performance with direct financial incentives.

As the result of a months-long multi-stakeholder negotiation process, the Colorado Department of Public Health and the Environment developed a program called The Colorado Environmental Leadership Program.^{lviii} Objectives of the program are to encourage pollution prevention and other beyond compliance environmental improvements in exchange for expedited permitting and a potential package of economic rewards. Any entity, large or small, public or private, may apply for inclusion in the program.

The applicant must meet both mandatory and some selected number of optional requirements for entry in the program. The principal mandatory elements are absence of any recent enforcement or compliance problems, documentation of in-place internal environmental management and pollution prevention programs, and compliance with Colorado's audit program. The applicant would receive additional consideration depending on participation in a number of other programs, such as Colorado's Pollution Prevention Partnership. About a dozen options are listed. The state offers an impressive array of possible financial and non-financial incentives for program participation. The most significant non-financial incentives identified are accelerated permit consideration, consolidated permit applications and extended permits, simplified reporting requirements, and additional credits that could be used if an emissions trading program is established. Direct financial incentives include possible state income tax credit for pollution prevention, dollar credits for money invested in optional programs to be applied against future obligations to the Department (such as permit fees), percentage reductions of permit and emissions fees, and dollar credits for participation in the Colorado Environmental Pollution Prevention Fund.

This is an unusually ambitious proposal at several levels. The range of opportunities for participation in what the state considers environmental improvement programs is very broad. Proposed changes in permitting and reporting requirements for successful applicants would, as a package, go beyond the experience of other states--and would presumably be accomplished more quickly. The financial incentives are unique.

Should this proposal be taken seriously? Obviously it is being taken seriously in Colorado, though three areas probably need further work from the perspective of the state environment agency. 1) Eventually, the agency will have to define more carefully the connection between participation in existing mandatory and optional environmental programs and beyond compliance or other environmental quality improvements. As with other states, for instance, participation in pollution prevention programs seems intuitively useful but in time all agencies will need accountability and methods to measure progress to go along with the increased flexibility. 2) If the state really intends to retool its permitting procedures *on a large scale*, significant bureaucratic effort is entailed. For other states (New Jersey, Massachusetts), this has involved years of retraining, reorganization, and culture change. 3) Changes in tax law cause consternation for all political officials, as it appears to be doing in Colorado. Agency officials are likely to have to work hard to keep the package of financial incentives intact.

Based on several interviews with environmental managers in large companies in Colorado, the proposed program is attractive indeed. They cite the obvious potential benefits in reduced transaction costs, less paperwork, operational flexibility and improved corporate image. Interviewees were also positive about the potential and existing pollution prevention benefits in terms of financial savings from reduced resource use and chemicals substitution (Kodak, for example, has been able to exchange water for methanol in its production process, thereby sharply reducing its single largest chemical emission.)^{lix} But the crucial drivers are the financial incentives, which environmental managers see as especially compelling within their companies. Only a representative of the Colorado Association of Commerce and Industry was more skeptical. In his view, Colorado companies in general have such a high level of frustration with

environmental agencies because of recent dealings over audit legislation and Clean Air Act implementation they will be hard to entice into another new program. The requirements for program participation are too high for the average company, he said, and the incentives too uncertain.^{lx}

III. REVIEW OF INTERNATIONAL PROGRAMS

A. Introduction

How to approach the study of European environmental programs is not a simple issue. Does one look at the whole system of a country? This might be helpful because it would convey the overall cultural and policy assumptions in that country, but it would also entail lengthy descriptions of programs tangential to this report. Does one select programs common to many European countries? The danger here is that the most innovative programs seem to exist in only one country. As a compromise, three programs in three countries were chosen. These particular programs were picked for several reasons. First, the culture of the host country is similar enough to the United States to permit the belief that country's experience can be reasonably transferred here. (Japan, by comparison, has an innovative compliance program based on gentlemen's agreements and saving face that is not likely to be adopted soon in this country.) Second, the program is well established and, as with the selection of state programs, offers the possibility for considered assessment. Third, these programs are innovative in the sense that they go beyond current United States practice, but not so far beyond that implementation here would be practical only in the eyes of an academic.

At the same time, the reader should be aware that cultural and historical differences exist even between these three countries and our experience that inevitably affect how any environmental program operates. Both the United Kingdom and the Netherlands have much more limited scope for public participation and the sharing of environmental information than does the United States. Does this affect their ability to implement integrated pollution control programs and voluntary agreements between government and industry? Sweden and the Netherlands are small, homogenous countries with relatively few industrial facilities. To what extent does this facilitate their ability to work in a spirit of trust and cooperation with individual entities in devising permits and compliance schedules? Despite this, the reader will notice many similarities with innovative efforts in the states, which is why this report does not go into greater detail describing these European programs.

Finally, by way of introduction, a word about environmental taxes. We do not like to use environmental taxes as an incentive in this country, and we are not likely to expand our use of them in the near future--as our recent experience with a proposed carbon tax demonstrates. Nevertheless, because this report is in part about incentives, one notes that a wide variety of environmental taxes play a major role in Europe in encouraging environmentally responsible behavior by consumers, governments, and the private sector. And, as a recent OECD publication shows, use of these taxes is growing.^{lxi} Europeans are applying taxes on products and energy as a form of pollution prevention and resource conservation. Sweden and Norway are taking the lead in devising policies which will actually shift tax structures away from an income basis

toward environmental targets. A reasonable topic for another report might be European use of positive tax incentives to advance environmental quality.

B. Voluntary Agreements in the Netherlands

A voluntary agreement, or covenant as it is called in the Netherlands, has been defined as a written agreement between the government and other entities (industries, local authorities, non-governmental organizations) for the purpose of achieving particular environmental policy objectives.^{lxii} The idea is not new, but it has gained greatly increased use over the last six year in the Netherlands because of the adoption in May, 1989 of the first Dutch National Environmental Policy Plan and because of the subsequent realization that new methods would be needed to achieve the ambitious objectives outlined in the plan.^{lxiii}

Dutch environmental officials came to see a number of shortcomings in the traditional approaches they had been using prior to 1990. New legislation took a long time to prepare and implement. Licenses (permits) often had to be totally rewritten after the passage of new law. Subsequent regulation was inflexible and single-media in orientation. Permit writers were never as knowledgeable as industry engineers about the manufacturing processes in an industry and were less able to devise sensible control or prevention techniques. Poor regulation or permit writing usually led to litigation.^{lxiv} Politically, the government could not force industry to accept the economic impacts of a further round of command-and-control requirements. In sum, the government realized that environmental problems cannot be solved simply through obligations imposed unilaterally by government. The required change in behavior can only be brought about by using the right mix of instruments. Legislation and regulations remain important instruments, but it is necessary to seek other instruments which are more in line with the concept of individual responsibility for ensuring a clean environment...covenants are an example (of this).^{lxv}

The alternative, expanding and strengthening voluntary agreements, was also driven by the desire to shift the obligation for devising environmental solutions from regulatory authorities to polluting companies. Agency officials wanted industry to *internalize* the challenge of environmental improvement by developing their own efficient remedies to waste and product emission problems (an objective, now, of many of our states as well).

Officials see the main advantages of the covenants as being:

- ¥ Shifting the burden to devise solutions from government to industry;
- ¥ Substituting a cooperative, problem-solving approach for litigation;
- ¥ Creating the opportunity for flexibility in designing solutions;
- ¥ Saving time; getting solutions implemented more quickly than through legislation;
- ¥ Reducing enforcement costs;

- ¥ Encouraging comprehensive, multi-media strategies rather than individual permits; and
- ¥ Ease in maintaining confidentiality of business information.^{lxvi}

The process for developing a covenant is relatively straightforward. First, a target group (team) is created, led by agency officials, which translates a general objective delineated in the National Environmental Policy Plan into emission reduction standards for each relevant industry group. Then, within each group, a negotiation begins involving many parties (though not, directly, public environmental organizations). The parties to the printing industry agreement, for instance, included the federal environment agency, the Union of Netherlands Municipalities, the Association of Provincial Authorities, the Association of Water Control Boards, the Royal Association of Printing and Allied Industries, and the Dutch Association of Board and Flexible Packaging Manufacturers.^{lxvii} The covenant itself must include, at a minimum:

- ¥ Agreements on actual waste reduction measures to be undertaken to achieve the standard, timing of implementation, and a cost-effectiveness analysis;
- ¥ Agreements on how the actions will be implemented, who is responsible for implementing them, and in what form these actions will be codified in eventual regulation;
- ¥ Agreements about actions necessary to support implementation of the program, such as an internal Environmental Management System or a public information campaign;
- ¥ Agreements on research needed for future decisions and action; and
- ¥ A summary of next steps, including discussion of the need for further negotiation.

Permitting is a separate process and is considered part of the implementation step after a covenant is signed.

To date, the Dutch government and industry have signed about 30 covenants covering sectors like food packaging, chemical, and metals and specific pollutant problems such as CFCs, nickel-cadmium batteries, and wooden staircases.^{lxviii} As their experience has grown, the Netherlands has tightened the voluntary agreements process, principally by strengthening their connection to the legislative approval process.^{lxix} Covenants must be submitted to the legislature (it is during this political process that public groups may initiate seminars or other actions to express their views),^{lxx} after which their standing is strengthened. Covenants are an interim measure for meeting policy plan objectives until this approval occurs.^{lxxi}

C. The Integrated Pollution Control Program in the United Kingdom

Prior to 1990, the policy framework for environmental protection in the United Kingdom was--as is still the case today in the United States--totally fragmented. Toward the end of that year, first a major governmental policy paper, then the Environmental Protection Act initiated a more comprehensive strategy called Integrated Pollution Control (IPC). The program itself was introduced in April, 1992.^{lxxii}

The objectives from the guidance document are:

- ¥ To prevent or minimize the release of prescribed (regulated) substances and to render harmless any such substances which are released;
- ¥ To ensure consideration of releases from industrial processes to all media in the context of the effect on the environment as a whole;
- ¥ To improve efficiency and reduce the economic burden of controls on industry, particularly by providing for a one stop shop ;
- ¥ To encourage use of cleaner technologies and waste minimization practices; and
- ¥ To create a more flexible (regulatory) framework.^{lxxiii}

The intent of the IPC is to create an incentive for industry to design its own approaches to pollution control which are efficient in minimizing cross-media transfers of pollutants and which minimize economic impacts on the facilities. The incentive is that, within the confines of use of Best Available Techniques Not Entailing Excessive Cost (BATNEEC), facilities are free to propose their own systems of emissions control. The facility simply applies for a permit by providing the following: a description of the (manufacturing) process; a list of prescribed substances used in connection with or resulting from the process; a description of the techniques to be used to prevent or minimize releases; details of any proposed release of prescribed substances and an assessment of the environmental consequences; and proposals for monitoring releases.^{lxxiv} Assuming the application meets or exceeds all existing relevant standards, the application is approved. The principal environmental benefit is the reduction in pollution transfers, though the programs also tries to encourage pollution prevention at the source. Thus far, large utilities, the waste disposal industry, and the chemicals industry have been brought under the IPC.^{lxxv}

While the program is still new and limited in its application, there is a certain elegance in its simplicity. The message is: we want you to consider pollution problems from a holistic perspective; it is up to you to figure out how you can best comply. It is basically the same concept as undergirds the Dutch covenants and many of the innovative permitting initiatives in the states.

D. The Permitting Process in Sweden

In some ways, Sweden's approach to environmental management most resembles that of the United States in the European Union. Sweden sees itself as one of the world's environmental leaders. It has a highly developed system of public participation and liberal freedom of information laws, and environmental interest groups have long been active.^{lxxvi} Development of modern environmental legislation and the creation of Sweden's Environmental Protection Agency coincide historically with similar actions in the United States.

Unlike the United States, however, Sweden quickly realized the limits of media-specific organizations for pollution control (actually, many in the United States realized this limitation early on as well, but were stymied in attempts to reform the system). Beginning in the early 1970s, agency divisions began to be combined and oriented around industrial sectors, eventually leading to allocations of particular agency personnel to oversee particular facilities--something possible only in relatively small countries. Sweden has only about 400 regulated facilities and many of those are addressed by local authorities.

Another key difference between Sweden and the United States is the reliance on negotiation and consensus in decisionmaking, rather than litigation. Problems are solved through cooperation--again, an approach not very well suited to the federal level in a large, diverse country but increasingly attractive to our states.

One result of all this is a flexible, integrated permitting system. Governing law is quite general:

Anyone performing or intending to perform an environmentally hazardous activity shall take such protective action, tolerate such restriction of the activity and take such other precautionary measures as may reasonably be demanded for preventing or remedying detriment. The extent of the obligation imposed by the provisions above is to be assessed on the basis of what is technically feasible for the activity in question, and taking both public and private interests into consideration. ^{lxxvii}

That's it. All permit details are worked out in negotiations specific to each facility, leaving room for technological and economic variations. Full public disclosure of information, an extensive public hearings process, and the strength of the public environmental organizations help ensure attentiveness to environmental quality. Large industries, unburdened by Best Available Technology or other similarly prescriptive requirements, are expected to propose control measures which best address overall pollution loadings.

E. Assessment of these Programs

This assessment is based on interviews with senior and environmental management officials in corporations in Europe, on performance reviews of countries prepared by the OECD, on a study performed by one chemical company of the IPC program in the United Kingdom, and on an extensive analysis done by the World Bank. The assessment is combined for all three programs partly because interviewees were all responsible for or aware of operations in many European countries and preferred to compare Europe to the United States, and because the OECD and World Bank reports lend themselves to summary conclusions.

Some consistent themes emerge both from looking at these three European programs and from the responses of interviewees to them.

Two important **background** issues are cultural expectations--the general public in Europe, as in Minnesota, expects responsible environmental management by individuals and collective entities--and the role of non-government environmental organizations. Most interviewees in Europe remarked, as did those in New Jersey, that the absence of NGO participants in negotiations increased openness and the ability to work cooperatively.

With regard to **environmental management systems**, there seems to be total consensus that command-and-control approaches have outlived their usefulness. Europeans have implemented programs which they believe are more flexible, more integrated, more cost-effective, more oriented toward pollution prevention, and shift the initiative for designing pollution control from government to polluting entities. In addition to giving more room for use of economic analysis, the incentives for industry are directly financial: most of the programs minimize transaction costs and give industry the freedom to devise the cheapest possible effective control strategies.

In terms of **attitudes**, most European systems employ cooperation and negotiation as problem-solving methods rather than confrontation and litigation.

Interviewees, the World Bank, and many other observers applaud these presumed improvements on command-and-control (though the World Bank is careful to note the special problems the United States has with its size and diversity of facilities). All participants commented on both the economic advantages and personal pleasure of working in the European context rather than in the United States. As one interviewee said, government is more accessible, speedier, more oriented toward cooperation, and there is no gotcha mentality. ^{lxxviii} Interviewees also asserted that European practices do not come at the price of strong compliance requirements: enforcement here is stronger than in the U.S. ^{lxxix}

As always, the devil is in the details. It seems relatively easy to make the case that these kinds of European programs actually do contain significant economic incentives for industry compliance (though there is much less idea of incentives for going beyond compliance). Programs like these have been in place for some years now, they are relatively well-liked by industry, and little in the literature suggests that they are anything but an improvement on older approaches from a cost-effectiveness perspective. One analysis, by Allied Colloids (a British

chemicals company) in cooperation with the government's Inspectorate of Pollution, documents both the economic and environmental benefits of the IPC. Using relatively innovative environmental cost accounting techniques, the analysis found cost savings of about 1.5 million pounds and important reductions in methyl chloride, solid waste, fugitive, and other emissions at three facilities.^{lxxx} More efficient environmental operations at one plant alone are producing annual savings of 233,700 pounds, with a potential further saving of 160,000 pounds.

Regarding environmental benefit, the Netherlands is relatively confident, based on its monitoring data, that the combination of covenants and the traditional permitting and enforcement systems are effective in achieving the ambitious environmental quality objectives laid out in the National Environmental Policy Plan.^{lxxxi} This is a notable comment on covenants as Dutch officials believe achievement of the objectives would be impossible through use only of traditional regulatory tools. As yet, little data is available on advantages for the environment of the IPC program other than the Allied Colloids study.

Please see appendices file for endnotes

IV. APPENDICES

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