REGULATIONS

Exploiting Opportunities for Pollution Prevention in EPA Enforcement Agreements

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Two relatively new EPA policies encourage the inclusion of pollution prevention in regulatory enforcement settlements. The advantages to a firm include reduction or elimination of environmental problems at the source (thus decreasing reliance on end-of-pipe controls), enhanced prospects for future compliance, and a potential for a reduction in the assessed penalty. We discuss the factors that influence both EPA and firms to include pollution prevention in enforcement settlements, characterize the process in a few exemplary cases, and recommend ways to enhance and expand these activities. The research presented focused on case study analysis of 10 recent EPA-negotiated enforcement settlements that included chemical substitutions, process changes, or closed-loop recycling.

Firms found in violation of EPA regulations can take advantage of two relatively new EPA policies that invite the inclusion of pollution prevention in enforcement settlements. Companies that have done so reduced or eliminated an environmental problem at the source and enhanced their prospects for future compliance. Many companies received a penalty reduction for their efforts, typically one dollar reduced for every two dollars expended. In order to increase the number of successful cases, the EPA Office of Enforcement commissioned the Massachusetts Institute of Technology to examine the agency's experience in promoting pollution prevention through its enforcement programs. This article presents the findings of that study (*1*).

Pollution prevention, according to the Pollution Prevention Act of 1990, reduces or prevents pollution at the source by reducing the amount of hazardous substances, pollutants, or contaminants entering a waste stream or released directly into the environment (including fugitive emissions) prior to recycling, treatment, or disposal; it also reduces public health and environmental hazards. Pollution prevention technological changes may be achieved either through innovation or through adoption of existing technology. Innovation is the first commercial application of a new invention (*2*). Major innovation represents a significant improvement in technology; incremental innovation involves smaller changes or significant adaptation of existing technology. Diffusion means widespread adoption of existing technology (i.e., involving minor adaptation but little or no innovation).

In June 1989, the EPA Office of Enforcement issued a Pollution Prevention Action Plan that articulated the agency's strategy for promoting pollution prevention in enforcement (*3*, *4*). The enforcement settlement process was the primary target. Roughly 90% of firms cited with noncriminal violations of federal environmental statutes resolved the matter through a negotiated settlement with one of 10 regional offices of EPA rather than administrative proceedings in court (*5*). In the settlement process, EPA and company attorneys agree on a penalty and a set of conditions designed to achieve and maintain compliance. EPA has little statutory or regulatory authority to require firms to implement pollution prevention; the regulated community can choose how it will comply with federal requirements. But once an enforcement action is initiated, a window of opportunity for pollution prevention opens because the means of achieving compliance are subject to agreement by the agency and violator.

The principle mechanisms for including pollution prevention in enforcement settlements were ar-

0013-936X/95/0929-220A$09.00/0

ticulated in two EPA policy statements. In 1991, EPA issued its "Policy on the Use of Supplemental Environmental Projects (SEPs) in Enforcement Settlements" (internal memo dated February 12, 1991). SEPs are environmentally beneficial activities negotiated into the terms of a settlement with EPA. The SEP policy authorized EPA to reduce the assessed penalty in exchange for the execution of a SEP. There are five categories of SEPs: pollution prevention, pollution reduction, environmental restoration, environmental auditing, and public awareness. In FY 1992, EPA negotiated 222 SEPs, excluding the 187 negotiated by the Office of Mobile Sources. Twenty-eight percent involved pollution prevention.

Also in 1991, EPA issued its "Interim EPA Policy on the Inclusion of Pollution Prevention and Recycling Provisions in Enforcement Settlements" (internal memo dated February 25, 1991), which provides specific guidelines for including pollution prevention in a settlement as either a SEP or a method of compliance. The Interim Policy gives agency negotiators flexibility to extend compliance schedules when pollution prevention is used as the means of compliance, especially if innovative technology is involved.

The primary objectives of our research were to discover the factors that influence both EPA and firms to include pollution prevention in enforcement settlements, characterize the process in a few exemplary cases, and recommend ways in which EPA can enhance and expand these activities. The research centered on case study analysis of nine SEPs and one enforcement settlement that used pollution prevention as the compliance method. In all 10 instances, a pollution prevention project was successfully negotiated into the terms of a legal settlement between EPA and the firm. These settlements included chemical substitutions, process changes, or closed-loop recycling activities and were drawn from the universe of judicial and administrative enforcement actions negotiated by EPA up to and including fiscal year 1992.

Methods and approach

Cases selected included innovative technologies, novel enforcement settlement features such as ones involving research and development, and categories of technology or industry such as medical device manufacturing not commonly found in pollution prevention case study literature. Case selection began with a review of EPA settlement summaries through FY '92 that purportedly included pollution prevention conditions. Of these, 33—spread across nine regional offices of EPA—involved pollution prevention activities consistent with the earlier definition. Only one involved pollution prevention as the method of compliance; the other 32 contained pollution prevention SEPs. The 33 settlements were partitioned into two groups based on whether they met the selection criteria; 18 settlements did (called Tier I). The other 15, called Tier II, involved widely diffused aqueous cleaning technologies, and thus did not meet the criteria.

The research focused on the three EPA regions that were highly active in incorporating pollution prevention into enforcement settlements, favoring regions that had the highest distribution of Tier I cases. Eight of the 10 cases ultimately chosen were drawn from the Tier I list, and two were Tier II cases. Thus, the cases selected for study should be viewed as exemplary rather than representative of the universe of available cases. Case study selection was made largely on the basis of technological change and settlement features; thus the distribution of company type and size was an artifact, not a criterion, of the selection strategy.

Case study research began with the review of technical and legal information from EPA's settlement files. The research consisted of unstructured interviews of EPA attorneys and engineers and firm representatives who negotiated the settlements and firm representatives who had developed and implemented the pollution prevention projects. Most interviews with EPA representatives were conducted in person, with the attorney and engineer team interviewed together. Interviewees were sent a list of questions in advance dealing with specific aspects of the case and general questions on strategies used to negotiate pollution prevention into settlements. To confirm accuracy, interview write-ups were sent to the interviewees for review.

Interviews also were conducted with one or more representatives of the 10 case study firms, six in person and four by phone. Again, questionnaires were sent prior to the interview, and write-ups were sent back to the firms for an accuracy check. Given the potential for disclosing sensitive information, the names of the firms were masked. Case study data were supplemented by numerous interviews of EPA representatives on general questions concerning institutional barriers to negotiating pollution prevention in enforcement settlements.

Results

Overview. An overview of the 10 settlements analyzed is presented in Table 1. For a more detailed description of the individual projects, the reader is referred to the full report (*1*). Six cases involved metal products manufacturers; the others included plastics coating, medical device manufacturing, pump service and sales, and bleached kraft pulp production. Three case study firms are single-plant com-

TABLE 1

EPA-negotiated pollution prevention projects and remedies for 10 companies

Company[a]	Violation	Description of pollution prevention project
Casted metal products manufacturer (CMPM) 1200 employees	Clean Water Act , failure to file a Baseline Monitoring Report (Sec. 403.12) and exceeding chromium and pH limits	Redesigned rinse systems on coating and cleaning process lines, reducing energy requirements and wastewater by 100,000 gpd; substituted aqueous and semiaqueous cleaners for organic solvents and Freon
Industrial coater (IC) 150–170 employees	EPCRA[b] 313, failure to file Form R for toluene and methyl ethyl ketone	Reformulated toluene-based coating and modified coater dryer section, reducing toluene 90%, methyl ethyl ketone 50%, and energy 890 kW/h
Lid manufacturer (LM) 200 employees	Clean Air Act, Section 133d, failure to certify coating lines	Converted ⅓ of total lid production from the rubber and heptane-based formula to non-VOC material, reducing VOCs by 50 tons per year
Medical device manufacturer (MDM) 100 employees	EPCRA 313, failure to File Form R for xylene, trichloroethane, and trifluoroethane	Engineered, tested, and ultimately purchased deionized water degreaser to eliminate 16,000 lb/year of Freon
Metal filing furniture manufacturer (MFFM) 65 factory workers	Resource Conservation and Recovery Act, treating waste without a permit	Installed solvent recycling system and paint-baffle collection system, reducing paint/solvent use, emissions and waste; administrative measures for pollution prevention
Metal finishing company (MFC) 80 employees	Resource Conservation and Recovery Act, including improper hazardous waste storage, and labeling	Extended nickel plating tank to reduce lead-contaminated polishing dust waste 83–85%; converted hexavalent to trivalent chromium; second SEP improved polishing dust collection system
Metal machining company (MMC) 1000 employees	EPCRA 313, failure to file Form R for 1,1,1-trichloroethane; xylene; methyl ethyl ketone	Reduced use of 1,1,1-trichloroethane by 130,000 pounds per year by substituting semi-aqueous degreaser for TCE degreaser
Powder metallurgy manufacturer company (PMMC) 50 employees	EPCRA 313, failure to file Form R for copper, chromium, trichloroethylene, and ammonia	Substituted blended hydrogen–nitrogen sintering atmosphere for anhydrous ammonia; switched to aqueous tapping fluid, eliminating trichlorethylene vapor degreasers, and reducing 26,860 lb/year fugitive emissions; and closed loop cooling
Pump service and sales co. (PSSC) 96 employees	EPCRA 313, failure to file Form R for Freon 113	Substituted Freon degreaser with semi-aqueous degreaser, eliminating use of Freon 113
Bleached kraft pulp manufacturer (BKPM) 600 tons/day	Clean Water Act, violation of National Pollutant Discharge Elimination System permit's effluent limits for chronic toxicity	Eliminated chlorine in bleaching of kraft pulp by modifying bleaching process, reducing chlorinated organic compounds in wastes

[a] The first nine companies used Supplemental Environmental Projects; the 10th used compliance method.
[b] Emergency Planning and Community Right-to-Know Act.

panies with 50 to 80 employees; two are small, autonomous divisions of larger companies; and four are small or medium-sized plants (100 to 1200 workers) owned by medium-sized, multiplant companies. The one case of pollution prevention as the method of compliance involved a manufacturing plant owned by a large corporation.

Of the 10 case studies, five were reporting violations under Emergency Planning and Community Right-to-Know Act (EPCRA), Section 313 (i.e., Form R, Toxics Release Inventory data reporting); two stemmed from Clean Water Act violations; one from a Clean Air Act violation; and one from Resource Conservation and Recovery Act violation. The predominance in the study sample of EPCRA cases, that is, those involving failure to report toxic emissions on a Form R, reflects the relatively large number of pollution prevention SEPs in the larger sample population that were negotiated in EPCRA 313 settlements.

Penalty reductions granted for SEPs range from $7350 to $218,000 (Table 2). In seven of nine cases, the penalty reduction leveraged a significantly greater pollution prevention expenditure by the firm. One notable case is a lid manufacturer (LM) which spent $298,000 to reformulate its lid gasket material for a penalty reduction of $38,000. Conversely, a dollar-for-dollar penalty reduction was granted in the case of a metal filing furniture manufacturer (MFFM).

Project financial return data are a mixture of numerical return estimates and qualitative impressions of profitability derived from the interviews and EPA case files. In some instances this information was unavailable, either because it was too early to gauge (as in the case of the MFFM) or because the information was considered sensitive (in the LM case). Project return ranged from a very profitable eight months to an estimated five to eight years. Projects involving reduction or elimination of ozone-depleting chemicals seem to be more

profitable than others because the price of these organic solvents is increasing steadily as the final phaseout date approaches.

It is important to note that profitability analysis of pollution prevention investments is a highly subjective process. Companies tend to omit certain financial benefits of pollution prevention projects, such as avoided liability and regulatory costs, because these costs are speculative and difficult to estimate (6). Therefore, caution should be exercised in drawing conclusions from reported return data.

Environmental and health benefits. Two categories of environmental benefits arose from the settlements examined. Direct benefits were derived from pollution prevention provisions included in the enforcement agreements. Indirect benefits were derived through subsequent technology transfer within or outside the firm and through improvements in overall environmental practices. Although direct benefits are easier to measure and evaluate, the latter may be significant and should not be overlooked.

Several hazard "trade-offs" were noted in the cases studied. In the case of LM, the pollution prevention activity reduced volatile organic compound (VOC) emissions at the price of small increases in NO_x, CO, hydrocarbon, and SO_2 emissions. A metal finishing company (MFC) reduced the generation of lead-contaminated nickel dust by increasing its use of nickel by 130%. In our study, we were sensitive to possible shifts of hazard from the environment to workers. In one clear case, the technological change created a new hazard for workers, but the firm recognized and addressed the problem. In the MFC case, we were not able to determine whether increased use of nickel increased the hazard to workers.

Source of the technical idea. Case study companies sought and obtained technical ideas from a variety of sources including their staffs, environmental consultants, technical consultants, trade journals, vendors, and an EPA engineer (Table 3). Several companies used more than one source.

Companies switching from organic solvents to aqueous degreasing systems relied heavily on equipment or chemical vendors. The MFC learned of trivalent chromium technology from a chemical supplier. A medical device manufacturer (MDM) saw an advertisement for deionized water cleaning equipment in a trade journal. The LM used an engineering rather than environmental consultant to help with equipment design. In the case of the MFFM, all technical ideas in the SEP came from an environmental consultant hired by the firm. The company did not feel it had the expertise to develop pollution prevention ideas.

In only one case, a casted metal products manufacturer (CMPM), did the EPA engineer play a significant role in providing technical expertise and specific suggestions. Most case study firms stated they would prefer not to involve EPA in developing technical proposals for a SEP, particularly if it would require repeated agency site visits. Many of these firms typically had, or quickly developed, project ideas that were consistent with their long-term critical technology path. One firm stated it would not reject good ideas from EPA, but it certainly was not expecting the agency to supply any.

TABLE 2

Original and final penalties, and project costs for settlements with Supplemental Environmental Projects (in dollars)

Company[a]	Original penalty	Final penalty	Penalty reduced for SEP	Project cost
CMPM	95,000	30,000	65,000	not available
IC	50,000	30,000	20,000	54,000
LM	123,947/76,000[b]	38,000	38,000	298,000
MDM	31,350	24,000	7,350	80,000
MFFM	360,000/311,130[b]	93,130	218,000	218,000
MFC	150,900	23,300	127,600	249,000
MMC	76,000	11,400	64,600	201,000
PMMC	76,000	30,550	45,450	78,300
PSSC	17,000	8,500	8,500	69,475

[a] See Table 1 for abbreviation definitions.

[b] First number is original penalty. Second number reflects a reduction in penalty granted by EPA for good faith compliance efforts.

Several EPA engineers reported a reluctance to provide technical advice to firms because of concerns that if the project failed, the enforcement case would be jeopardized and they would be held accountable. Furthermore, they believe that companies better understand their own processes and are positioned better to develop appropriate and creative technical pollution prevention ideas.

Technology transfer benefits. Of the cases studied, three settlements resulted in the transfer of technology from the subject plant to other plants owned by the firm. CMPM and a metal machining company transferred the solvent and water use reduction technologies, respectively, to other plants. The SEP implemented in the pump service and sales company settlement included substituting aqueous cleaning systems in the subject plant and in another plant out of state.

Other cases demonstrate strong potential for further adoption of technologies included in settlements. An industrial coater and LM will evaluate the success of the SEP projects and decide whether to apply the technology to other product lines within the subject facilities. In two cases, the MFC and a powder metallurgy manufacturing company, there is significant potential for technology transfer to other firms. The MFC participates in a state-sponsored organization of industries involved in pollution prevention and uses the state pollution prevention technical assistance office. The president of the powder metallurgy manufacturing company is active in his trade association. The MDM will not implement the deionized water degreasing system because the company is closing the plant. However, the company will seek Food and Drug Administration approval to install the system in a new plant.

Finally, the technology transfer benefits arising from the implementation of total chlorine-free pulping of the bleached kraft pulp manufacturer are quite significant. When the project is completed, the bleached kraft pulp manufacturer will be the first mill in the United States to produce such pulp without using chlorine. The company has disclosed techni-

TABLE 3

Source of pollution prevention idea and technology transfer potential

Company[a]	Source of idea					Technology transfer potential		
	EPA	Company	Environmental Consultant	Engineering Consultant	Vendor/ other	In plant	In company	Out of company
CMPM	✓	✓	✓				✓	
IC		✓				✓	✓	
LM		✓		✓		✓	✓	
MDM					✓		✓	
MFFM			✓					
MFC		✓ [b]			✓ [c]			✓
MMC		✓			✓	✓	✓	
PMMC	✓	✓						✓
PSSC		✓			✓		✓	
BKPM		✓						✓

[a] See Table 1 for abbreviation definitions. [b] Nickel tank extension. [c] Trivalent chromium.

cal information about the new bleaching technology, so the project certainly will move an important technological frontier in the industry.

Organizational change. Interviewers sought to uncover whether and how the company would change its environmental management as a result of implementing pollution prevention SEPs or injunctive relief projects. In some cases, it is difficult to determine whether the changes were the result of implementing pollution prevention or of the enforcement action in general.

In the case of the powder metallurgy manufacturing company, the president's perception of environmental investments has changed. He now believes it is economically sensible to stay ahead of environmental regulations by eliminating hazardous operations. The CMPM increased its environmental staff by adding a full-time engineer and three part-time technicians. Through the SEP process, technical staff at the CMPM and the metal machining company developed knowledge and skills enabling them to pursue pollution prevention beyond the SEP, and they will apply their abilities to achieve total elimination of organic solvents and zero discharge of wastewater effluents. The MFFM implemented organizational changes proposed by the firm's environmental consultants, including pollution prevention training and the development of a pollution prevention program. Two companies prohibit new chemicals from entering their plants without prior approval from environmental staff.

Innovation versus diffusion and the locus of technological change. The technological changes undertaken by firms can be categorized by pollution prevention projects according to the locus and innovativeness of the change (Table 4). Locus refers to a primary, secondary, or ancillary production process. A primary process yields the basic functional form of the product such as forming or casting a part from a material; a secondary process might involve the application of a functional finish, such as noncorrosive or aesthetically pleasing finishes. An example of an ancillary process is the cleaning of the fastener prior to the application of a finish. The designation "primary," "secondary," or "ancillary" indicates how fundamental the process is in the manufacturing sequence for a particular product and should not be construed to indicate its importance.

Projects consisting of a major innovation in primary production processes represent dramatic changes in the core technology of the firm. Generally, these projects require relatively high capital investment and pose greater risk to the firm, particularly when changes in product characteristics may disrupt established markets or when new technical expertise is needed and old expertise becomes obsolete (*7*).

The majority of technological changes made by case study firms are diffusion driven. A smaller number can be considered incremental innovations, and only the bleached kraft pulp manufacturer case can be considered a major innovation. There is a fairly even distribution of technological changes across the spectrum of primary, secondary, and ancillary processes. If a random case study selection process had been used, the sample would have been more heavily weighted toward diffusion-driven changes to ancillary production processes. The larger universe of EPA settlements containing pollution prevention consisted mostly of adopting off-the-shelf cleaning technologies. This suggests there are unexploited opportunities in enforcement for stimulating innovative technological changes. This would require changing attitudes and levels of knowledge on the part of both the firm and EPA.

Projects not completed under the SEP. Two companies, an industrial coater and an MDM, did not fully implement the SEP projects within the established timeline and elected to repay the portion of the penalty that was reduced. During implementa-

tion, the industrial coater experienced unanticipated problems in using its existing coating equipment to apply the new coating formulation and thus could not meet the SEP implementation deadline. Despite the region's offer of an extension, the company chose to repay the penalty to eliminate the pressures of the SEP deadline. Considering it to be a "bonafide win–win situation for the environment and [its] enterprise," the company plans to re-initiate the project in the near future. The MDM chose to close its subject plant and build a new facility.

TABLE 4

Characterization of pollution prevention technological changes made by case study firms according to locus and degree of change[a]

	Degree of change		
Locus of change	**Major innovation**	**Incremental innovation**	**Diffusion**
Primary production process	BKPM—TCF bleaching	IC—organic solvent-free coating LM—reformulate gasket	PMMC—ammonia to nitrogen/ hydrogen atm.
Secondary production process		CMPM—redesign of rinse systems MFC—nickel tank extension	MFFM—paint and organic solvent recycling/waste reduction MFC—convert to trivalent chromium
Ancillary process		MDM—substitute deionized water degreasing system	CMPM—substitute aqueous cleaners MMC—substitute semiaqueous cleaners PMMC—substitute aqueous tapping fluid and closed loop cooling PSSC—substitute semiaqueous cleaners

[a] See Table 1 for abbreviation definitions.

Discussion

Most of the firms claimed to have considered the projects before the enforcement action. Several firms stated that had the enforcement action not occurred, the projects eventually would have been implemented. It is difficult to verify these assertions, because discretionary projects often are carried along from year to year and implemented only when, and if, the will and the resources exist. In many cases, the SEP serves as a catalyst by helping to overcome some of the financial and institutional barriers to project implementation.

For pollution prevention SEPs to be included in negotiated settlements, a firm's decision makers must approve the use of resources—in-house staff, technical and legal consultants—to support the SEP process. Decision makers typically are interested in quick settlements to avoid prolonged negotiations or a "contractual relationship" with the agency and the accompanying legal and financial uncertainties. Therefore, the reduced penalty plus the perceived value of the pollution prevention project must outweigh the desire to settle quickly.

We conclude that the desire to reduce the penalty is determined by the firm's belief that it was penalized unjustly, the size of the proposed penalty, and the ability to pay. The value of the pollution prevention project is perceived to be higher if the project was considered prior to the enforcement action but had not been implemented because it could not be financially justified, because of other resource constraints, or because of a lack of a project champion. A possible penalty reduction and a concession from EPA negotiators (particularly when antagonism is high), along with an ability to mitigate the psychological impact of an enforcement action, are strong incentives for adopting pollution prevention projects.

Once EPA negotiators agree to allow the firm to submit a SEP proposal, the firm needs time to develop it. The amount of time needed depends on many factors, including the firm's previous consideration of the project, its familiarity with pollution prevention, its technological sophistication, the decision to use a technical consultant, and the complexity of the project. Insufficient time to develop a pollution prevention proposal may bar implementation of a pollution prevention SEP or it may lead to a suboptimal project proposal. Although the firms studied seemed sympathetic to the agency's desire for a short implementation period, some felt uncomfortable with the timeline they were able to negotiate or, afterward, felt deadline pressure. Time limits were most problematic for firms that agreed to implement technically difficult or innovative projects. It could not be determined from the sample the degree to which SEP negotiations break down over an inability to gain consensus on implementation periods.

Firms come to the negotiation table with vastly different levels of pollution prevention knowledge and technological sophistication. Larger companies tend to have greater in-house technical and regulatory resources and therefore are more likely to have prior knowledge of pollution prevention. Larger companies also are more likely to have one or more pollution prevention projects "in the wings" at the time of the enforcement action, making the task of proposing a SEP to the agency negotiators simpler.

A smaller company, with little or no prior knowledge and experience in pollution prevention, finds the pollution prevention SEP process more challenging. It must learn the pollution prevention concept and how to integrate techniques into its existing manufacturing processes, develop an acceptable proposal, and instill confidence in the EPA negotiators about its ability to execute the project. All of these

challenges must be met in the context of an enforcement situation. To meet these challenges, small firms tend to rely on outside technical consultants. Outside consultants fill a need for additional technical expertise and help build confidence with EPA negotiators. Therefore, smaller firms may face a barrier to SEP inclusion if they do not use a technical consultant. This suggests that existing state offices of pollution prevention technical assistance might be useful here.

The small firm's choice of consultant will, in part, determine the type of project proposed. If the company hires a consultant to assist in correcting the violation, it is likely that the consultant will be retained to develop the pollution prevention SEP proposal. Few environmental consulting firms have experience to assist firms by recommending process or product changes.

When considering pollution prevention as the method for achieving compliance, the firm has strong incentive to choose a low-risk technological option. If the project fails, the firm will incur the additional cost for alternative technology, additional legal and administrative costs, and prolonged uncertainty of a pending enforcement case. Therefore, where pollution control and prevention options exist and a pollution control option appears to have a lower risk of failure, it will have greater appeal to the firm. A notable exception to this rule is the case of a firm that stands to save significantly, now or on future compliance costs, if a pollution prevention remedy is implemented.

Finally, for both the agency and the firm the different roles of the technical and legal negotiators must be delineated carefully. It may be difficult to have a constructive technical discussion between firm and agency engineers in an adversarial atmosphere. Preparing ahead of time and charting the evolving roles of the players can help. Furthermore, because the interactions of the parties will continue over a year or more, continuity of personnel assigned to a particular negotiated settlement is important.

Conclusions

Representatives from all nine of the SEP case study firms indicated support for the SEP policy. The firms were glad to have had the option to implement a pollution prevention project in exchange for some penalty reduction. The SEPs took some of the sting out of the enforcement process but did not eliminate the significant economic and psychological impacts associated with being found out of compliance. Several companies stated that SEPs help to recognize their efforts to make improvements.

Some critics charge that the SEP policy will compromise the deterrent effect of the agency's enforcement programs. We believe this charge is based on an unsubstantiated belief that firms will make a calculated decision to save money by not investing in pollution control or prevention because the SEP policy lessens the financial risk of noncompliance. EPA, after all, has the right to refuse to negotiate a SEP on the basis of a company's prior noncompliance history or "bad faith" negotiating posture.

In their report to EPA, the authors conclude that EPA has had success in instigating pollution prevention in enforcement settlements through SEPs. However, this method appears to be underexploited. The flexibility offered by the two EPA policies should be used more aggressively to enhance not only pollution prevention, but also the development of new pollution prevention technologies and adoption of existing innovative technologies. Several of the cases demonstrated that this can be done, though not without determination and creativity on the part of both the agency and the firm. The next phase of research will focus on identifying promising technologies for development and adoption.

Note

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