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Pollution Prevention: A Regulatory Update

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ABSTRACT

Pollution prevention is the emphasis of the 1990s environmental philosophy. This new environmental era was ushered in when President Bush signed the Pollution Prevention Act in October 1990. This law, with its accompanying philosophy, was in response to the realization that end-of-the-pipe treatment, which frequently changed the media in which a pollutant or waste was discharged, was inadequate to protect the environment and human health. Pollution prevention advocates source reduction, where material substitutions and engineering solutions are sought to reduce the volume and toxicity of waste and pollutants. This proactive approach reduces environmental impacts such as those of former waste sites which have produced environmental legacies that will cost billions of dollars and take decades to remediate.

This paper describes pollution prevention philosophy and summarizes regulatory pollution prevention requirements. It describes current regulatory trends in the area of pollution prevention, including voluntary programs and enforcement actions. The Pollution Prevention Act of 1990 is described, and pollution prevention initiatives embodied in other laws, including the Clean Air Act, the Clean Water Act, the Emergency Planning and Community Right-To-Know Act, the Resource Conservation and Recovery Act, and the Toxic Substances Control Act, are discussed. A historical overview of waste minimization initiatives within the Department of Energy is given, and other pollution prevention initiatives that affect federal facilities, such as Executive Order 12780, which mandates recycling and the procurement of recycled materials, are also outlined.

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DEVELOPMENT OF FEDERAL POLLUTION PREVENTION POLICY

More than a score of laws were enacted by Congress between 1970 and 1980 to protect against the intrusion of harmful substances or pollutants into the environment. All of these laws focused on the control of pollution rather than its prevention. Enforcement of the pollution control statutes has been based on a Congressional philosophy that compliance must be compelled. Among the compliance tools the U. S. Environmental Protection Agency (EPA) may use are permits, compliance orders, administrative penalty proceedings, and referrals to civil and criminal tribunals. This web of legal standards and enforcement options has collectively become known as “command-and-control.”

The United States Congress was aware by the mid-70s that pollution control often has unintended, damaging side effects. Because each new pollution control law was designed to control pollution in only one medium, the new law often created additional pollution by causing the transfer of substances from one medium to another. During the next decade of environmental regulation, policy-makers began to understand that source reduction—preventing the generation of waste or other pollution—is a more environmentally sound and economical method of protecting the environment and is an approach that can result in cost savings.

EPA first proposed a policy for the prevention of pollution in 1989; this policy was predicated on the realization that “there are limits as to how much environmental improvement can be achieved under media-specific pollution control programs, which emphasize management after pollutants have been generated.” EPA stated that it believed that further improvements in environmental quality could be achieved by reducing or eliminating discharges or emission to the environment through the implementation of source reduction and environmentally sound recycling practices. The proposed policy established a hierarchy of desirable waste management practices, with source reduction as the preferred technique.

The draft policy was issued the same year that William K. Reilly became Administrator of EPA. Administrator Reilly immediately made pollution prevention one of the Agency’s top priorities, and he requested that EPA’s Science Advisory Board (SAB) conduct a study and report on reducing risk associated with environmental pollutants. In its report, the SAB recommended that EPA emphasize pollution prevention as the preferred option for reducing risk. The Board concluded from its study that:

End-of-pipe controls and waste disposal should be the last line of environmental defense, not the front line. Preventing pollution at the source is usually a far cheaper, more effective way to reduce environmental risk, especially over the long term.

In its 1989 draft pollution prevention policy statement, EPA abandoned the phrase “waste minimization” because of its close ties with the Resource Conservation and Recovery Act (RCRA). Indicating that its proposed policy had applicability beyond RCRA hazardous waste, EPA stressed that the policy focused primarily on the prevention of pollution through multi-media reduction of pollutants at the source. At the time of EPA’s draft pollution prevention policy statement, EPA’s definition of pollution prevention included the practice of source reduction and recycling and excluded the practice of treatment. In 1992, after the passage of the Pollution Prevention Act, EPA issued a Statement of Definition of Pollution Prevention that equated pollution prevention with source reduction and eliminated recycling as part of the definition:

Pollution prevention means "source reduction," as defined under the Pollution Prevention Act, and other practices that reduce or eliminate the creation of pollutants through increased efficiency in the use of raw materials, energy, water, or other resources, or protection of natural resources by conservation.

In accordance with the requirements of the Pollution Prevention Act of 1990, EPA published a Pollution Prevention Strategy on February 26, 1991, which contained two major objectives.

The first objective reflects EPA's belief that for pollution prevention to succeed it must be a central part of the Agency's primary mission of protecting human health and the environment; the goal is to incorporate prevention into every aspect of the Agency's operations in program and regional offices.

The second component of the strategy includes a plan for targeting 15 to 20 high-risk chemicals that offer opportunities for prevention and sets a voluntary goal of reducing total environmental releases of these chemicals by 33% by the end of 1992 and at least 50% by the end of 1995. This plan, now called the 33/50 Program, is discussed in more detail later in this paper.

The strategy indicates that EPA will concentrate its pollution prevention efforts within the following activities: (1) identifying and overcoming barriers to pollution prevention; (2) grant projects; (3) the Pollution Prevention Information Clearinghouse; (4) improving data and developing indicators to measure progress; (5) expanding public participation and choice; (6) partnerships with federal agencies; (7) building and strengthening state programs; (8) conducting outreach and training; (9) a research strategy for pollution prevention; and (10) encouraging development of safer substitutes for hazardous raw materials or products, as well as cleaner technologies.

The strategy also states that EPA will continue to proceed with regulation development, permitting, and enforcement and its other responsibilities as required by law. This paper will show how the Agency has reoriented its authorities under the pollution control laws to provide incentives to prevent pollution.

FEDERAL REGULATORY DRIVERS

The principle environmental statute for dealing with hazardous wastes is RCRA. The 1984 Hazardous and Solid Waste Amendments (HSWA) amended RCRA to make one of its objectives:

...minimizing the generation of hazardous waste and the land disposal of hazardous waste by encouraging process substitution, materials recovery, properly conducted recycling and reuse, and treatment.

HSWA also added a statement of national policy regarding the minimization of hazardous waste:

The congress hereby declares it to be the national policy of the United States that, wherever feasible, the generation of hazardous waste is to be reduced or eliminated as expeditiously as possible. Waste that is nevertheless generated should be treated, stored, or disposed of so as to minimize the present and future threat to human health and the environment.

In the Pollution Prevention Act of 1990, Congress broadened the RCRA waste minimization policy into a multi-media approach to cover all forms of waste that cause pollution. The Act declares that it is national policy to prevent pollution at the source and to recycle pollution in an environmentally safe manner. The Act's pollution prevention hierarchy provides that the following sequence of steps be taken in dealing with pollution: (1) pollution should be prevented or reduced at the source whenever feasible; (2) pollution that cannot be prevented should be recycled in an environmentally safe manner whenever feasible; (3) pollution that cannot be prevented or recycled should be treated in an environmentally safe manner; and (4) disposal or other release into the environment is to be employed only as a last resort and conducted in an environmentally safe manner.

The Pollution Prevention Act of 1990 is designed to "implement the national objective of pollution prevention" by establishing a source reduction program at EPA and by assisting states in providing information and technical assistance regarding source reduction. The statute (1) establishes a national policy on pollution prevention; (2) directs EPA to conduct pollution prevention activities; (3) provides for matching grants to states for technical assistance programs; (4) establishes a source reduction clearinghouse; (5) requires business to report source reduction and recycling data in annual toxic chemical release reports; and (6) requires biennial reports by EPA to Congress on pollution prevention activities and results.

The Pollution Prevention Act requires each owner or operator of a facility that is required to file an annual toxic chemical release form (Form R) under Sect. 313 of the Emergency Planning and Community Right-To-Know Act (EPCRA) to include a toxic chemical source reduction and recycling report with its toxic chemical release filing. The report must cover each toxic chemical required to be reported on EPA Form R (Form 9350-1), "Toxic Chemical Release Inventory Reporting Form." Form R must be submitted for each toxic chemical manufactured, processed, or otherwise used at each covered facility as described in the reporting requirements in Title 40 *Code of Federal Regulations* Part 372 (40 *CFR* 372).

Reporting of source reduction and recycling data (Part II, Sect. 8, "Source Reduction and Recycling Activities") had previously been optional when submitting Form R but is now mandatory under the Pollution Prevention Act of 1990. Source reduction and recycling reporting requirements under the Pollution Prevention Act cover releases of listed chemicals to all media (air, water, and land).

Source reduction and recycling data must be reported beginning with Form R reports covering calendar year 1991. The first reports were due to EPA and affected states and Indian tribes by July 1, 1992. Because of delays in finalizing and distributing the Office of Management and Budget-approved 1991 Form R and accompanying instructions, EPA indicated in 1992 that it would not initiate enforcement proceedings against facilities that file accurate Form R reports between July 1, 1992, and September 1, 1992. EPA announced that the 1992 Form R will continue to be used in 1993, and they will increase enforcement of reporting under EPCRA and the Pollution Prevention Act.

Pollution prevention integration into other programs is evidenced in new regulations implementing the Clean Water Act. Section 402(p) of the Clean Water Act clarifies that storm-water discharges associated with industrial activity to waters of the United States must be authorized by a National Pollutant Discharge Elimination System (NPDES) permit. EPA published a notice in the *Federal Register (FR)* on September 9, 1992, that it was issuing final NPDES general permits for storm-water discharges associated with industrial activity from construction sites in ten states. These general permits establish Notice of Intent (NOI) requirements, special conditions, requirements to develop

an implement storm-water pollution prevention plans, and requirements to conduct site inspections for facilities with discharges authorized by the permit. EPA anticipates that storm-water management measures at many sites will be able to provide for the removal of at least 80% of total suspended solids.

The NPDES general permits for storm-water discharges associated with industrial activity require that a discharger submit an NOI to be covered by the permit prior to the authorization of its discharges under such permit (40 *CFR* 122.28(b)(2), 57 *FR* 11394). A discharger that submits a complete NOI is not required to submit an individual permit application for storm-water discharge, unless it is notified that an individual permit application is submitted. The NOI must contain a certification that a storm-water pollution prevention plan has been prepared for the site in accordance with the permit and that such plan complies with approved state or local sediment and erosion plans or permits or storm-water management plans or permits.

Pollution prevention initiatives have also become an integral part of the Clean Air Act Amendments of 1990. One such provision includes a voluntary Early Reductions Program of Hazardous Air Pollution (HAP) as outlined in 40 *CFR* 63. Source owners and operators can realize benefits from participating in the early reduction program by obtaining more time to develop strategies for compliance with Maximum Available Control Technology (MACT) standards in exchange for significantly reducing HAP emissions earlier than otherwise required. It gives them an opportunity to design cost effective emission reduction approaches for their facilities and reduce the cost of compliance over the long term. Section 112(i)(5) of the Clean Air Act allows an existing source to obtain a 6-year extension of compliance with an emission standard promulgated to Sect. 112(d) of the Act. To obtain the extension, the owner or operator of the source must demonstrate that the source has achieved an emission reduction of 90% or more of hazardous air pollutants (95% or more for particulates) based on a 1987 baseline. If a compliance extension is granted, an alternate emission limitation will be established by permit to ensure continued achievement of the emission reduction. Another pollution prevention initiative related to the Clean Air Act amendments includes replacement of ozone depleting substances, or chlorofluorocarbons (CFC) as outlined in 40 *CFR* 82. Production phase-out is currently scheduled for January 1, 1996; however, CFCs that have already been produced can be used after that date. On July 1, 1992, release prohibition went into effect, and these regulations require that maintenance activities on equipment containing CFCs be conducted in a manner that prevents release of vapors to the air. The current trend is for conversion from CFCs to Hydrochlorofluorocarbons (HCFC), which have less of an ozone-depleting potential. The current schedule for phase-out of HCFCs is by the year 2015.

In alignment with the initiatives required in the Pollution Prevention Act of 1990, EPA is implementing a pilot program that will require companies that manufacture new chemicals to submit pollution prevention plans under TSCA (Chemical Regulation Reporter, October 30, 1992). Each plan will outline possible alternate methods for handling new chemicals during its full life-cycle so that exposure to toxic chemicals or any releases to the environment can be avoided. These plans have to be submitted by companies that wish to manufacture new chemicals that (1) present an unreasonable risk of injury to human health and the environment, (2) may introduce high exposure releases, and (3) have good potential for pollution prevention opportunities. In addition to a pollution prevention plan, EPA has instituted a voluntary prevention page to pre-manufacture notices which will provide information on the new chemical. This information can result in reductions in regulatory controls or testing requirements if the information mitigates EPA's concerns regarding toxicity, human exposure, or environmental releases of the substance.

A pollution prevention approach is also apparent in current EPA evaluation of National Environmental Policy Act (NEPA) requirements. Section 102(2) (C) of NEPA directs all federal agencies to include in proposals for major federal actions significantly affecting the quality of the human environment, a detailed statement on the environmental impact of the proposed action. This Environmental Impact Statement (EIS) must provide a full and fair discussion of significant environmental impacts and inform decision-makers and the public of the reasonable alternatives that would avoid or minimize adverse impacts to or enhance the quality of the human environment. A recent development has been for agencies to incorporate pollution prevention concepts into the NEPA decision-making process by considering pollution prevention alternatives to proposed action and pollution prevention as a means of minimizing adverse impacts. EPA reviews the draft EISs of other federal agencies and will urge an agency to consider pollution prevention measures and alternatives when the agency has failed to include such considerations in its statement.

In addition to EPA statutes, federal agencies have had to respond to their own set of legislation in the area of pollution prevention. In 1978, President Carter issued Executive Order 12088, "Federal Compliance With Pollution Control Standards," which made the head of each agency responsible for ensuring that all necessary actions are taken to prevent environmental pollution at federal facilities. When RCRA was amended in 1984, federal facilities became subject to RCRA permitting requirements to the extent that waste generated was hazardous waste. These changes prompted federal facilities to develop programs in waste minimization.

The Department of Energy (DOE) promulgated a number of policies and regulations acknowledging that DOE is subject to RCRA and other environmental laws. These departmental policies, which are the foundation of DOE's Waste Minimization Program, are found in a series of Secretarial Orders and Notices, DOE plans, and internal memoranda and guidance that apply to nonhazardous, hazardous, radioactive, and radioactive mixed waste. The sensitivity within DOE to pollution prevention has heightened in the last year, and several initiatives have given high visibility to waste minimization and pollution prevention within the department. A new departmental policy on waste minimization and pollution prevention became effective in 1992, and a Waste Minimization Crosscut Plan, which provides a vision and identifies key objectives and strategies for the department's achievement of excellence in waste minimization, was drafted. A Secretary of Energy Notice (SEN-37-92) was signed on March 13, 1992, which implements the Waste Minimization Crosscut Plan, including delineation of responsibility and the organizational framework for implementation. These activities are a clear indication that pollution prevention is being given some level of priority within federal facilities.

VOLUNTARY PROGRAMS

In support of pollution prevention and in accordance with its strategy, EPA has instituted voluntary programs. The 33/50 Program was announced in February 1991 and is one component of EPA's pollution prevention strategy that promotes source reduction to reduce pollutants. The program establishes a national goal to reduce releases and off-site transfers of 17 priority chemicals. The EPA Administrator has asked private companies and federal agencies that produce or use these 17 chemicals to participate in the 33/50 Program by making voluntary commitments to reduce their releases to all environmental media. EPA is encouraging program participants to use pollution prevention practices (rather than end-of-pipe treatment) to achieve these reductions. EPA hopes that

the 33/50 Program will help foster a pollution prevention ethic in which facilities routinely analyze all their operations to reduce or eliminate pollution before it is created.

EPA's reduction goal applies to total releases to air, land, and water. Progress in achieving the program goals will be monitored using information reported to the Toxic Release Inventory (TRI). EPA will also use the new pollution prevention TRI reporting requirements to assess the contribution of source reduction and recycling in achieving the 33/50 reductions.

Although EPA is targeting these 17 chemicals for pollution prevention reductions, participants are encouraged to also reduce their releases of other TRI chemicals and develop their own reduction goals. A participant is not required under the 33/50 Program to commit to a 50% reduction goal for 1995. EPA has informed participants that each should commit to a reduction goal that makes sense for its facilities, whether this number is less than 50% or greater than 50%. Participants may also choose a baseline year other than EPA's established 1988 baseline by which to monitor their progress. EPA has stated, based on the voluntary nature of the program, that it does not have legal authority to impose penalties and will not seek penalties against participants that do not achieve the 33/50 reduction commitments.

Another voluntary EPA program that promotes pollution prevention is the Green Lights Program. This program establishes a partnership between industry and EPA which promotes energy conservation and pollution reduction. The voluntary conservation initiatives eliminate pollution by reducing energy demand through the use of energy-efficient lighting. Any corporation that joins the Green Lights partnership commits to performing lighting surveys and implementing retrofits that are profitable within five years of joining the program. These retrofits consist of higher efficiency light bulbs, light fixtures, ballasts, and, in some cases, lights that operate on motion detectors so that the lighting is used only when someone is in the room. In exchange for a corporation's participation, EPA will publicize positive results the corporation achieves. In addition to the environmental benefits of the program, the potential cost savings in increased lighting efficiency and decreased energy consumption are found to be significant by many corporations.

AFFIRMATIVE PROCUREMENT PROGRAM

Another aspect of pollution prevention is increased efficiency and protection of natural resources through recycling and recovery of materials. These practices help avoid potential pollution created by waste disposal and raw material acquisition and typically reduce pollution generation and energy consumption during manufacture.

To encourage recycling and use of recovered materials, legislation has been passed which promotes recycling and the procurement of products containing recovered materials. Section 6002 of RCRA is one such mandate, which imposes requirements on agencies engaged in purchasing to procure items "composed of the highest percentage of recovered materials practicable..., consistent with maintaining a satisfactory level of competition." RCRA Sect. 6002 requires the Administrator of EPA to develop guidelines that:

1. designate those items that are or can be produced with recovered materials and

2. set forth recommended practices with respect to the procurement of recovered materials and items containing such materials and, where appropriate, recommend the level of recovered material to be contained in the procured product.

Procurement guidelines have been issued for paper and paper products, retread tires, lubricating oils containing re-refined oil, building insulation products containing recovered materials, and concrete containing fly ash.

RCRA requires each procuring agency to develop an affirmative procurement program that will ensure that items composed of recovered materials will be purchased to the maximum extent practicable, which is consistent with applicable provisions of federal procurement law. Each affirmative procurement program is to include, at a minimum, the following four elements:

1. A recovered materials preference program.
2. An agency promotion program to promote the preference program.
3. A program for requiring estimates of the total percentage of recovered materials utilized in the performance of a contract; certification of minimum recovered material content actually utilized; and reasonable verification procedures for estimates and certifications.
4. An annual review and monitoring of the effectiveness of the agency's affirmative procurement program.

The RCRA requirement for an affirmative procurement program within each agency has existed since 1976 but has not been enforced. Executive Order 12780, "Federal Agency Recycling and the Council on Federal Recycling and Procurement Policy," signed October 31, 1991, by President Bush, is designed to strengthen the requirement. This Executive Order seeks to encourage the development of economically efficient markets for products manufactured with recycled materials by using the federal government's power as the nation's largest single consumer. One of the purposes of the Order is to direct "the immediate implementation of cost-effective federal procurement preference programs favoring the purchase of such items."

"Recovered materials" are post-consumer materials such as paper, paperboard, and fibrous wastes after they have passed through their end-usage as a consumer item or are collected from municipal solid wastes. The Executive Order and RCRA require annual reports from federal agencies on progress of their affirmative procurement programs.

The Office of Federal Procurement Policy (OFPP) has issued Policy Letter No. 92-4 on "Procurement of Environmentally-Sound and Energy-Efficient Products and Services," which was published in the *Federal Register* on November 9, 1992. The OFPP policy letter requires the implementation of cost-effective procurement preference programs for the purchase of environmentally sound, energy-efficient products and services. It applies to federal executive agencies and state and local government agencies that use appropriated federal funds for procurement purposes. The policy letter provides direction for developing affirmative procurement programs and for procuring paper that contains post-consumer waste. The letter also implements the Energy Policy and Conservation Act, and three Executive Orders (including Executive Order 12780). The policy letter directs executive agencies to consider energy conservation and efficiency factors in the procurement

of products and services. It also requires federal agencies to give preference in their procurement programs to practices and products that conserve natural resources and protect the environment.

ENFORCEMENT AND TRENDS

Pollution prevention initiatives are in the forefront of environmental regulatory initiatives. The signing of the Pollution Prevention Act in 1990 marked a new environmental philosophy based on source reduction and multi-media assessments. The trend toward a multi-media pollution prevention strategy is apparent in many of the revisions to regulatory requirements. Pollution prevention is being integrated into the Clean Water Act, the Clean Air Act, RCRA, TSCA, and NEPA. This multi-media source reduction strategy is apparent in recent permitting and enforcement actions b 9.

As part of its pollution prevention strategy, EPA has begun to incorporate pollution prevention conditions into its enforcement settlements. This enforcement policy is based on EPA's belief that vigorous enforcement remains a primary tool for creating an incentive to reduce industrial pollution. EPA has recently settled cases with industry in which the industry violated different pollution control statutes with agreements to implement pollution prevention programs. This multi-media approach is also seen in permitting activities in an experimental program in New Jersey where several industries are negotiating with the state to issue facility-wide permits rather than individual air, water, and hazardous waste disposal permits. EPA has also announced that it will select 40 federal facilities to take part in an experimental program in 1993, in which the facilities will comply with environmental laws through a multi-media pollution control approach. In addition, EPA has indicated that it may initiate multi-media enforcement inspections within defense facilities over the next two years, with an objective of reducing barriers presented by media-specific compliance programs that may direct contamination from one media to another.

It appears that EPA's trend is toward true pollution prevention and toxic use production versus the end-of-the-pipe treatment philosophy. There is also a trend for voluntary initiatives and specialized programs that will allow companies participating to realize benefits such as relaxed compliance schedules and improved public image. In alignment with pollution prevention, there is also growing emphasis within the federal government and EPA to establish positive programs toward resource conservation and energy efficiency.

SUMMARY

Pollution prevention represents a paradigm shift in environmental protection. Components of pollution prevention, including source reduction, recycling, toxic use reduction, and resource conservation, are being integrated into the environmental regulatory framework. Changes are occurring at a rapid pace, with pollution prevention initiatives being established within the framework of various environmental statutes. In addition to new regulatory initiatives, EPA is actively pursuing voluntary initiatives and strengthening mandates in areas which promote environmentally sound practices and energy conservation. This rapidly changing trend warrants careful attention and evaluation so that compliance can be maintained and programs will be consistent with future pollution prevention initiatives.