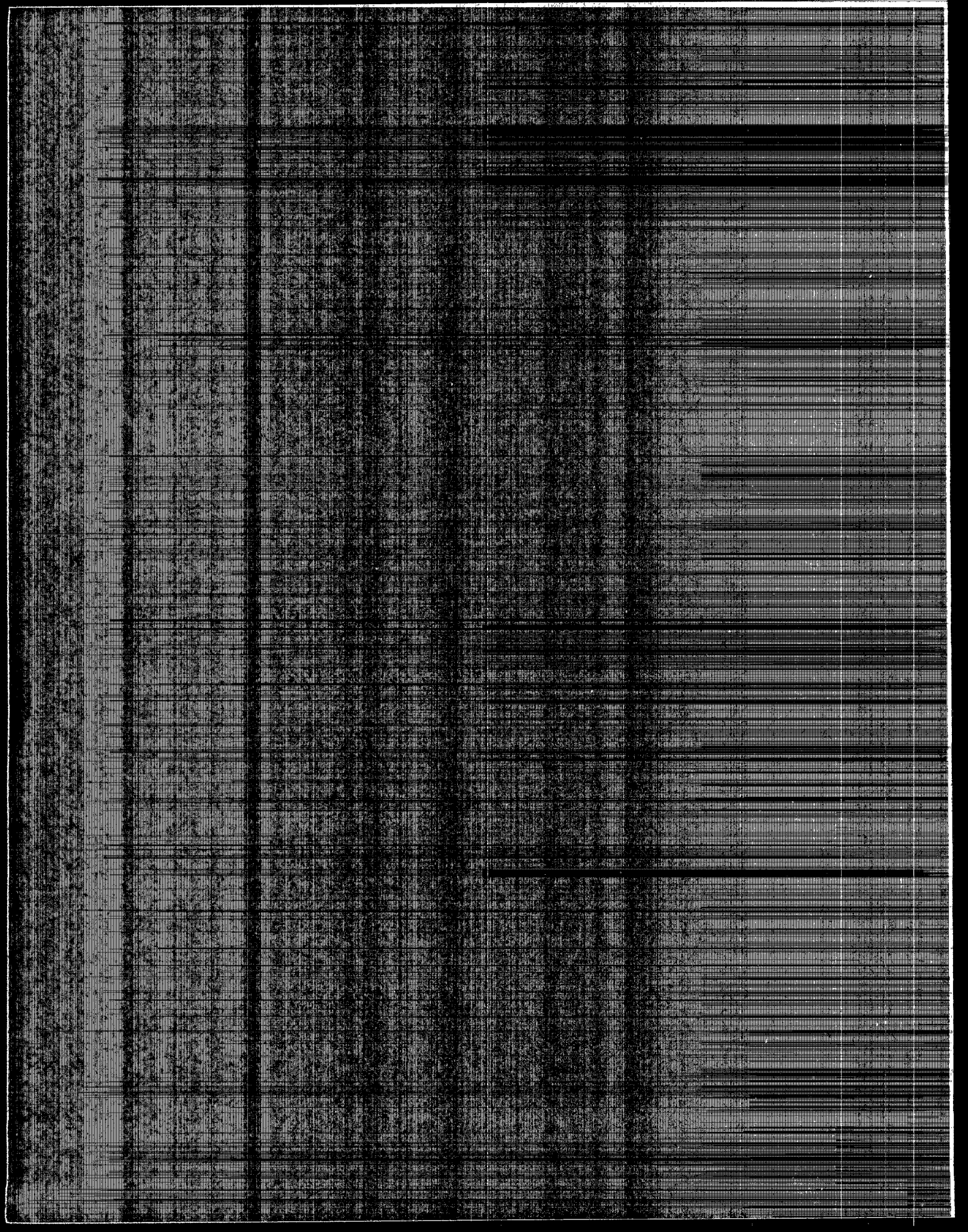




Preventing Pollution Through Regulations

The Source Reduction Review Project

An Assessment





UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

JAN 31 1996

OFFICE OF
PREVENTION, PESTICIDES AND
TOXIC SUBSTANCES

MEMORANDUM

SUBJECT: Transmittal of Our Assessment of the Source Reduction Review Project

FROM: Lynn R. Goldman, M.D. *Lynn R. Goldman*
Assistant Administrator

TO: The Administrator
The Deputy Administrator

As promised in our November 22nd briefing with you, Fred, we are ready to share with you both our assessment of the Source Reduction Review Project (SRRP). OPPT conducted this assessment over a period of two years in cooperation with the media offices. We undertook this assessment because SRRP was the first time EPA made such a coordinated effort across media offices to take a cross-media perspective and foster pollution prevention (P2) through regulations.

SRRP Assessment

The assessment has been reviewed by OAQPS in OAR, OSW in OSWER, OST in OW, ORD, and OGC. As such, it represents views generally held by the majority of reviewers. I believe the assessment addresses some fundamental issues about our environmental regulatory process and its impact on real environmental management.

The assessment includes case studies of seven SRRP rules so readers can better evaluate our conclusions. We draw a list of positive SRRP lessons and identify the Agency-wide obstacles that offices collectively faced. (There is significant common ground between our assessment and the NAPA Report discussion of EPA's role in managing industrial pollution, and overcoming fragmentation.) Based on our broad findings, and as supported by case-study level details, we make several recommendations in the paper.

Points of Emphasis

The main points we want to highlight are as follows.

1) In evaluating P2 outcomes, we found the importance of taking a multi-media approach was striking, yet a multi-media perspective is often not emphasized in the development and implementation of regulations at the Agency.

2) Environmental regulatory planning, as largely shaped by Congressional statutes, is a legacy of single-media thinking and is not aligned with cross-media needs. The current planning model impedes integrating regulations, impedes offices' abilities to create cross-media strategies, and often breeds piecemeal approaches.

A basic premise of the assessment is that an environmental regulatory framework is here to stay. The existing framework has an enormous impact on how Americans choose to manage their environmental responsibilities. A key question addressed in the assessment is what can be done by EPA to reinvent this framework for the better.

The paper emphasizes what EPA can do internally, and with others, to address some of the commonly acknowledged obstacles to promoting cleaner (and smarter and cheaper) regulatory outcomes. Steps that EPA takes in the short term -- internally and with others -- will help inform longer term efforts, both administrative and legislative. Few are better positioned than EPA to think through, test out, and report on the administrative implications of moving toward more integrated and flexible approaches to environmental management.

3) P2 and reform go very much together. In looking at the obstacles offices confronted while working on SRRP rules, the assessment found issues that run across regulatory activity generally. The single-media system contributes to the perception that P2 is an "extra" activity rather than an integral regulatory goal for the majority of cases. While SRRP rulemaking went the extra mile to foster P2 wherever reasonably feasible, the assessment observes that for numerous non-SRRP rulemakings, the single-media system tends to allocate resources and set goals in a way that discourages people from seeing P2 as their principle of first choice in the environmental management hierarchy.

With considerable reflection, the assessment concludes that reform and P2 (or wise use of the environmental management hierarchy) go together very well. The assessment posits that if resources were allocated and if goals were set in ways that made cross-media planning and coordination more realistic and more routinely attainable, people would be more inclined to see their work as routinely following the environmental management hierarchy.

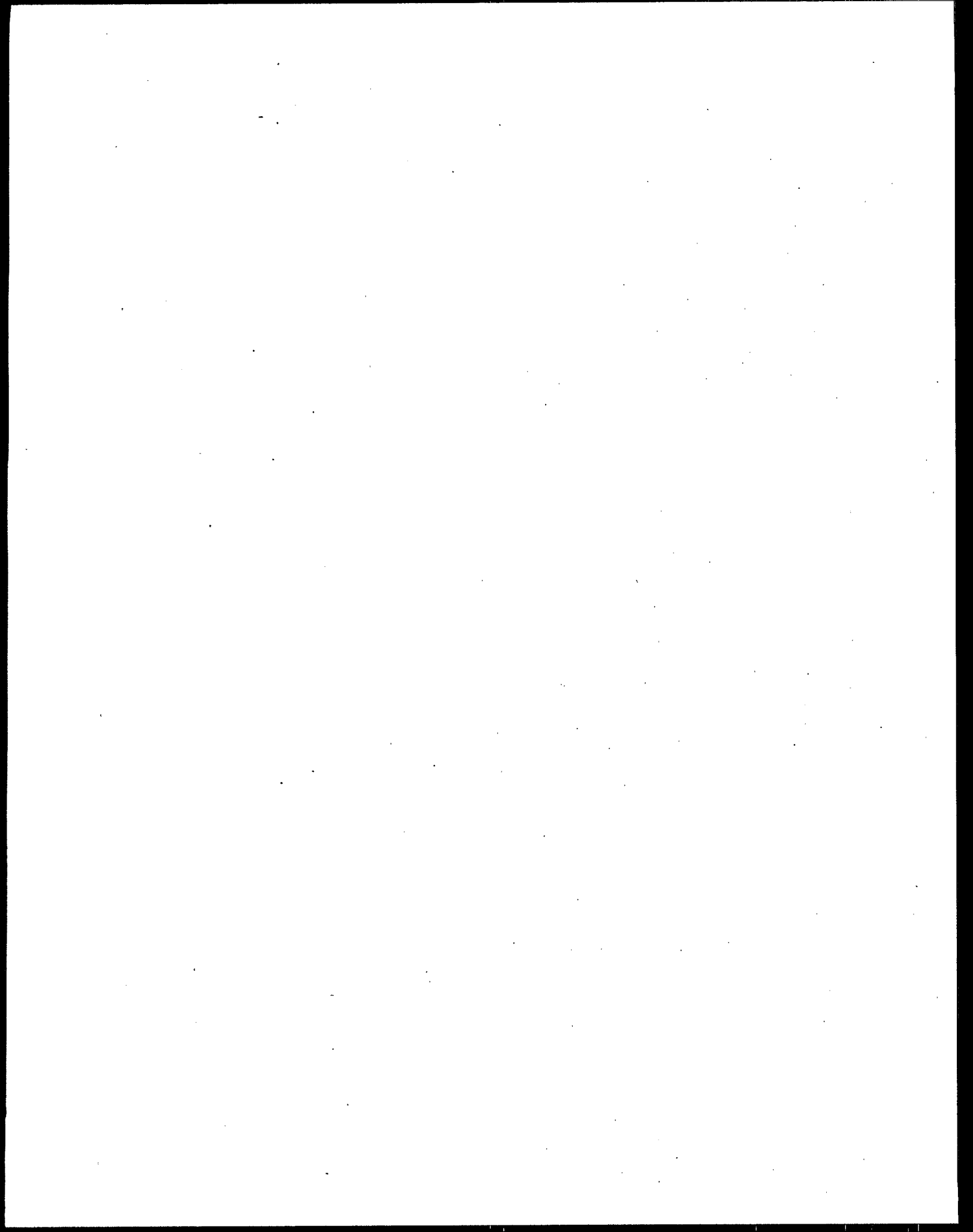
Next Steps -- Implementation

As you suggested at the briefing, Fred, OPPTS will share the key elements of the SRRP assessment with the Regulatory Policy Council. We will work with this forum and report on our progress in tackling issues raised in the assessment. Any interest and support from the 12th floor would be critically advantageous in implementing steps in modifying the budget and planning processes. Finally, I would like to note that Appendix A of the assessment highlights the paper's relevance to recent initiatives, especially the Common Sense Initiative, and regulatory reinvention.

Attachments:

Executive Summary of the SRRP Assessment
SRRP Assessment, with Appendices

cc: Mary D. Nichols/OAR
Elliott P. Laws/OSWER
Robert Perciasepe/OW
Robert J. Huggett/ORD
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Executive Summary

ASSESSMENT OF THE SOURCE REDUCTION REVIEW PROJECT: PREVENTING POLLUTION THROUGH REGULATION

December 1995

- > *The Project.* The Source Reduction Review Project (SRRP) started in early 1992 to encourage cross-media and pollution prevention (P2) approaches during the Agency's regulatory development and implementation processes. The work was prompted in part by the Pollution Prevention Act, which requires the Agency to review regulations before and after proposal to determine their effect on source reduction. In developing SRRP rules, media programs collected more P2 data, added technical and economic analyses of P2 options and technologies, and otherwise engaged in more cross-media analysis than in rulemakings prior to SRRP. In this respect, SRRP offered an opportunity for close-hand examination of the opportunities for and obstacles to using multi-media P2 approaches. (*Appendix B* of the assessment provides case studies for seven SRRP rulemakings, consisting of NESHAPs under the Clean Air Act, Effluent Guidelines under the Clean Water Act, and a RCRA hazardous waste listing.)
- > *Positive Lessons.* EPA's experience with SRRP represents the beginning of a transition in how EPA media programs develop their rules. The air, water, and solid waste offices are making genuine strides in incorporating a multi-media and P2 perspective into their rulemakings. The positive lessons that can be drawn from their experience include: (1) focus on cross-media data collection and cross-media analysis of regulatory options; (2) write the standard to be flexible; (3) test new territory with stakeholders; (4) coordinate agenda-setting; (5) use preambles and development documents to explain P2 multi-media approaches; (6) use statute-specific approaches developed in SRRP; and (7) use program-tailored P2 training.
- > *The Obstacles.* A key contribution of SRRP is identifying Agency-wide obstacles to more effectively integrating multi-media and P2 approaches into regulatory and other mainstream activities, and finding general agreement among SRRP participants that the obstacles should be addressed. The fundamental obstacles that participating programs encountered are: (1) the lack of incentives for inter-office (multi-media) coordination in planning and budgeting; (2) the piecemeal nature of the statutory framework; (3) challenges in promoting P2 process changes and innovative technologies; (4) the lack of understanding about cross-media impacts; (5) the lack of resolution about collecting source reduction data through industry surveys; and (6) unclear roles for sharing P2 leadership among all parts of the Agency on various aspects of P2.
- > *Effects of Obstacles.* These obstacles have had the following effects: (1) resource allocations are not conducive to the coordination and cross-media analysis that is beneficial to the development and evaluation of P2 options, and information sharing among offices is limited; (2) deadlines for rules affecting the same industry are

generally not synchronized, and regulatory strategies are not developed on an industry-sector basis; (3) P2 process changes and innovative technologies can be difficult to promote; (4) potential cross-media impacts sometimes remain unknown; (5) missing P2 data from surveys sometimes impedes development of source reduction options; and (6) P2 and cross-media policy issues are not explored as creatively as they might be.

> *Implementation Issues.* Based on SRRP rulemaking experience, implementing source reduction in permitting will raise issues regarding flexibility in timetables, resource demands on permit writers, cross-media coordination in permitting, and risk sharing for innovative source reduction approaches.

> *Recommendations.* To make multi-media and P2 perspectives more central in the development and implementation of EPA rules, the assessment recommends:

- 1) Emphasizing the key link between cross-media solutions and source reduction;
- 2) Continuing to place special attention on targeted rules, especially during their implementation through the permitting and compliance phases;
- 3) Applying some of the positive SRRP lessons to more rulemakings;
- 4) Taking steps to start systematically addressing the obstacles to fostering prevention:

- Reinventing the planning and budgeting processes to enhance cross-media and P2 outcomes;
- Developing a cross-media legislative strategy;
- Broadening the flexibility of regulatory requirements;
- Deepening Agency understanding of cross-media impacts;
- Addressing Paperwork Reduction Act concerns about collecting source reduction data from industry;
- Clarifying P2 roles within the Agency; and --

- 5) Linking efforts to address these obstacles to full implementation of the Common Sense approach and reinvention of EPA.

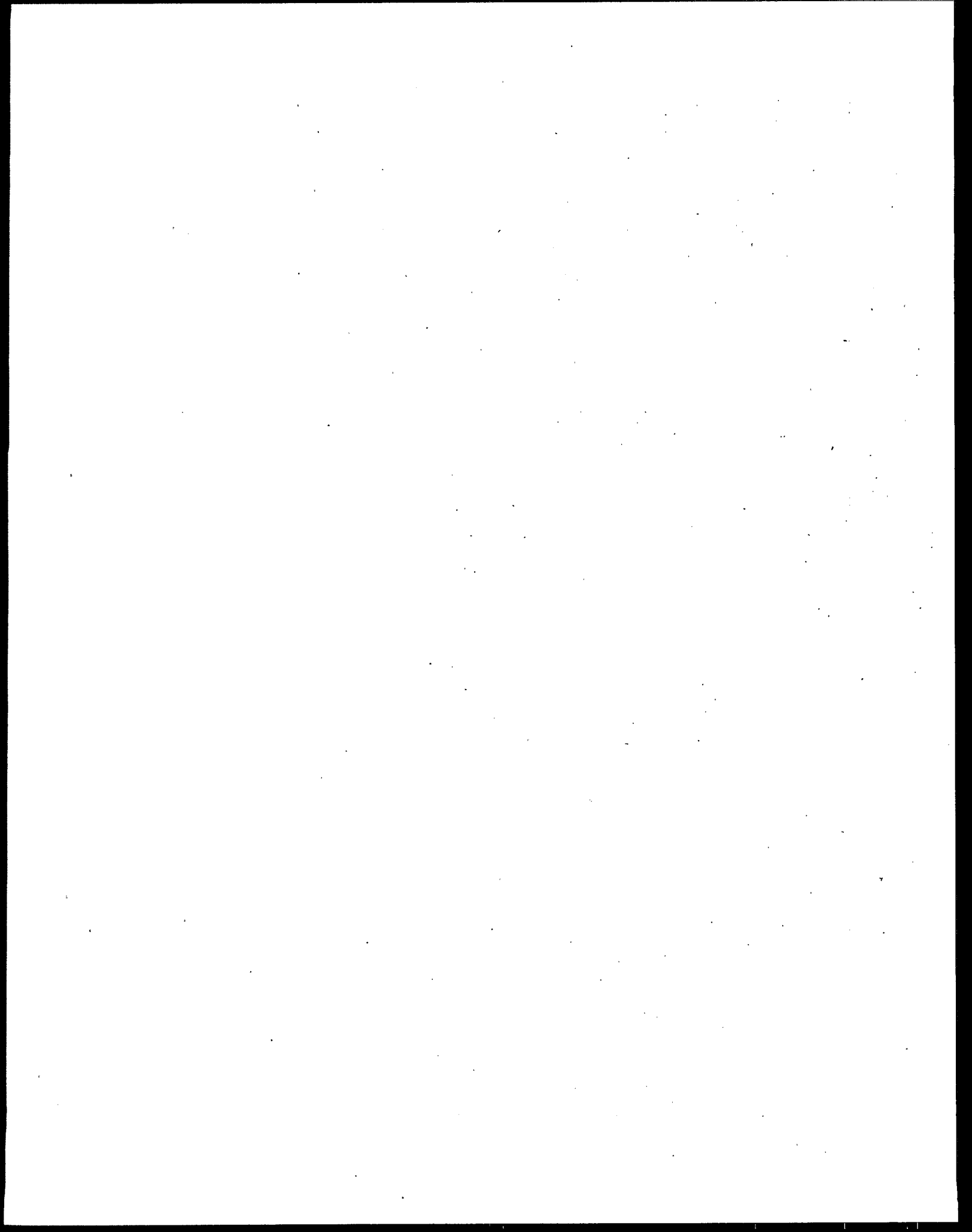
> *Appendix A.* Appendix A highlights that the assessment is relevant to the common sense approach and reinvention of EPA because: (1) it provides a partial demonstration of how regulatory actions can be compatible with the principles of the Common Sense Initiative (CSI); (2) it provides a source or ideas for making regulatory actions more compatible with CSI; (3) it reinforces the value of the mission of EPA's Permits Improvement Team; and (4) it reinforces the value of many of the priority actions in the Administration's program for reinventing environmental regulations, and contributes ideas for reinventing EPA.

**PREVENTING POLLUTION THROUGH REGULATION:
THE SOURCE REDUCTION REVIEW PROJECT**

**Assessment
December 1995**

Outline

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PREVENTING POLLUTION THROUGH REGULATION: THE SOURCE REDUCTION REVIEW PROJECT

Assessment
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1. *The Project*

In 1992, EPA began the Source Reduction Review Project (SRRP)¹ in response to the Pollution Prevention Act of 1990 (the Act), which requires the Agency to "review regulations . . . prior and subsequent to their proposal to determine their effect on source reduction" (section 4(b)). EPA's goal, through SRRP, has been to foster² industry's using cross-media, source reduction measures as the primary means of complying with regulations. If EPA cannot find a way to foster source reduction, then it encourages recycling, in accordance with EPA's pollution prevention (P2) policy statement (which places source reduction at the top of the environmental management hierarchy, followed by recycling, then treatment, and lastly disposal).

As framed in the August 1992 publication, "Source Reduction Review Project," the initial goal of SRRP has been to evaluate opportunities for building multi-media pollution prevention into the development and implementation of a number of specific water, air, and hazardous waste rulemakings. The longer-term goal of SRRP is to assist EPA in creating a model for integrating P2 into the development and implementation of its rules generally, since the Act applies to all EPA rulemaking.

SRRP was designed to consist of two phases: rule development and rule implementation. The rule development phase of SRRP has established a clear track record, since seven SRRP rules have been proposed or are near proposal, and two have been made final.³ One rule implementation activity is underway, and others are being explored.

¹ Participants in SRRP have been the Office of Science and Technology (OST) in the water office, the Office of Air Quality Planning and Standards (OAQPS) in the air office, and the Office of Solid Waste (OSW) in OSWER. The Office of Pollution Prevention and Toxics (OPPT) has been coordinating SRRP, and OPPT staff cover cross-media, source reduction issues on SRRP workgroups. The Pollution Prevention Policy Staff played a leading role in initiating SRRP as partners with OPPT. Office of Research and Development (ORD) laboratories have made significant contributions to the SRRP process through the research, development, and demonstration of viable pollution prevention approaches and technologies, and ORD generally has been an active player in SRRP regulatory decision-making. The Office of Enforcement and Compliance Assurance (OECA) and the Office of Policy, Planning, and Evaluation (OPPE) have contacts for SRRP.

² Statutes do not authorize EPA in most cases to require use of source reduction measures. Rather, EPA simply identifies technologies that will meet required emission limits.

³ Appendix B gives individual assessments of the SRRP rules listed below, describing for each the net source reduction anticipated (measured across media) and the impediments to using cross-media, source reduction approaches. The rules are:

2. Approach of this Assessment

This assessment examines primarily the period from 1992 to 1994, when most SRRP activities took place. This paper analyzes the experience of SRRP participants, namely staff and managers at the working level, and it meant to reflect their comments on what actually happened in the development of SRRP rules. Some of this experience includes events subsequent to 1994.

This assessment is intended primarily to assist EPA in meeting the Administrator's challenge of making pollution prevention the principle of first choice and the central environmental ethic of the Agency. The purpose of this paper is to assess⁴ how EPA is

-
- * *Pulp and Paper Manufacturing NESHAP* (National Emission Standard for Hazardous Air Pollutants, under the Clean Air Act) and *Effluent Guideline* (under the Clean Water Act). Proposed 12/93; final expected no earlier than late 1995. These affect pulp and paper mills and are EPA's first integrated rules, a benchmark for cross-media rulemaking.
 - * *Halogenated Solvent Cleaners (Degreasing) NESHAP* (CAA). Proposed 11/93; final 11/94. This rule covers halogenated solvent cleaning machines used in making furniture, fixtures, metal products, and electric/electronic/transportation equipment.
 - * *Carbamates Hazardous Waste Listing* (RCRA Subtitle C). Proposed 3/94; final 2/95. EPA proposed listing six wastestreams from the production of carbamates as "hazardous." This affects about 25 sites making organic chemicals. OSW will also be determining the Best Demonstrated Available Technology for treating these wastes.
 - * *Pesticide Formulating, Packaging, and Repackaging Effluent Guideline* "Pesticide Formulating Effluent Guideline" (CWA). Proposed 3/94; final due 3/96. This affects about 3,500 facilities.
 - * *Metal Products and Machinery Effluent Guideline (Phase I)* (CWA). Proposed 5/95; final due 9/96. This effluent guideline covers facilities that make, rebuild or maintain finished metal parts, products, or machines. Phase I covers aerospace, aircraft, electronics, hardware, ordnance, and mobile and stationary industrial equipment.
 - * *Pharmaceuticals Effluent Guideline* (CWA). Proposed 5/95; final due late 1996. This affects about 304 manufacturing facilities, who already recycle 2/3 of their solvents.
 - * *Wood Furniture Manufacturing NESHAP* (CAA). Proposed 11/94; final due 11/95. This affects wood furniture makers; sources of emissions are coatings, glues, clean-up, and wood cutting and storage. OAQPS developed the proposal through regulatory negotiation with State, industry, and public interest representatives.

⁴ Several preparatory steps were taken for this assessment. OPPT studied opportunities and barriers to fostering prevention through regulations in early 1993, and then convened a September cross-program meeting to discuss SRRP coordination, opportunities for "clustering" development of SRRP rules, and sharing data and technology across SRRP workgroups and with other offices. Later in September 1993, OPPT convened a workshop for SRRP participants to discuss rulemaking successes, obstacles to fostering source reduction in rulemaking, and ways to overcome the obstacles. OPPT continued to assess SRRP activities and solicit comments from other EPA offices. Studies considered during development of this paper include: 1) the National Advisory Council for Environmental Policy and Technology's "Transforming Environmental Permitting and Compliance Policy to Promote Pollution Prevention: Removing Barriers and Providing Incentives to Foster Technology Innovation, Economic Productivity, and Environmental Protection"; 2) the Business Roundtable's "Facility-Level Pollution Prevention Benchmarking Study"; 3) EPA's Office of Policy, Planning, and Evaluation's study of efforts to cluster EPA rulemakings; and 4) Integrated Pollution Control: A Symposium, ENVIRONMENTAL LAW, Vol. 22, No. 1 (1992).

doing in fostering P2 through its regulations, in part by having the media programs join OPPT in reflecting upon SRRP progress, and to recommend next steps. It can also serve as an internal tool for educating a spectrum of personnel about issues EPA faces as it moves increasingly toward P2 (and therefore multi-media) approaches for protecting the environment.

3. Significance of this Assessment to EPA

The value of this assessment to EPA is not only as a measurement of the SRRP experiment, but also as: (a) a partial demonstration of how regulatory actions can be compatible with the common sense approach⁵; (b) a source of ideas for making regulatory actions *more* compatible with the common sense approach; and (c) a source of ideas for reinventing EPA⁶. This paper helps to support CSI and other regulatory reinvention initiatives, adds another perspective on the issues being engaged in these initiatives, and raises related issues for thought and discussion.

As a partial demonstration of how regulatory actions can be compatible with CSI, the assessment gives examples of actions providing incentives for P2, actions encouraging new technologies, actions building partnerships with stakeholders, actions making economic sense, and actions exploring multi-media approaches. It also explores ideas for increasing P2 incentives, expanding multi-media approaches, and further encouraging technological innovation through regulatory action. Finally, it reinforces the value of many of this Administration's priority actions for reinventing environmental regulation. It explores ideas for remaking our organizational structures work to support the new generation of environmental approaches, redesigning the way the Agency does its work, and changing EPA's culture to facilitate reaching Agency objectives.

Appendix A gives citations to pages -- in the text and Appendix B -- that discuss issues relevant to the common sense approach and regulatory reinvention.

⁵ In 1994, Administrator Browner took the principle of organizing environmental efforts by industrial sector and created the Common Sense Initiative (CSI) which has these goals for six pilot industry sectors: 1) coordinated review of regulations; 2) pollution prevention; 3) simplified record-keeping/reporting; 4) permit streamlining; 5) compliance/enforcement initiatives; and 6) innovative technology. In late November 1994, the Administration identified as an EPA priority the full implementation of the common sense approach. This includes examining all regulatory actions currently underway to see if they are compatible with the principles of CSI and, if not, to reconsider their approach.

⁶ This Administration identified reinventing EPA as an Agency priority in 1994. On March 16, 1995, President Clinton and Vice President Gore released a report containing a comprehensive set of 25 high priority actions for reinventing environmental regulations. The first track is a set of actions targeted to fixing problems with today's regulatory programs, and the second track is a set of actions designed to develop innovative alternatives to the current regulatory system.

4. Overall Assessment of SRRP Progress

Successes: Steps Taken, Obstacles Identified. SRRP rule-writing efforts to date are a major step in the right direction. EPA can be proud of the substantial work that went into writing these rules with a source reduction perspective. Many of the proposed and final rules set limits that can be achieved, at least in part, by using source reduction technologies and approaches, and some of them document specific source reduction approaches in rule preambles and development documents. SRRP experience to date indicates that practical solutions most often combine source reduction, recycling, and treatment. If EPA implements these rules in a way that emphasizes the source reduction aspects of the rules' design, then EPA will in all likelihood foster significant progress in preventing pollution.

Although the August 1992 guidance on SRRP did not specifically state its measures of success, the guidance does state, "The emphases of the [SRRP] will be on rigorous technical analysis as the underpinning for incorporating source reduction into regulations, and on a coordinated, multi-media approach to rulemaking." In assessing the success of SRRP, it is helpful to recognize that SRRP *is the beginning of a transition for EPA*. Measuring current SRRP results from the perspective of how EPA has traditionally developed rules, it is clear that EPA programs are making significant strides toward incorporating a P2 ethic into their rulemakings. Generally, they have collected more P2 data, added technical and economic analyses of P2 options and technologies, and engaged in more cross-media analysis than in rulemakings prior to SRRP. Nonetheless, they have encountered significant obstacles that kept them from getting all the data they needed and addressing certain issues. (These obstacles will be discussed in section 3.2.) If these obstacles can be overcome, then future efforts to foster prevention through regulations should benefit substantially.

One major success in SRRP is the identification of these obstacles and the general agreement among participants that they must be addressed. An inherent challenge in fostering source reduction through national rules is that source reduction measures cannot always be applied broadly across an industry; these institutional obstacles facing participants greatly compounded this challenge. These obstacles contribute routinely to the inefficient use of Agency resources, and have placed serious constraints on the results attainable through SRRP. EPA should address these barriers in a systemic way. The importance of doing so lies in the direct relationship this bears on whether the Agency can successfully meet the Administrator's objective of making prevention the principle of first choice in all EPA mainstream operations, and to the resulting benefits anticipated for the environment and the economy.

SRRP Impact on Rulemaking Generally is Mixed; Lack of Consistent Multi-Media and P2 Perspective in Rulemaking. An EPA long-term goal, through SRRP and other efforts, is to develop a model for routinely building multi-media and prevention approaches into environmental regulations. SRRP has increased people's awareness of source reduction, and consequently some questions are asked that may not have been addressed before. SRRP was an important catalyst in launching efforts such as those made in developing the

ESD/OAQPS prevention training, the preamble language in the Magnetic Tape NESHAP addressing prevention, OAQPS' use of a broad source definition in CAA Sections 112(g) and 112(j), the prevention ideas incorporated in OST's non-service industry effluent guidelines, OST's initiation of a life-cycle analysis for a service industry effluent guideline, and OSW's investigation of source-reduction/recycling in the hazardous waste listings for dyes and petroleum.

In spite of these steps forward, cross-media and P2 approaches are still not used consistently in EPA rule development and implementation. The routine constraints and deadlines that interfere with effective planning generally act as substantial obstacles to taking a cross-media perspective and integrating P2 into regulations. When these obstacles are perceived as jeopardizing a timely output, the organization generally feels compelled to proceed with or without careful attention to opportunities for pollution prevention. For the integration of prevention to be seen as more central to the core rulemaking, the Agency must be willing to address some combination of the obstacles to allow for better timing, better use of resources, meaningful coordination, creativity, and clarity of roles.

4.1 Positive Lessons of SRRP for Rule Development

The SRRP project shows that certain activities contribute positively to EPA's P2 ethic in rulemaking. These steps are proving effective or bear substantial promise for further development and refinement. These steps are widely applicable in rulemaking. They are:

(a) ***Focus on Cross-Media Data Collection and Cross-Media Analysis of Regulatory Options.*** These are key points for taking action. Collecting release and source reduction data across all media and conducting thorough cross-media analysis, for all releases to all media, lays the foundation for assessing cross-media transfers associated with various options. A good example of thorough cross-media analysis is the risk characterization that OSW did in the *Carbamates Hazardous Waste Listing* (see Appendix B, page 4). Sharing insights on effective approaches is also useful; good examples are a May 1994 discussion between OW and OSW economists on using full cost accounting in evaluating regulatory options, and OSW's use of source reduction language from OST's preamble for the *Pesticides Formulating Effluent Guideline* in its *Carbamates Hazardous Waste Listing*.

(b) ***Write Standard to be Flexible.*** Writing the standard so it allows industry flexibility is key because P2 approaches are generally not "one size fits all" (for industrial process and economic reasons) and new P2 technologies can emerge after a rule is issued. As noted in (c), consulting with stakeholders helps achieve a balance between flexibility and conformity.

An excellent example of flexibility can be found in the proposed *Pesticide Formulating Effluent Guideline* (the 6/95 Federal Register Supplemental Notice version). This proposed approach gives industry flexibility in several key areas: (1) it allows facilities to choose between meeting zero-discharge requirements or using P2 practices (this latter

option allows them to discharge remaining pollutants to water, based on multi-media benefits associated with P2 practices); (2) it allows facilities room for technological innovation because permit-writers are being given explicit authority to approve P2 practices not listed in the rule; and (3) it allows facilities the potential to avoid in-plant treatment altogether, as permit writers will have the authority to determine if in-plant treatment is unnecessary based on how clean the discharge has become as a result of P2 practices. (See Appendix B, p. 6).

(c) *Test New Territory with Stakeholders.* Consulting with stakeholders in advance of and in addition to the normal comment process -- useful in any rulemaking-- also helps foster prevention. Offices are finding it helpful to test new territory with stakeholders -- industry, environmentalists, and States -- to see what can work for everyone. In performance standards, for example, EPA must strike a balance between the flexibility industry wants (to experiment, meet diverse needs, etc.), and the conformity inspectors need to measure performance. For this reason alone, OAQPS found consultation useful in developing the *Aerospace* and *Wood Furniture NESHAPs*, among other rules (in the *Wood Furniture NESHAP*, industry might also help collect needed data after the rule is final). In the *Pesticide Formulating Effluent Guideline*, mutual interest between OST and the stakeholders led to a Supplemental Notice adding a P2 alternative under the Guideline.

(d) *Coordinate Agenda-Setting.* Setting compatible dates for rules affecting the same industry is key to cross-media coordination. In the *Pulp and Paper rules*, the Administrator and Assistant Administrators made a historic decision to integrate rule development. Deadlines were synchronized, and EPA made its first attempt at writing a combined air and water rule for an industry. While there are numerous issues associated with this effort, the resulting proposal contains elements that are among the strongest for fostering prevention. The experience of Pulp and Paper can offer lessons for the next integration effort.

(e) *Use Preamble and Development Document.* Industry and permit-writers need to have the rule preamble and development document (1) discuss findings regarding the applicability of P2 measures for the source category and cross-media implications of various compliance approaches, and (2) encourage source reduction as a compliance strategy, even if not required. (Good examples can be found in the *Pesticide Formulating* and *Metal Products Effluent Guidelines*.)

(f) *Use Program-Tailored Training.* Staff training could be used widely to integrate prevention thinking into offices' rulemaking cultures. In one approach, an OAQPS division first surveyed staff on P2 efforts, and then conducted State-led training that took cases from the survey. Training should cover rulemaking case studies whenever possible.

(g) *Use Statute-Specific Approaches.* Background information is included in Appendix B and is further available from the Pollution Prevention Division in OPPTS.

Clean Air Act -- In setting NESHAP emission limits, it is useful to: (1) define "source" broadly, when an entire facility is the regulated source, to include facilities having

low-to-zero releases of hazardous air pollutants (this not only helps data collection, but also helps determine the MACT (Maximum Achievable Control Technology) floor -- performance of top 12% of industry -- and thus the standard itself); (2) consider whether a subcategory of an industry could have its own source reduction-based standard, if such an approach would not work for the industry as a whole; and (3) consider factors listed in Title III such as non-air media impacts and costs (energy costs, materials savings, treatment costs/savings.)

Clean Water Act -- In setting effluent guideline limits, it is useful to: (1) consider whether an industry subcategory could have its own source reduction-based standard, if such a standard wouldn't apply to the whole industry (these rules often cover more industry subcategories than NESHAPs); (2) use P2-based management practices to augment best available technologies, especially for small facilities; (3) include source reduction options in economic analyses; (4) consider non-water quality impacts, such as the pollutant loadings from hauling and incineration of wastes associated with zero discharge limits; and, (5) use mass-based effluent limits whenever practicable.

RCRA -- Useful approaches for determining a list of hazardous constituents and the Best Demonstrated Available Technology (BDAT) for recovering or treating those constituents include: (1) modeling all media pathways during risk characterizations to identify releases to all media and identify regulatory gaps (cross-media analysis enhances prevention options); (2) using concentration-based listings to provide an incentive for facilities to limit releases of hazardous wastes; and (3) investigating BDAT at the same time as the hazardous waste listing is being developed; this way, the criterion for selecting which chemicals go on a list can be whether they are all compatible with a particular recovery-based (as opposed to a treatment-based) technology.

(h) *Train Contractors.* Contractors often provide technical assistance to EPA in its development of rules. Requiring them to take prevention training (as being explored by OAQPS) would be quite useful.

4.2 Obstacles to Multi-Media and P2 Outcomes as Revealed in SRRP

Six Main Obstacles. This assessment identifies six obstacles that detract from a consistently strong multi-media and P2 perspective in rulemaking. SRRP participants found these obstacles were usually beyond their immediate control (but not necessarily beyond EPA's capacity to initiate or influence change), and they and SRRP observers generally conclude that these obstacles impede cross-media and P2 results in rulemakings across the Agency. They are:

- > The lack of incentives for multi-media coordination in planning and budgeting;
- > The piecemeal nature of the statutory framework;
- > Some challenges in promoting P2 process changes and innovative technologies;
- > The lack of understanding about cross-media impacts;

- > The lack of resolution about collecting source reduction data through industry surveys; and
- > Unclear roles -- how to share P2 leadership among all major EPA offices.

(a) *First Obstacle: The Lack of Incentives for Multi-Media Coordination in Planning and Budgeting.* Through SRRP, EPA created new incentives for inter-office coordination, but did not fundamentally alter⁷ offices' independent priority setting, resource planning, and budgeting on rules. To meet the goal of considering cross-media impacts in conjunction with source reduction, SRRP participants had to coordinate their work more than ever before across offices; yet *without more coordination of offices' priority setting, strategic and resource planning, and budgeting having taken place, they found opportunities for coordinating and integrating work were sometimes limited.* This diminished the effectiveness of their efforts to redefine what can be achieved under existing statutes.

Historically, almost no one has expected EPA offices to coordinate their planning and budgeting from a multi-media perspective. *The long-standing expectation has been that each program should focus on its own agenda priorities, operating plan, budget, and outputs.* EPA offices generally do not coordinate their regulatory agendas, budgets, or resource planning sufficiently to lay a meaningful foundation for cross-media and pollution prevention outputs. While EPA is now emphasizing cross-media and prevention approaches in rules, the Agency has been slower to change its budget and agenda-setting policies and processes to promote cross-media and prevention outcomes. Since budgets and deadlines decisively affect the outcome of work, independent decision-making in these key activities is now serving as a limitation on offices' abilities to foresee and respond to needs for mutual coordination in working across media.

EPA's principal statutes do not give EPA an incentive to coordinate planning and budgeting from a multi-media perspective, because these statutes focus more on controlling releases to individual media, than on minimizing cross-media transfers of waste or integrating rules. The Pollution Prevention Act of 1990 created a national policy favoring prevention, but didn't amend EPA's core statutes or create new remedies.⁸ So, as before, EPA still works with a framework in which statutes are largely not coordinated with one another. This statutory framework has led to *another long-standing expectation, which is that offices should*

⁷ EPA began SRRP before this Administrator's arrival. This Administration has been taking steps to add incentives for coordinating approaches to environmental protection. With the Pollution Prevention Policy Statement, the Administrator emphasized the need to minimize cross-media transfer of waste. She also put enforcement back together as a multi-media office, organized on an industrial sector basis. She then used this same industry-sector principle and created the Common Sense Initiative. She also invited States and Tribes to the 1993 budgeting meeting to hear directly about their needs and interests. This Administration has also set many other initiatives in motion, including the recent 25 high priority actions for reinventing environmental regulation (see footnote 6).

⁸ Rather, the Act (Section 6608) requests EPA feedback on regulatory and nonregulatory barriers to source reduction, opportunities for using existing regulatory programs, and incentives and disincentives for source reduction.

*independently apply their own regulatory tools, based on the goals of their own programs.*⁹ Virtually no one has expected EPA offices to plan how to bring together technology-based and risk-based tools from the entire regulatory framework and coordinate their use to address cross-media and prevention concerns.

(b) *2nd Obstacle: The Piecemeal Nature of the Statutory Framework.* If the statutory framework were better coordinated across media, one would expect multi-media and P2 outcomes to be enhanced considerably in EPA rulemaking. An expanding literature discusses the barriers presented by single-media statutes and their piecemeal agendas. The existing framework is one in which statutes are generally not coordinated with one another in term of specific deadlines, chemicals to be regulated, methodologies, or approaches to setting regulatory standards. This impedes EPA coordination and drains industry resources.

Do Specific Statutes Pose Barriers? To some extent the answer is yes. For example, although some language in the amended CAA clearly supports prevention approaches, its structure imposes some limitations on using P2 approaches as the bases for standards. The CAA requirement of setting standards at the average emission level of the best 12% of industry performers can limit the use of P2 approaches. If EPA lacks data to prove that P2 approaches can match the performance for air emissions achieved by the top 12% of industry, then EPA cannot designate these P2 approaches as ones that achieve the emission limits of the MACT standard.

Further, the CAA requires EPA to address 189 hazardous air pollutants (HAPs), and the inflexibility of this requirement can often mean requiring expensive control devices even when prevention options exist. This can happen because available P2 options might not reduce total HAP emissions to a level achievable through control devices, leaving EPA with little choice except to require control devices. This can have the affect of curtailing P2 investments, because of the competing expense of the required control devices.

The lack of explicit direction in RCRA and CWA statutory language on prevention fosters a perception that these statutes do not make prevention a priority, but it is not clear whether they pose actual barriers. Lastly, there is a tension between the authority under environmental statutes for collecting source reduction data from industry and the Paperwork Reduction Act (see discussion in (e) below).

(c) *3rd Obstacle: Challenges in Promoting P2 Process Changes and Innovative Technologies.* Many P2 opportunities are based on changes that can be made to industrial processes inside the plant. EPA's ability to use its knowledge of industrial processes to foster P2 depends on such factors as the breadth of the industrial category being regulated, the complexity of the industrial processes in question, and how quantifiable the P2 reductions and benefits are. Broadly-defined industrial categories make it hard for EPA to use the

⁹ "Regulatory tools" refers to the collective body of techniques and approaches used to execute regulatory statutes.

performance of P2-based processes changes as a basis for compliance, because these processes can vary tremendously from plant to plant. Similarly, when P2 approaches vary a lot from plant to plant, this makes it difficult to quantify P2 reductions and benefits.

Innovative technologies are often promising for P2. When investigating innovations during rule development, personnel sometimes face difficulties in finding a measurable track record for recent innovations to justify using them as a basis for a rule. When innovation occurs after a rule is final, it becomes a permitting decision whether the new technology will qualify as compliance. Technically, rules based on technology performance do not command the use of the referenced technology but, as a practical matter, permit writers often rely heavily on this technology because evaluating innovations burden their workload. This creates a challenge for encouraging innovative technologies.

(d) *4th Obstacle: Lack of Knowledge about Cross-Media Impacts.* The major shift toward P2 at the Agency leaves EPA with an expertise problem on cross-media impacts. EPA currently knows more about single-media analysis than either (1) cross-media analysis, or (2) comparative analysis of P2 approaches minimizing cross-media transfers versus control approaches maximizing reductions to a single media.

(e) *5th Obstacle: Lack of Resolution on Collecting Source Reduction Data Through Industry Surveys.* The main vehicle that some media offices use to obtain needed data on source reduction and recycling practices is the Information Collection Request (industry survey). Under the Paperwork Reduction Act, EPA must obtain approval from the Office of Management and Budget (OMB) for gathering data from more than nine independent sources. Although reference materials are generally available on P2 approaches, specific opportunities can often only be identified through learning about the industries to be regulated. OMB has repeatedly asked, in particular, whether OSW questions on source reduction -- relevant to it listing determinations -- were necessary. Due to consent decrees and related time constraints, OSW has chosen in all but one case¹⁰ to leave questions voluntary rather than entering into further negotiations with OMB, which might have significantly delayed its data collection efforts and listing progress. Information is necessary and empowering, and lack of source reduction data through surveys has served as a barrier to developing source reduction options.

(f) *6th Obstacle: Unclear Roles -- How to Share Leadership Among All Major EPA Offices on Various Aspects of Multi-Media and P2 Approaches.* Lack of clarity about how to share leadership on various aspects of multi-media and P2 approaches creates some confusion. For example, it is widely acknowledged that it is difficult to share data across offices, but it is not clear whose role it is to take the lead in resolving this issue. Also, within the traditional framework of working relationships, media offices respond to how the

¹⁰ OSW, with upper management support, got an agreement from OMB that its survey of the petroleum industry could contain mandatory source reduction questions.

other EPA offices conduct their business, and vice versa, so a status quo role by virtually any part of the organization tends to inhibit the overall evolution to more P2 and cross-media approaches. Lack of clarity about one's leadership role on prevention can result in little risk-taking and a reluctance to elevate P2 policy issues. This, in turn, can limit the Agency's creativity in finding ways to define the functional relationships among offices as a matrix that promotes cross-media and P2 outcomes.

5. Effects Resulting from Unaddressed Obstacles

5.1 Effects Resulting From the Lack of Incentives for Multi-Media Coordination in Planning and Budgeting.

(a) *Few Cross-Media Resource Allocations; Narrow Focus of Analysis.* Analyzing multiple media pathways enhances the quality of regulatory options for fostering prevention. Yet, programs often face resource allocations that are not conducive to the cross-media analysis that is beneficial to the development and evaluation of source reduction options. Few resource allocations are made according to cross-media needs, and once EPA has allocated resources according to single-media needs, there are seldom resources for needed cross-media work. When programs respond to these constraints by narrowing their focus to exclude some media pathways, this perpetuates the difficulty of bridging gaps between single-media perspectives on multi-media phenomena.¹¹

The tendency of offices to narrow their focus is common. Research suggests that rule writing workgroups give limited consideration to the issue of where residual releases might re-enter the environment after treatment.¹² EPA's recently initiated tiering of rules (for purposes of internal review) indicates offices place the vast majority of their rules in Tier 3, which presumes little involvement from other offices, streamlines review, and is designed for rules having minimal cross-media impacts. Offices choosing Tier 3 usually respond "no" on the tiering form to whether cross-media impacts are foreseen for the rule. Maintaining a

¹¹ SRRP provides several examples of the difficulty of bridging media gaps through single-media planning. First, a routine factor in developing effluent guidelines, including *Metal Products and Machinery*, is that industries pay to have their wastewaters hauled off-site for treatment. Agency analysis counts the cost of contract hauling, but counts the pollutant loadings from contract hauling as zero. While EPA deals with these pollutant loadings in central waste treater and incineration effluent guidelines and underground injection rules, it does not conduct an integrated assessment of how these wastes hauled off-site might be transferred across several media, and how to minimize this. Second, in the *Carbamates Hazardous Waste Listing*, OSW did cross-media modeling for characterizing risk and found unregulated carbamate air emissions that it felt RCRA could not address. Yet, opportunities for OSW and OAQPS to coordinate on other options for addressing these unregulated air emissions were limited, due to issues of timing, resource allocations, and communications associated with single-media planning. (It is quite resource-intensive as it is in the RCRA Subtitle C program to develop source reduction incentives through concentration-based listings; it would be beneficial if cross-media benefits could ensue from these efforts.)

¹² See "Potential Impact of Future EPA Regulations on Hazardous Waste Combustion," 10/94 Draft Report by Radian Corp. for OPPT.

single-media perspective avoids having a rule in Tier 2, which presumes more complete multi-office involvement.

Problems can worsen when budget trade-offs within a media office have a large impact on all inter-office coordination. The OAQPS budget for developing NESHAPs was cut substantially for FY 1994-95. This impedes the ability of OAQPS to sustain its prior level of cross-media and source reduction analysis for SRRP rules (much less expand to other rules), postpones numerous NESHAPs for one to four or more years, and gives OAQPS little or no flexibility to coordinate with OST or OSW in any rulemakings, with or without OPPT assistance. Since the regulatory agenda for NESHAPs now dwarfs those for effluent guidelines and hazardous waste listings (due to reauthorization of the CAA), this will have big repercussions on cross-media coordination, and the generation of source reduction options, across rulemaking generally.

(b) *Few Synchronized Deadlines; Timing Problems.* In many cases, two or three media offices have rules affecting the same industries. Since EPA does not have synchronized deadlines for such rules, this imposes limitations on the Agency's ability to address cross-media issues. Resolving cross-media issues during single-media rulemaking expands the workload, and EPA has been reluctant to jeopardize single-media deadlines.¹³ In rulemakings outside the SRRP framework, workgroup members often do not raise cross-media issues, as this could interfere with a timely output.

(c) *Missed Opportunities for Teamwork on Cross-Media Impacts.* Limited coordination at the planning level contributes to the difficulty of addressing the relative risks of chemical substitutes. To address substitutes typically involves analyzing the relative risks of volatile chemicals and/or aqueous chemicals. This is a task well-suited to risk analysts, who may not be found in the media office leading the development of a technology-based rule. This makes the case for selectively combining EPA's technology-based and risk-based tools to resolve questions of cross-media impacts that may arise as a result of a media rule.

¹³ For example, EPA tried to resolve cross-media issues common to the *Metal Products and Machinery Effluent Guideline* and *Degreasing NESHAP*, but single-media deadlines made this difficult. Although the rules were not synchronized at the outset, OAQPS, OST, and OPPT were working collaboratively to show the environmental impacts of substitution and other compliance approaches for these two rules and how the use of substitutes would affect the cost of complying with Metal Products. The timetables for the rules grew further apart, and this factor weighed against accomplishing the task (the end product was to be data for industry).

EPA also tried to resolve cross-media issues common to the *Pharmaceuticals air and water rules*. Given a commitment to meeting their own single-media schedules (proposed water rule 5/95, proposed air rule 7/96), the best OST and OAQPS could do was coordinate activities to mutually shape the water rule. But stakeholders are not satisfied with OST's basing the rule on the performance of a technology that addresses water and air concerns, and are now asking why these rules were not integrated, believing the "best" CWA option for addressing multi-media issues may not be as good as combined CWA/CAA regulatory options. (As of this writing, industry is concerned that their flexibility may be jeopardized if the final water rule is based on a technology that results in water benefits and significant air benefits and that costs more than the technology which is solely geared to water concerns.)

(This is not saying risk assessment should be routinely required in technology-based standards.) OAQPS and OST efforts¹⁴ to engage OPPT risk analysts, a very positive step, could have benefited from early, multi-office, synchronized planning.

(d) *Limited Information-Sharing Between Regulatory and Other Programs.* Several SRRP participants and observers have noted that better coordination between regulatory and non-regulatory efforts could improve results in fostering P2 through regulations.¹⁵ Voluntary, right-to-know, and technical assistance programs can be good sources of P2 data to inform rulemaking. Front-end coordination could also involve personnel who will be involved in permitting and compliance, since they are a key link between regulators and the regulated community, and could shed light on what approaches could fair well during implementation.

(e) *Difficulty in Sharing Data Across Media Offices.* Numerous SRRP participants have observed it is not easy to share data across offices, due to differences in data formats and data often being with different EPA contractors. This situation alone is a major impediment to cross-media analysis. It is a situation more easily addressed systemically than in individual rulemakings.

5.2 Effects Resulting From the Piecemeal Statutory Framework.

1) *Difficulty in Developing Integrated Cross-Media Strategies.* Statutory deadlines for single-media rules are not coordinated by industry sectors. This makes it very hard for EPA to develop cross-media strategies, because the Agency can rarely work on all media aspects of an industry at the same time; the timing is usually off by years. When the Agency is sued, consent decrees usually establish new independent deadlines, thus perpetuating and compounding the problem. This is a roadblock in virtually all rulemaking, including *all SRRP rules -- except the pulp and paper rules* which have integrated deadlines. (For example, the *Degreasing NESHAP* consent deadline precluded synchronizing its development with the *Metal Products Effluent Guideline*; *Degreasing* deadline precluded addressing the impacts of aqueous cleaners; OSW did not request OMB approval for mandatory source

¹⁴ As noted in footnote 13, the workgroups in the *Degreasing NESHAP* and *Metal Products and Machinery Effluent Guideline* did not pursue investigations of aqueous cleaners' impacts on their own, but turned to a collaborative effort among OAQPS, OST, and OPPT about the time *Degreasing* was proposed. This multi-office effort evolved because the workgroups for both rules did not find existing data easy to assimilate on the environmental and health effects of aqueous cleaners, potential substitutes for regulated cleaners in both rules. The offices assumed some facilities would respond to both rules by substituting unregulated aqueous cleaners for regulated ones, and OPPT agreed to try creating data on comparative hazards. The task was quite involved, given the myriad of cleaner formulations, and the need for more lead time was another factor that weighed against accomplishing the task.

¹⁵ One opportunity almost missed was in the *Drycleaning NESHAP* (a non-SRRP rule), where the focus was on controls rather than P2 alternatives. At the same time, a voluntary EPA Design for Environment initiative was investigating an improved drycleaning technology with fewer cross-media impacts. Fortunately, EPA used the new technology as a basis for the final rule.

reduction questions in its *Solvents Listing* industry survey due to probable delay in meeting consent decree.)

2) *Difficulty in Setting Priorities on an Industry-Sector Basis.* In the regulatory scheme, lack of synchronization among statutory approaches and chemical lists -- and the absence of administrative discretion to evaluate pollutant priorities on a sector basis -- leave little room for exercising common sense when trying to get the most environmental protection per dollar on a sector basis. For example, if cross-media analysis for an industry reveals that, in one industrial process, releases of greatest concern are primarily to air, but the CAA regulatory agenda does not focus on this industrial process, and/or only the CWA regulatory agenda focuses on this industrial process, this makes it hard for EPA to address this situation according to the priorities of multi-media risk.

5.3 *Effects Resulting From Some Difficulties in Promoting P2 Process Changes and Innovative Technologies.*

(a) *Process Changes Difficult to Use as Basis for Limits in Broad Industrial Categories.* EPA's preliminary success with writing a P2 alternative in a proposed rule, based on its knowledge of P2 process changes, confirms the value of investigating P2 process changes. Yet, factors contributing to this positive outcome in the proposed *Pesticides Formulating Effluent Guideline*-- the narrowly-defined industrial category and the lack of complexity in the industry's processes and wastestreams -- are not present in every case. The *Metal Products and Machinery Effluent Guideline* presents a different scenario, with a broadly-defined industrial category and more diverse, complex processes. The opportunity for re-creating the use of a P2 alternative in the proposed Metal Products rule does not appear viable, based on the great diversity of facilities affected by the rule.

(b) *Difficult to Quantify Some P2 Benefits.* Personnel are used to quantifying the actual reductions and health benefits associated with add-on controls, and at least some are finding it difficult to quantify the reductions and benefits for P2 approaches, either because they are not one-size-fits-all for an industry sector, or because they are having some difficulty in getting measurable track records for some P2 innovations, and this has sometimes led them to choose control options.

(c) *Permitting Can Stymie Use of Innovative Technologies.* Some facilities reportedly experience difficulty in getting approval for innovative technologies as a basis for their operating permits, when innovation has occurred after a final rule.

5.4 *Effects Resulting From the Lack of Cross-Media Understanding.*

Potential Cross-Media Impacts Unknown. Cross-media impacts may be associated with the *Wood Furniture NESHAP*, the *Degreasing NESHAP*, and the *Metal Products and Machinery Effluent Guideline*, yet the relative risks of these impacts are unknown. In the case of the wood furniture rule, industry might help collect data after the final rule is issued.

5.5 *Effects Resulting From Lack of Resolution on Collecting Source Reduction Data through Industry Surveys.*

Difficulty in Gathering Needed Data. As a result of OMB discouraging some offices from using mandatory source reduction questions in industrial surveys, these offices have had difficulty in gathering data needed for developing options. For example, in the SRRP *Solvents Listing*, OMB discouraged OSW from using mandatory source reduction questions in their survey because it felt that if source reduction was good for industry, facilities would already be doing it on their own. (Experience suggests, however, that companies are often unfamiliar with the analytic tools that would reveal the savings achievable through P2.) OSW decided to use voluntary source reduction questions to avoid further negotiations in the face of a consent decree deadline.¹⁶ OSW received virtually no data on waste minimization in the survey responses, which impeded development of waste minimization options for this listing. OSW could not fill in the data gaps through site visits, because solvent use is too diverse to capture in a few visits.

5.6 *Effects Resulting From Unclear Roles on P2 Leadership Among Offices.*

Business as Usual. Media offices work in connection with all other EPA offices, and all affect each other's ability to reinvent Agency business to enhance P2 outcomes. For example, in the context of mainstream rulemaking, OGC traditionally defers from raising P2 policy questions, yet media offices tend to avoid potential risks identified by OGC. Generally, media offices are kept busy with regulatory action, and other offices have key roles to play in designing the planning and other systems that structure EPA decision-making on regulatory action and other matters. Offices such as OARM, OPPE, OGC, and OECA are involved in budgeting, planning, legal, and enforcement issues, and their involvement is key for reinventing approaches that affect decision-making on regulatory action. In the context of SRRP, it has sometimes appeared difficult for the separate offices of EPA to use their interconnectedness in a focused way to enhance the success of P2 outcomes.

Reinforcing messages may be needed to clarify expectations. SRRP participants were sometimes unaware of the importance of coordinating with other media offices to gather cross-media data relevant to their rulemaking. This happened only in instances where one media rule was under development for an industry. Nonetheless, emphasizing source reduction by itself has not necessarily meant to people that they should coordinate with other offices to examine cross-media impacts.

¹⁶ As stated in footnote 10, OSW, with upper management support, got OMB's okay for using mandatory source reduction questions in its petroleum industry survey.

6. Anticipated Issues for Permitting, Compliance, and Enforcement

The implementation of new and existing regulatory standards is a key phase of activity for fostering source reduction, a phase of activity that warrants attention if EPA rules are to result in actual use of P2 approaches. Implementation is key because: 1) there is a great deal more flexibility to foster P2 approaches through specific facility permitting than through nationwide rules; 2) EPA rules cannot always capture the state of technological innovation during rule development; and 3) the market place also has non-source reduction technologies that facilities could choose to meet EPA limits. Based on SRRP rulemaking experience, the following are some issues that EPA will need to address to foster source reduction through permitting, compliance, and enforcement activities.

Flexible Permitting Timetables. EPA and States often lack flexibility in permitting timetables to accommodate the longer time it may take to implement P2 technologies, and the possibility that new P2 approaches may not work. Facing relatively short time constraints, facilities with a choice between P2 and controls will tend to install controls. Facilities with little choice besides prevention may need to begin before a rule is final, which is a bit risky. This is the case for a few mills affected by the proposed *Pulp and Paper rules*, who would have to retrofit to meet a chlorine-free performance standard.

Permit Writers Will Need Help. Without more flexibility in permitting timetables and adjustments to their own workloads¹⁷, permit writers will have difficulty *finding time* for the facility investigations that may be needed to justify writing source reduction into a specific permit. *Outreach* to permit writers (mostly in state programs) and industry will be key. Permit writers may need to work with a range of P2 options so they can demonstrate flexibility in approving facility permits, and industry will need compliance assistance. Development documents, routinely produced as background on the rule, could be used as a source of guidance on applicable source reduction measures, and more user-friendly guidance manuals may also be needed. Regional/State non-regulatory P2 staff could also help permit writers by assisting with targeted, compliance outreach to industry.

Support of Local Authorities Needed for Mass-Based Effluent Limits. A major issue for prevention in the water program is finding a way to make more effective use of mass-based effluent limits for indirect dischargers. Unlike the traditional concentration-based limits, mass-based limits minimize the possibility of diluting a wastestream with water as a way of meeting an effluent limit, and thus promote source reduction in very concrete terms. Generally, local control authorities (POTWs) write the NPDES permits for industrial indirect dischargers. With mass-based limits, POTWs would have to convert concentration-based limits to mass-based limits, on the basis of historical water flow. They would also have to change their inspection practices from end-of-pipe grab samples to in-plant inspections of

¹⁷ The Permits Improvement Team is working on administrative streamlining and alternatives to individual permits as ways to ease the workloads of permit writers so they can devote more time to complex and pollution prevention-based permits.

flow meters. The *Metal Products and Machinery Effluent Guideline* is a testing ground for this issue, and is the subject of discussion among stakeholders in the Metal Finishing CSI (Common Sense Initiative) Sector.

Cross-Media Permitting. States and EPA have often been unable to synchronize the implementation of rules across media, leading industry to respond with single media end-of-pipe controls rather than comprehensive prevention strategies.¹⁸ EPA and States need to move forward in coordinating permitting on a cross-media basis so industry can take comprehensive, P2-based approaches instead of single-pipe approaches.

Accommodation Needed in Enforcement Policy. A company has little incentive to risk trying a P2 approach, if it must face substantial enforcement penalties for noncompliance in the event the P2 technology fails. Source reduction often involves more experimentation than pollution control, and concern about the enforcement risks of trying P2 is being raised as an issue in EPA's Permits Improvement Team and the Common Sense Initiative. EPA's Project XL does not address this particular concern, because qualifying applicants must already be in compliance. The EPA enforcement culture needs to evolve to accommodate facilities that will be taking a compliance risk in trying P2 approaches.

Need for Better Coordination Between Rule Development, Implementation, and Non-Regulatory Efforts. As noted above, some observers believe there is a need for better coordination among rule development, implementation, and non-regulatory efforts. In particular, coordination with voluntary, right-to-know, and technical assistance programs could enhance the use of prevention as a means of compliance.

7. Recommendations

People need to come together more effectively, within EPA and across government-stakeholders lines, to develop a thoroughly cross-media perspective to source reduction, and to use their resources more effectively. This assessment, conducted with the active participation of media program managers, recommends action in several key areas. Many recommendations are directed to EPA leadership for consideration. These recommendations may or may not be ripe to address, and a further assessment of some recommendations may be warranted before major steps are taken.

¹⁸ The creation of the Administrator's Permits Improvement Team and the cross-media permitting pilot under the President's 25 initiatives for reinventing environmental regulation offer opportunities for examining cross-media permitting.

7.1 Broad-Based Recommendations

The broad-based recommendations of this assessment are:

- (1) *Emphasize the fundamental link between cross-media solutions and source reduction;*
- (2) *Continue to place special attention on targeted rules, especially during their implementation through the permitting, compliance, and enforcement phases, as a way of piloting approaches for broader use;*
- (3) *Apply some of the already developed SRRP approaches to other rulemakings;*
- (4) *Take steps to start systematically addressing the obstacles to fostering prevention; and*
- (5) *Link efforts to address these obstacles to full implementation of the common sense approach and reinvention of EPA.*

It is especially key for the Agency to examine the incentives and disincentives for P2 during the permitting and enforcement phases of regulatory action. This should include examining the steps identified in section 6 above.

7.2 Steps for Implementing Recommendation #4

To expand on Recommendation #4, the following steps are recommended for addressing the obstacles to fostering P2 experienced first-hand in SRRP. As stated above, the assessment endorses linking these steps to full implementation of the common sense approach and regulatory reinvention.

First Step: Reinvent the Planning and Budgeting Processes to Enhance Cross-Media and P2 Outcomes.

While Administrator Carol Browner has established strong incentives for inter-office coordination, more can be done to integrate the Agency's separate media cultures and change the way it does business. It is important for sustained pressure to come from the Administrator's level to reshape basic EPA processes and ways of doing business.¹⁹ Internal coordination is vital to using EPA resources more effectively, helping the environment, and fostering sound investments for industry.

EPA needs to increase the frequency and visibility of coordinated action. When source reduction is highly visible, as in the early stages of the SRRP pilot, people's awareness broadly increases across the organization. Having senior management tirelessly promote coordination, P2, and the importance of cross-media solutions among concurrent and

¹⁹ The Administrator has already set the stage by taking unprecedented steps in this area. See footnote 7.

related rulemakings and major initiatives would help keep needed visibility on P2 and maintain expectations, accountability, and recognition of continuous improvement.

(a) *Reinvent Agenda-Setting to Extent Possible.* Achieving more compatible deadlines that allow for meaningful cross-media analysis is essential for personnel to integrate P2 into regulations.

Work Toward Fully Coordinated Regulatory Agenda. When conducting rulemaking, EPA should take steps to devise and negotiate compatible regulatory deadlines across media for regulations affecting the same industries, and lay groundwork for working toward a fully coordinated regulatory agenda. (Presumably cross-media planning would retain the one benefit of single-media planning, which is to address the priorities of each media office.) Due to the barriers presented by statutory deadlines and related consent decree deadlines, this effort would need to involve *discussions with Congress and key stakeholders*. EPA should explore with stakeholders whether a cross-media proposal for addressing some of these deadlines collectively would be effective.

Use Flexibility in Agenda for Effluent Guidelines. EPA could start by using the existing flexibility in the agenda for effluent guidelines under the Clean Water Act. Under a 1991 consent decree with the Natural Resources Defense Council, the water office must select eight, as-yet unidentified industries to set CWA effluent guidelines for. Consultation with other offices about multi-media opportunities would be useful. The water office may be selecting the first two of the eight industry sectors in 1995.

(b) *Reinvent Budgeting Processes.* It would be valuable for EPA to consider using its budgeting policies and processes more explicitly to promote cross-media, prevention-based outcomes. Agency analysis would more easily result in cross-media solutions if resource planning was done on a cross-media basis to begin with.

Work Towards Allocating Regulatory Budget by Industry. A key step that EPA has taken in this direction is working on an industry-sector basis in the Common Sense Initiative. EPA should take additional steps toward allocating its regulatory budget by industry. Personnel often find they are now hemmed in by the cross-media inefficiencies that result from media-by-media allocations. A primary goal of developing cross-media regulations is to use an integrated approach for a given industry. EPA could demonstrate a strong preference for source reduction, including *resource shifts* from end-of-pipe activities to prevention initiatives.

Use Interim Measures as Needed. As interim measures, EPA could build on the Administrator's efforts to make budgeting more collaborative by considering some of the following actions: (a) *Collaborative Budget Proposals* -- the Agency could ask for *jointly developed* collaborative budget proposals from its media offices; (b) *More Stakeholders* -- more stakeholders could be invited early in the budget process to give EPA input on opportunities for coordinating efforts; (c) *Budget Flexibility* -- EPA could create budget

flexibility for offices so they can respond to each other's cross-media requests; (d) *Inter-Office Reserve Fund* -- EPA could create an inter-office reserve fund that could be used to support cross-media work identified after agenda-setting; and (e) *Budget Set-Aside* -- EPA could use introductory incentives to promote cross-media budgeting, such as a budget set-aside²⁰ for addressing cross-media regulatory issues.

(c) *Use Multiple-Statute Training and New Teams to Create Multi-Media Culture.* To enhance its understanding of cross-media issues and to promote collaboration in a very complex regulatory environment, EPA needs to integrate its separate media cultures within the Agency. (For the discussion of new teams, see Fourth Step below.)

Integrate Media Cultures Through Training. EPA should develop training on the basics of multiple statutes -- CWA, CAA, RCRA, TSCA, PPA, and SARA Title III (TRI) -- to integrate the separate media cultures in the Agency. Personnel need a baseline of multi-program knowledge to think creatively about combining regulatory tools and using them as a range of alternatives for addressing issues. This baseline of multi-program knowledge could also help personnel bridge the cultural gaps that exist among the sub-parts of the organization, based on their different orientations. EPA could designate a cross-program team to identify what to emphasize in training.

(d) *Invent New Data Strategies.* New data strategies could help offices share data more easily.

Unified Reporting System Endorsed. The recent announcement of a major new Agency initiative to create a single, unified reporting system²¹ for industrial facilities will set EPA on the right path toward sharing data easily and efficiently. This is increasingly important for cross-media outcomes. Through a unified reporting system, EPA would gain an ability to cross-check a facility under multiple statutes, the public would get more facility information, and industry would be able to meet reporting requirements more easily. The first step toward one-stop reporting will be create a database in which each facility has a single identification number; OPPT is now developing the common identifiers.

Consider Post-Rule Public Reporting. In addition to this new initiative, EPA should also consider the use of post-rule public reporting. EPA needs better databases on industry practices, including facility shifts away from targeted pollutants, as the basis for its rules. Based on the tremendous power of public information in TRI, this could have a significant

²⁰ In prior Agency use of budget set-aside, a portion of operating funds was "set-aside" so each office could submit proposals for prevention projects that, if chosen, would be funded from this pool. By contrast, an inter-office reserve fund would be available on a first-come, first-served basis for cross-media needs arising during a fiscal year.

²¹ This is one of the administration's 25 priorities for reinventing environmental regulation, described in the 3/16/95 report from the President and Vice President as one-stop emission reports.

impact on changing behavior toward implementing prevention on the part of the regulated community.

Second Step: Develop a Cross-Media Legislative Strategy.

(a) ***Take a Multi-Media, Integrative Approach to Legislative Priorities.*** To promote multi-media and P2-based outcomes, EPA should whenever possible take a multi-media, integrative approach to legislative priorities. If a single-media statute is being reauthorized, it is key to seek enough *flexibility in its agenda and provisions* to allow an office to coordinate with other media programs on cross-media regulatory issues and to set integrated cross-media standards when appropriate. The crowded agenda of the air program, brought on by CAA reauthorization, has left the program limited flexibility. EPA should take a multi-office view on whether the terminology, approaches, and chemical lists of media statutes can be made more mutually compatible. Given the opportunity, EPA should also explore ways to integrate the provisions of the Pollution Prevention Act with other environmental statutes.

(b) ***Discuss Statutory Multi-Media Issues with Stakeholders.*** In concert with the earlier recommendation to discuss agenda-setting with stakeholders and Congress, EPA should raise in these discussions any related multi-media concerns about the statutory framework not previously explored with these parties. The Common Sense Initiative offers one opportunity for exploring some of these issues with stakeholders.

Third Step: Broaden Flexibility of Regulations.

(a) ***Continue Expanding Emphasis on Flexibility.*** To promote technological innovation and encourage P2-based process changes, EPA should explore a variety of ways to create more flexibility in regulatory actions. Flexibility can be a powerful incentive for industry, and flexibility can be tailored to promote various goals, as appropriate to the nature and scope of a particular regulatory action and affected regulated community. In new initiatives like Project XL, EPA will be piloting ways to grant regulatory flexibility in exchange for an enforceable commitment to achieve better environmental results (preferably through P2) than required by existing regulations.

(b) ***Use Flexibility in Rule Development.*** In rule development, EPA should seek to apply the *approaches proposed in the Pesticides Formulating Effluent Guideline* (creating a P2 alternative in the rule, creating economic incentives for using P2 alternative, giving explicit authority to permittees to approve innovative technology) to other regulatory actions as appropriate.

(c) ***Encourage Innovation Through Permitting.*** EPA should consider developing a strategy for broadly encouraging permittees to encourage technological innovation through the implementation of *existing* rules.

(d) *Use Flexibility in Enforcement.* Flexibility as an incentive for industry is also key for those facilities who will find it a risk to be trying P2 approaches. Concerned about enforcement penalties if their P2 approaches should fail, facilities are expressing interest in a "soft landing" policy that would allow them some alternatives for coming into compliance in the event of a failed P2 technology. EPA should take steps to address this commonly expressed concern.

Fourth Step: Address the Need for Track Records on Innovative Technologies.

Technology Verification Endorsed. Since lack of a measurable track record for innovative technologies can impede EPA's ability to base a standard on an innovative technology, it is important to gain credible performance data on innovative technologies. EPA has recently launched an effort to promote technology verification and to accelerate the entrance of new technologies into the market place by providing the purchaser and permitter with credible performance and cost data. This assessment strongly endorses these efforts.

EPA personnel should also continue developing their confidence in assessing the performance of P2 technologies.

Fifth Step: Deepen Understanding of Cross-Media Impacts; Guide on Quantifying P2 Benefits.

(a) *Increase Knowledge of Cross-Media Impacts.* To enhance decision-making by government, industry, and the public alike, EPA should take steps to increase the scientific knowledge and understanding of comparative risks across media. This should include increasing understanding of the comparative benefits of P2 approaches minimizing cross-media transfers and controls obtaining bigger reductions to a single media. This is the kind of job that EPA -- federal government -- is uniquely suited for. It should give industry and communities (and state and federal government) the kind of data needed to make better, more well-informed environmental decisions.

(b) *Guide on Quantifying P2 Benefits.* EPA should guide personnel on how to proceed when unable to quantify the reductions and health benefits associated with a P2 approach. At a minimum, rule writers should be encouraged to point out potential cross-media transfers associated with different compliance approaches to a rule.

(c) *Consider Building Teams that Combine Technology and Risk Skills.* To increase understanding of cross-media impacts, EPA should consider building new teams or creating other incentives for combining the use of technology-based and risk-based skills. For example, risk characterization of wastestreams could inform choices about chemical substitutes. TSCA chemical testing authority might be used to generate missing data on the health and environmental effects of aqueous cleaners. Risk-modeling and/or structured activity reports might be used to help guide decision-making when some data are missing.

Sixth Step: Address Paperwork Reduction Act Concerns vis-a-vis Collecting Source Reduction Data.

For media programs that need to collect source reduction data through industry surveys to develop relevant prevention-based regulatory options, EPA should make the case for collecting *mandatory* source reduction data. EPA should take this matter as high up the chain of command as is needed to resolve this issue.

Seventh Step: Clarify Prevention Roles.

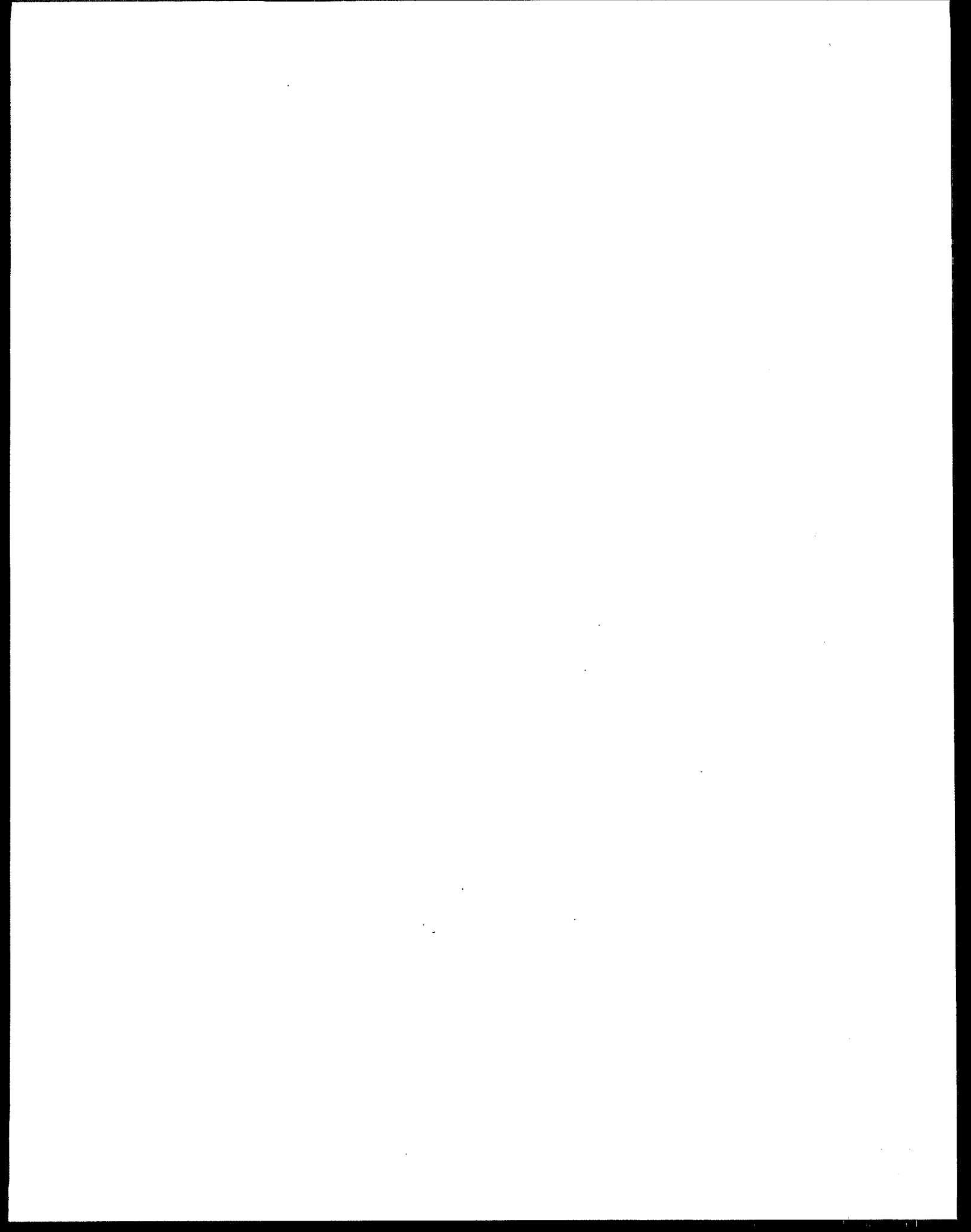
EPA should consider how its preference for P2 approaches in all its mainstream operations can translate into an empowering, leadership role for each major office in the Agency.

(a) ***Clarify Roles.*** EPA should translate the principle of P2 into better defined roles for not just media offices but all EPA offices. Each office has a distinct and principal role to play in reinventing the Agency to promote P2 and cross-media outcomes in the next generation of environmental approaches. Offices would benefit by understanding how all roles fit together for promoting P2 in mainstream operations. This would assist in redesigning planning and budgeting systems to support the success of P2 outcomes, and in promoting creativity for regulatory reinvention. For example, this should include clarifying what is expected in interactions between program offices and OGC on P2 issues that arise in rulemaking, and how policy questions can get raised in this context for upper level consideration.

(b) ***Clarify Messages.*** In tandem with clarifying and reinventing roles within the Agency, EPA should clarify aspects of the P2 message -- such as how a P2 policy preference is to be weighed against legal risk -- that pertain to each office. If personnel are being encouraged to adopt new norms, repeated and confirming messages help build confidence about what course of action is expected. Emphasizing coordination, source reduction, and cross-media approaches, not only among regulatory actions affecting the same sector but also across rule development, compliance, and voluntary efforts, would be very valuable.

8. Conclusion

It has been the goal of this assessment to assist principally in highlighting key issues for prevention during this time of regulatory reinvention. The lessons of SRRP can help to assure that pollution prevention will be an important part of the success of the next generation of environmental approaches. Regulatory action, and alternatives to regulatory action, will continue to be central to the core mission of the Agency. In this time of re-examining Agency programs, the possibilities for reinventing how the Agency does business are as good as they have ever been. The challenge now is to seek out the opportunities that change presents, and to act on these opportunities throughout the reinvention process.



Appendix A

Appendix A gives citations to pages -- in the text and Appendix B -- that discuss issues relevant to EPA's common sense approach and regulatory reinvention efforts.¹ Specifically, the issues discussed are relevant as: (1) positive SRRP examples of how regulatory actions can be compatible with Common Sense Initiative (CSI) principles; (2) ideas for making regulatory actions more compatible with CSI principles; and (3) ideas for reinventing EPA.

I. Positive SRRP Examples of How Regulatory Actions Can be Compatible with CSI Principles

a) Actions providing incentives for P2:

- A proposed P2 regulatory option would **excuse a facility from meeting zero-discharge obligations and could potentially excuse a facility from meeting in-plant treatment requirements** (Pesticide formulating, packaging, and repackaging effluent guideline "pesticide rule", pp. 5, B5);
- Making a hazardous waste **listing concentration-based** provides an incentive to reduce hazardous constituents in wastestreams (Carbamates hazardous waste listing, pp. 7, B3-B4);
- **Basing standards, at least in part, on the performance of P2 technologies** can increase confidence in the reliability of these P2 technologies (various SRRP rules discussed throughout the text and appendix).

b) Actions encouraging new technologies:

- Giving **local authorities explicit discretion to allow P2 technologies** other than those listed in the rule (proposed pesticide rule, pp. 5, B5).

c) Actions building partnerships with stakeholders:

- Developing the proposed wood furniture manufacturing NESHAP by stakeholder consensus is bringing industry into partnership with EPA in **collecting post-rule data** on the use of chemical substitutes (pp.5, 14);
- Staying attuned to industry interest in a P2 alternative led to revising proposed rule to include a P2 alternative (proposed pesticide rule, pp.5, B5).

¹ For a description of EPA's common sense approach and its regulatory reinvention efforts, see page 3 of the main text, footnotes 5 and 6.

d) Actions making economic sense:

- The proposed pesticide rule allows industry to use a P2 alternative (based on cross-media benefits) instead of meeting a zero-discharge requirement, thus **eliminating the cost of contract hauling of wastes**; also, rule allows local authorities discretion to define allowable P2 discharge so as to make in-plant treatment unnecessary, thus **potentially eliminating the cost of in-plant treatment** (pp. 5, B5).

e) Actions exploring multi-media approaches:

- A multi-media risk characterization **helped identify hazards** for a waste listing (Carbamates Hazardous Waste Listing, pp. 7, B3-B4);
- **Proposing a P2 alternative** prevents water pollution and **reduces the cross-media impacts** anticipated from the zero-discharge alternative of the rule (Pesticide rule, pp. B4-B5);
- Proposing source reduction measures reduces water pollution, minimizes pollutant transfers to air, reduces the metals in sludge, and reduces the amount of sludge (Metal Products and Machinery Effluent Guideline, pp. B6-B7).
- Proposing source reduction measures contributes to preventing air and water pollution (pulp and paper integrated rules, pp. 6, B1-B2).

II. Ideas for Making Regulatory Actions More Compatible with CSI Principles

a) Providing greater P2 incentives by:

- Using any of **various statute-specific approaches** for fostering multi-media P2 outcomes -- e.g., investigate BDAT at the same time as developing a hazardous waste listing, so that a criterion for deciding which chemicals go on a list can be whether all are compatible with a particular recovery-based -- as opposed to a treatment-based -- technology (pp. 6-7);
- Using **ideas listed in Section III below for creating a budgeting and planning framework that promotes P2 outcomes**;
- Developing an **integrative, multi-media legislative strategy** (p. 20).

b) Encourage new technologies by:

- Developing a strategy that encourages permit writers to **approve new technologies that meet standards of existing regulations** (p. 21);

- Making it **explicit in new rules** -- as done in the proposed pesticides formulating rule -- that **local authorities have the flexibility to approve new technologies** not foreseen by the rule (pp. 5, B5).
- c) Explore multi-media approaches by:
 - Using **flexibility in the effluent guideline agenda** to create an opportunity for integrating rules; a key factor in deciding which industries OW should regulate could be whether guideline development can be integrated with development of a NESHAP or hazardous waste listing for the same industry (p.18);
 - Creating **interdisciplinary teams** of personnel using technology-based tools and those using risk-based tools to address the cross-media impacts of chemical substitutes that industry might use in response to particular rules (pp. 8, 12, 19);
 - Using **ideas in Section III below for creating a budgeting and planning framework that promotes cross-media outcomes.**

III. Ideas for Reinventing EPA

- a) Making our organizational structures work for us:
 - **Budgeting:** Use the budgeting process to create more opportunities for multi-media pollution prevention (pp. 10-11 describe the significant impacts of the budgeting process on the development of multi-media P2 approaches; pp. 18-19 discuss recommendations).
- b) Redesigning the way we do our work:
 - **Agenda-setting:** **Coordinate** regulatory (and non-regulatory as possible) agenda-setting **across media** offices by industry to create more opportunities for integrated, multi-media P2 approaches (pp. 11-12 describe the significant impact of agenda-setting on the development of multi-media P2 approaches; pp. 18 and 20 discuss recommendations); also, **consult with stakeholders** in the development of the effluent guideline agenda;
 - Clarify roles for all offices -- not just media offices -- on **how to share leadership on various aspects of P2** (p. 21).
- c) Changing EPA's culture to facilitate reaching our objectives:
 - Give **multiple-statute training** to most EPA personnel to spur creative, multi-media thinking (p. 19).

Appendix B

This appendix describes seven SRRP rules -- and their source reduction outcomes. Each rule description assesses the net source reduction being fostered, as measured across all media, and states the impediments SRRP participants encountered in using cross-media analysis and selecting source reduction measures. Air regulations (National Emission Standards for Hazardous Air Pollutants) and water regulations (Effluent Guidelines) set emission limits that are based on the performance of designated technologies; to comply with these rules, facilities can use the designated technologies or any other legal technologies and approaches that can perform within the emission limits.

1. Pulp and Paper NESHAP (National Emission Standard for Hazardous Air Pollutants/CAA) and Effluent Guideline (CWA).

Proposed 12/93; final due Spring 1996. The proposed air and water rules for pulp and paper manufacturing mills are the first that EPA has integrated and set a benchmark for cross-media rulemaking.

(a) *Description of Net Source Reduction Across Media.* The integrated air and water rules set emission levels that are based on the performance of a combination of source reduction technologies and management practices, air pollution control devices, and upgrades on existing end-of-pipe wastewater treatment systems. The performance of source reduction technologies significantly reduces net water releases, but does not adequately control all hazardous air pollutant (HAP) releases. Air pollution control devices are needed to control HAP emission levels. In the pulping area, open sources would be hooded, and would vent gases through a duct to a boiler or incinerator; OAQPS is evaluating how to handle the sulphur dioxide that remains after burning vent gases containing total reduced sulphur. Process water from the pulping area will go to a steam-stripper; the methanol vented from the steam-stripper is sent to a boiler or an incinerator to recover heat value. In the bleaching area, vents are ducted to a scrubber which produces a fairly neutral waste stream that goes to a wastewater treatment facility.

The use of source reduction technologies improves the quality of sludge by reducing its dioxin concentration. After the rules are final, OSW has the option of addressing landfilling of sludge through a hazardous waste listing determination. Facilities can also incinerate and landfill sludge.

Source reduction measures that contribute to achieving the proposed water limits (in-process and end-of-pipe) are process changes in the pulping and bleaching areas of mills. Facilities can use any combination of technologies to meet the proposed effluent limits. Changes in the pulping area -- improved uniformity of wood chips, better washing of pulp prior to bleaching, and oxygen delignification -- reduce the amount of bleaching chemicals required. Changes in the bleaching area -- substituting chlorine dioxide for elemental chlorine to brighten pulp and eliminating hypochlorite -- reduce the discharges of dioxins;

furans, chlorinated phenolics, and other compounds in bleach plant streams and final effluent discharges. For one small subcategory of the industry, the proposal sets a totally chlorine-free (TCF) standard.

Source reduction measures that contribute to achieving the proposed air limits are using low-flow enclosed washers for washing pulp and substituting chlorine dioxide for hypochlorite (which specifically reduces air emissions of chloroform, chlorine, and hydrochloric acid).

Proposed prevention-based Best Management Practices (BMPs) require good housekeeping and control equipment to reduce pulping liquor leaks/spills discharged to wastewater treatment systems, and to reduce operating costs through more chemical recovery. BMPs would include mandatory practices such as developing and updating spill prevention plans, training, and related activities. BMPs would also require installation of equipment that can be chosen from a menu including secondary containment diking, covered storage tanks, and tank level alarms.

(b) *Impediments to cross-media analysis/source reduction.* There were two impediments to completely eliminating discharges of dioxins and related compounds in these rules. First, facilities do not think there is an adequate market for all the lower-brightness paper that would result from a major industry shift to TCF technology. While some U.S. mills are taking advantage of the European market for TCF products, U.S. mills have a weaker domestic market for TCF products. The President's Executive Order on recycling and procurement of environmentally friendly products and related initiatives may help to grow the TCF market at a modest pace. Moreover, other options being considered (e.g., chlorine dioxide substitution) will substantially reduce dioxin generation to levels that are at or below limits of detection.

Second, EPA did not have the administrative discretion to decide which pollutants were most important to address from a cross-media, as opposed to a single-media, perspective, and accordingly did not have the opportunity to evaluate which solutions represented the best investment from a cross-media perspective.

One additional factor was negative, although not an impediment, and that is EPA's current inability under the CWA to extend the time for facilities to come into compliance. An extension may be necessary for some mills to comply with the rules. To comply within the normal time frame, some facilities may not be able to wait until the rule is final to begin making changes. EPA cannot extend the time frame because EPA authority for an "innovation waiver" under the CWA has expired. EPA will continue to evaluate this concern and any appropriate options.

2. Halogenated Solvent Cleaners (Degreasing) NESHP

Proposed 11/93/ final 12/94. This rule affects halogenated solvent cleaning machines.

Industries affected include furniture and fixtures, fabricated metal products, electric and electronic equipment, transportation equipment, and other manufacturing.

(a) *Description of net source reduction across media.* The rule sets limits at the cleaning machines themselves, and this is designed to reduce the use of halogenated solvents, which is a source reduction approach to reducing volatile air emissions. The rule is not expected to reduce sludge (mostly grease being cleaned off product parts plus spent solvent) that forms at the bottom of machines. The use of carbon adsorbers (devices installed directly at the machine), allowed by the rule, would present cross-media impacts such as releases to water if not properly operated, sludge collected from carbon adsorbers, and spent carbon adsorbers that need to be disposed as hazardous waste. If facilities use aqueous cleaners to avoid halogenated solvents altogether, EPA does not know what impact this would have on water. If facilities use technology that eliminates the need to clean (using plastic molds to create product parts), this would reduce sludge significantly.

The preamble to the proposed rule discussed the benefits of eliminating the need to clean. The final rule lists three ways to achieve compliance when using cleaners; all are designed to reduce solvent use. The first method is equipment modification, and can be achieved from a menu of equipment modifications plus work practices, record-keeping, and monitoring. The second method is idling emission limit plus work practices, record-keeping, and monitoring. The third method is overall emission limit plus record-keeping. Emission limits are at a level that approximates what would be achieved through equipment modification.

(b) *Impediments to cross-media analysis/source reduction.* Addressing substitute issues would have been desirable for cross-media analysis. Impediments to addressing substitute issues were (1) the lack of existing data on the environmental and health impacts of aqueous cleaners, and (2) a consent-decree deadline that limited the time for exploring these issues.

3. Carbamates Hazardous Waste Listing (RCRA Subtitle C)

In February, 1995 EPA published a final rule listing six wastes from the production of carbamates as hazardous and thus subject to Subtitle C regulations under RCRA. This affects about 25 facilities making organic chemicals. EPA will subsequently be making a determination of Best Demonstrated Available Technology (BDAT) for treating these wastes.

(a) *Description of net source reduction across media.* The hazardous waste listing creates one incentive for source reduction which, if used, could reduce the volatilization of pollutants in waste water (including scrubber waters, condenser waters, wash water, separation waters, and waste waters derived from organic waste from the production of carbamates) going to waste water treatment tanks. For reasons discussed in (b) below, this incentive is somewhat undercut by other factors, and the upcoming opportunity to foster recovery of constituent chemicals through determining the BDAT may be rather limited.

OSW took a major stride in cross-media modeling by going beyond the traditional examination of groundwater to look at risk in all media pathways for all waste streams in this rule. Modelling for waste stream K157 (waste waters comprised of scrubber, condenser, wash, and separation waters) and the waste water derived from waste stream K156 (organic waste including heavy ends, still bottoms, light ends, spent solvents, filtrates, and decantates) showed that fugitive air emissions from waste-water treatment tanks were the main concern. Facilities could reduce volatilization by reducing the concentration of the carbamate contaminants in waters going to treatment tanks. Accordingly, OSW created exemptions for K157 and waste waters from treatment of K156, so that wastes measured at the point of generation with a concentration of less than 5 ppmwt for hazardous pollutants would not be considered hazardous. Known source reduction practices would result in the production of smaller volumes of more concentrated wastes (most likely K156 wastes). These exemptions are perceived as providing operational flexibility and an incentive for waste minimization.

When setting the BDAT as a follow-on activity to the listing, EPA would find it desirable to find a recovery technology that achieves acceptable performance levels, since this would be closer to source reduction than a treatment technology. Yet OSW's upcoming opportunity to foster recovery through setting the BDAT may be limited, as discussed below.

(b) *Impediments to cross-media analysis/source reduction.* First, under an "NPDES Wastewater Exemption," the Clean Water Act exempts wastewater going to treatment tanks from RCRA (the tanks receive NPDES permits to discharge to surface waters). Thus, listing K157 has no regulatory force beyond creating the stigma of a HAZWASTE listing. Second, the economic impact analysis indicated that recovery or recycling of K157 constituents costs several times more than status quo discharge via NPDES permits. These two factors undercut the incentive for reducing the concentration of carbamate contaminants in waters going to treatment tanks. Third, from a cross-office coordination perspective, OSW explored whether the CAA could be used to bolster the incentive for limiting the volatilization of carbamates, but the Hazardous Organic NESHA then under development in OAQPS did not materialize as a good opportunity for regulating carbamates. Fourth, OSW's opportunity to promote recovery when setting BDAT may be limited due to EPA's recent choice of a streamlined approach to land disposal restrictions (LDR). The limitation in the streamlined LDR approach is that universal treatment standards will now apply to many constituents of concern, with no flexibility for lowering threshold concentration values to a performance level that could be achieved through recovery-based technology.

4. Pesticide Formulating, Packaging, and Repackaging Effluent Guideline (CWA)

Proposed 3/94; supplemental notice to proposed rule published 6/8/95; final due 3/96. The rule will affect about 3,500 facilities discharging directly to surface waters and indirectly to publicly owned treatment works. Affected are formulators/packagers that mix pesticide active and inert ingredients, and repackagers of agricultural pesticides at bulk refilling establishments.

(a) *Description of net source reduction across media.* The rule as proposed in March 1994 sets a limit of zero discharge to water (only small producers of sanitizers are exempt). The Agency has identified approaches that most facilities could use to meet this limit that would minimize, but not eliminate, transfers of waste to air and land. If facilities do not use the recommended approaches, this could result in measurably more transfers of waste to air and land.

Following the proposal of the zero discharge regulation, EPA received comment on the possible increase of incineration of dilute pesticide-containing wastewaters that were not reusable. Comments requested that EPA consider allowing de minimis discharges of wastewater in exchange for facilities incorporating specific source reduction, recycling, and reuse practices. On June 8, 1995, EPA published a supplemental notice on an alternative pollution prevention option. Using the source reduction, recycling, and reuse practices discussed in the proposed rule, EPA has developed a set of specified practices. If a facility chooses to implement these practices they will be allowed a pollution prevention allowable discharge. If a facility cannot fully demonstrate that they can meet this alternative, it will have to comply with zero discharge.

This pollution prevention option should reduce the concentration and volume of wastewater being indirectly discharge to POTWs, and reduce the cross-media impacts associated with contract hauling for off-site incineration. This option will also help spread the use of source reduction/recycle/reuse practices throughout the industry and, possibly, to non-pesticide formulating operations when performed under the same roof as pesticides formulating. Moreover, this option would add flexibility for facilities by giving local authorities the discretion, based on their best professional judgment, to (1) allow alternative practices to meet the pollution prevention alternative, and (2) eliminate the need for in-plant treatment.

Formulators and packagers can meet the limit through in-process and out-of-process reuse of contaminated rinsewater, reduced water flow, and treatment of the remainder where necessary. Facilities choosing the zero discharge limit can reuse the water left over after treatment, while facilities choosing the pollution prevention alternative can discharge these wastewaters. Agricultural repackaging establishments can meet the limit through secondary containment, and use of loading pads and sumps to hold collected wastewater for reuse as product. Facilities not relying on source reduction or recycling will have off-site hauling of solids and/or wastewater to incinerators and deep wells to fall back on. Some facilities already achieve close to total recycling; this is because the industry has a relatively simple wastewater stream, consisting mostly of product-wash. Zero discharge and the pollution prevention alternative eliminate the need for analytical monitoring for compliance.

The preamble and development document discuss source reduction practices. The development document flags their cross-media implications so facilities can make informed choices. (For example, it describes how to reuse water in existing wet scrubbers; it also points out that disposable worker clothing avoids wastewater, but creates solid waste.) The

development document also refers to EPA's cost-effectiveness analysis. In its economic analysis, EPA did an expanded assessment of pollution control costs and identified the benefits of reusing contaminated water, reducing wastewater requiring treatment, and reusing the remaining treated water.

(b) *Impediments to cross-media analysis/source reduction.* No data on air pathways was collected or factored into cross-media analysis, due to cross-media resource constraints.

5. Metal Products and Machinery Effluent Guideline (Phase I) (CWA).

Proposal published 5/30/95; final due 9/96. This guideline will be the first of two phases of regulations covering facilities that manufacture, rebuild, or maintain finished metal parts, products, or machines and discharge directly to surface waters and indirectly to publicly owned treatment works (POTWs). The sectors covered under Phase I are aerospace, aircraft, electronics, hardware, ordnance, and mobile and stationary industrial equipment. Common across all these facilities is the metal content of their wastewaters and corresponding treatment systems.

(a) *Description of Net Source Reduction Across Media.* The proposed effluent guideline sets limits that are based on the performance of a combination of in-process source reduction technologies, recycling, and end-of-pipe wastewater treatment systems. (The proposal is soliciting comment on whether to include best management practices.) The proposed guideline covers more than 90% of industry flow, applying to all direct and indirect dischargers except existing indirects who discharge less than one million gallons annually. EPA projects that use of the combined technologies as proposed should eliminate almost a million pounds of toxic pollutants discharged to water, minimize pollutant transfers to air, reduce the metals content of municipal sludge, and reduce the amount of sludge. The reduced metals content of the sludge will allow 184 sewage treatment facilities to land-spread an additional 439,000 dry metric tons of sewage sludge rather than incinerating or landfilling the sludge.

Source reduction and recycling measures that contribute to achieving the proposed water limits include the use of flow restrictors, conductivity controllers or timed rinses, centrifugation and recycling of painting water curtains, centrifugation and pasteurization to extend the life of water-soluble machining coolants, and in-process metals separation and recovery. End-of-pipe treatment is chemical precipitation. Effluent limits are proposed as mass limits, obtained by multiplying the concentration limit by a reasonable process wastewater value (this promotes source reduction by preventing use of dilution water in lieu of treatment).

In-process metals recovery, bath maintenance practices, and water conservation technologies reduce the discharge of metals present in the wastewater, which in turn reduces the amount of sludge generated. Air transfers are minimized by recovering and recycling materials in-process (reduces volatilization off wastewater treatment areas) and from the

industry's awareness of problems with air-borne solvents (no shift to these solvents is expected).

EPA has developed a compendium of pollution prevention methods and literature sources that is found in the technical development document; many of these methods apply only to sites with certain characteristics and cannot be the basis for the nation-wide standard. This pollution prevention information is expected to be a valuable resource to site environmental managers. Benefits from source reduction, such as material recovery were incorporated into the costing of in-process technology options.

(b) *Impediments to cross-media analysis/source reduction.* First, it was a difficult task to identify all the aqueous cleaners used on metal parts. Instead of regulating individual organic compounds, EPA is proposing to use oil and grease as an indicator parameter for the control of organics. During sampling, it was found that the organic compounds tended to remain in the oil fraction; therefore, treating for oil and grease should result in the treatment of organics as well. The lack of data on aqueous cleaners also meant the relative cross-media risks of airborne solvents could not be compared with the risks of aqueous cleaners.

Second, regulatory analysis modeled releases from contract hauling of wastes as zero. Contract hauling of wastes is a viable option available to MP&M sites, yet there was no integrated assessment of how these wastes hauled off-site might be transferred across several media (through incineration, centralized wastewater treatment, and/or underground injection), and how to minimize this.

Another area not actually an impediment but more of a challenge is the use of mass-based limits to measure compliance in this and other effluent guidelines. Mass-based limits are obtained by multiplying the concentration limitation by a reasonable process wastewater flow value. While mass-based limits are required for direct dischargers, this is not typically the case with indirects. Facilities which in the past have not had to measure the flow of process wastewater must do so, and the control authority must determine an appropriate flow rate to use.

6. Pharmaceuticals Effluent Guideline (CWA)

Proposal signed 2/28/95; final due in 1996. This affects about 304 facilities making pharmaceuticals by fermentation, extraction, synthesis, and mixing. The industry already recycles about 2/3 of solvents used.

(a) *Description of Net Source Reduction Across Media.* In developing the proposal, source reduction was not the basis for the effluent guideline, largely because this industry is regulated by the Food and Drug Administration (FDA), and a facility must get FDA approval to use new processes or materials. The Office of Water explored with FDA the possibility of expediting FDA approval for certain process changes in the industry; FDA separately undertook an initiative to expedite reviews of revised processes for manufacturing existing

drugs. EPA shared with FDA information gathered from the pharmaceutical industry to facilitate these reviews. FDA also agreed to encourage manufacturers to consider developing and using processes for new drugs which do not use solvents (i.e., water-based processes).

Technologies used as the basis for the proposed effluent limits are steam stripping (post-manufacturing, pre-treatment) and biological wastewater treatment (end-of-pipe). Direct dischargers would use both technologies, and indirect dischargers would use only steam stripping, with POTWs providing the biological wastewater treatment. Releases from this industry are from air and water, and steam stripping is favored because it controls air releases as well as water releases. Steam stripping also would allow a facility to implement additional materials recovery or recycling. Biological wastewater treatment is the source of most air releases in the form of volatilizing solvents and other chemicals particularly from preliminary treatment areas. Condensable gases from steam-stripping may be used in a boiler or an incinerator, and sludge from biological treatment is land-filled.

OST has been coordinating with OAQPS, who is developing a NESHAP for the pharmaceuticals industry, in cross-media data analysis and modeling. For direct dischargers, the proposed effluent guideline includes end-of-pipe limits for volatile organic pollutants and defers to OAQPS standards being developed. For indirect dischargers, the proposed effluent guideline sets in-plant limits to remove the highly strippable, volatile organic pollutants. OST and OAQPS discussed integrating their rules but decided not to because the OAQPS rulemaking was on a schedule behinds OST's, and resource constraints would not permit them to be integrated. Nonetheless, the final air and water rules for this industry will, at a minimum, be closely coordinated and may yet be integrated.

(b) *Impediments to cross-media analysis/source reduction.* First, the inability to integrate the air and water rules has led to some uncertainty among stakeholders regarding details of how EPA will address multi-media concerns and achieve the best multi-media outcome. Second, the opportunities for expedited FDA review of process changes for existing drugs appear limited, given manufacturers' considerable investments already in the efficacy and availability of those drugs. (Greater opportunities are likely for developing organic solvent-free processes for new drugs.)

7. Wood Furniture Manufacturing NESHAP (CAA).

Proposed 11/94; final due between 11/96 and 11/98. This will affect wood furniture manufacturing sites; sources of emissions are coatings, glues, and clean-up. OAQPS is developing the rule through regulatory negotiation with State, industry, and public interest representatives.

(a) *Description of Net Source Reduction Across Media.* Most air emissions from wood furniture plants are fugitive, leaving the building through windows, doors, roof monitors, and oven stacks. The proposed rule would set a HAP-emission rate limit for coatings based on chemical substitution of non-HAP or low-content HAP coatings, such as

switching from methyl alcohol to ethyl alcohol. Ideally, however, some sites may opt for the more challenging approach of switching to low-solvent (low volatile organic compound (VOC)) coatings, thereby also helping to minimize depletion of the ozone layer. One low solvent option is the use of water-borne instead of organic solvent-borne coatings. It is also possible, in some production situations, to switch to radiation (i.e., ultraviolet and electron beam cured coatings which can be formulated to contain little or no solvent. It is somewhat difficult to predict the net effect of the rule across media because it is unclear how many sites will choose the more challenging water borne and/or low solvent route. The cross-media impact would not change for the simple alcohol substitution option. EPA has requested comment on whether use of water-borne coatings would result in increased effluent discharges.

The rule also sets out work practices aimed at boosting efficiency in coating and clean-up operations. The proposed rule would not limit the formaldehyde content of glues. Emissions from the cutting and storage of wood products was deferred to a future pressed wood manufacturing NESHAP.

Facilities relying on substitution to comply with the finishing operations emission rate limit (1.0 lb HAP/1 lb of solids for existing sources, and 0.8 lb HAP/1 lb of solids for new sources) can do so either on the basis of individual coatings or averaging across all coatings. Substitutes include higher-solids coatings, non-HAP or low-content HAP VOC coatings, and aqueous coatings. The limit for cleaning operations in both existing and new sources requires use of strippable spray booth coatings that contain no more than 0.8 lb/1 lb solids. There are separate emission limits for foam and non-foam gluing operations, the limits for new sources being more stringent. Proposed work practices include using more efficient spray guns, record-keeping on use of cleaning solvents, worker training, equipment maintenance plans, and other housekeeping options.

Facilities in non-attainment areas for ozone will likely be subject to state limits on VOC content (VOCs are precursors for ozone). To assist them, EPA made publicly available on July 15, 1994 a Preliminary Draft Model Rule for VOCs that reflects the views of the Wood Furniture Manufacturing Regulatory Negotiation Committee. EPA also plans to publish a Control Techniques Guideline (CTG) that will give information on low VOC solvent coatings, including water-borne topcoats, radiation cured topcoats, water-borne stains, and high-solids topcoats and sealers. The CTG work practice options are identical to those in the MACT standards.

(b) *Impediments to cross-media analysis/source reduction.* The lack of information and analysis on chemical substitutes and their health and environmental impacts was an impediment to cross-media analysis. Perceived time constraints operated against gathering this data and involving the water office.