



# **Federal Facility Pollution Prevention**

## **Tools for Compliance**





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# **FEDERAL FACILITY POLLUTION PREVENTION: TOOLS FOR COMPLIANCE**

by:

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## NOTICE

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## FOREWORD

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Today's rapidly changing technologies and industrial practices carry the risk of generating materials that, if improperly managed, can threaten public health and the environment. With the recent adoption of the Pollution Prevention Act of 1990, the Federal Facilities Compliance Act, and numerous Executive Orders, the U.S. Congress and the President have established pollution prevention as a "national objective" and the most important component of the environmental risk reduction hierarchy. Thus, national policy declares that the creation of potential pollutants should be prevented or reduced during the production cycle whenever feasible. Federal facilities must comply with the requirements laid out in these Acts and Orders and, in doing so, are setting an example for all other public and private entities in the U.S. and abroad to follow. A Federal facility that plans and implements an effective pollution prevention program can expect to realize many environmental and economic benefits while achieving compliance.

In carrying out its program to encourage the adoption of pollution prevention, the Office of Research and Development's Risk Reduction Engineering Laboratory offers this manual entitled, *Federal Facility Pollution Prevention: Tools for Compliance*. This guide is geared towards Federal facilities, as a companion manual to the *Facility Pollution Prevention Guide*, which details how to implement a pollution prevention program and how to conduct a pollution prevention opportunity assessment. This manual includes Federal facility case studies, policies, and programs and is written from an overall Federal facility perspective.

*Federal Facility Pollution Prevention: Tools for Compliance* is written for Federal facility environmental managers and is intended to help Federal facilities develop broad-based, multimedia pollution prevention programs. It describes how to identify and assess opportunities and implement alternatives and/or improvements for preventing pollution and how to stimulate the ongoing search for such opportunities. Facilities that adopt this approach typically find that they reduce both their operating costs and their potential liabilities, in addition to helping to preserve the environment.

This is not intended to be a prescriptive, comprehensive document. It is, however, intended to provide exposure to the tools and techniques necessary for the development of a successful pollution prevention program plan that is feasible to implement and able to meet facility-specific pollution prevention goals. This manual also provides references and information sources that will help facility environmental managers expand their efforts.

This document is a living document and is dynamic in its need to incorporate new tools, strategies, examples, policies, and regulations over time. Revisions will be provided on a regular basis; Appendix I provides a means for the readers of this manual to input case studies, lessons learned and to comment on this version. Every reader and user of this document is encouraged to do so.

## **ABSTRACT**

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This document is intended as a guide for Federal facility managers in the use of pollution prevention tools to reduce their waste generation and emission or release rates in order to meet compliance objectives. This project is the latest of a series of pollution prevention studies conducted under the Risk Reduction Engineering Laboratory's (RREL's) Waste Reduction Evaluations At Federal Sites (WREAFS) program. The WREAFS program is designed to provide technical assistance and support to Federal facilities in conducting pollution prevention opportunity assessments (PPOAs) and pollution prevention research.

This guide presents pollution prevention tools and provides a step-by-step approach to develop a pollution prevention program plan for Federal facilities. The tools needed to complete a successful pollution prevention program or project are not described in detail in this guide but it does include valuable information pertaining to pollution prevention opportunity assessments; training and outreach; energy conservation and efficiency; cost/benefit analysis, life-cycle costing, total cost assessment, and life-cycle analysis; and pollution prevention program planning. The guide incorporates characteristics and operating procedures distinct to Federal facilities, with emphasis on case histories for illustration of key points. The report includes several appendices that provide lists of pollution prevention contacts, outlines of State and Regional programs, Executive Orders on pollution prevention and Federal facility compliance, policy briefs by Federal departments, a technical resources directory, and pollution prevention publications lists.

The information used for this manual was compiled and prepared by Science Applications International Corporation, Falls Church, VA, under Contract No. 68-C2-0148 for the U.S. Environmental Protection Agency's (EPA's) Office of Research and Development (ORD).

# CONTENTS

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	<u>Page</u>
Notice .....	ii
Foreword.....	iii
Abstract .....	iv
Contents .....	v
Figures .....	vii
Tables .....	vii
Acknowledgments .....	viii
List of Acronyms .....	x
Tools for Pollution Prevention.....	xii
1.0 Overview .....	1
1.1 Definition of Pollution Prevention for Federal Facilities .....	2
1.2 Purpose and Scope .....	2
1.3 EPA's Objectives for this Guide .....	3
1.4 Organization.....	6
2.0 The Regulatory Basis for Pollution Prevention .....	7
2.1 Why Is Pollution Prevention Important? .....	8
2.2 Federal Environmental Requirements .....	9
2.3 Environmental Regulations and Pollution Prevention Techniques.....	19
2.4 Saving Money Through Pollution Prevention .....	31
2.5 Wrap-Up .....	37
3.0 Ensuring Organizational Support.....	37
3.1 Working Up and Down the Chain of Command .....	38
3.2 What You Need to Know .....	44
3.3 Building Teams .....	46
3.4 Training and Outreach .....	51
3.5 Understanding Incentives and Barriers to Pollution Prevention .....	54
4.0 Establishing Pollution Prevention Goals and Objectives.....	63
4.1 Introduction .....	64
4.2 Goals .....	67
5.0 Gathering Appropriate Data and Information .....	73
5.1 Introduction .....	74
5.2 Preparing the Baseline .....	75
5.3 Baseline Management Recommendations .....	77

## CONTENTS (continued)

---

	<u>Page</u>
6.0 Identifying and Screening Pollution Prevention Alternatives .....	83
6.1 Pareto Analysis .....	86
6.2 Economic Screening Methods .....	91
7.0 Implementing and Measuring the Success of Pollution Prevention .....	95
7.1 Implementing Pollution Prevention .....	96
7.2 Monitoring and Evaluation .....	101
Appendix A - Economic Analyses Methods .....	105
Appendix B - Case Studies .....	123
Appendix C - Federal Facilities Compliance Act .....	139
Appendix D - Presidential Executive Orders .....	155
Appendix E - State Pollution Prevention Programs .....	193
Appendix F - Facility Pollution Prevention Planning - Provisions of Twelve State Laws ....	203
Appendix G - Establishing a Recycling Program .....	219
Appendix H - Pollution Prevention Opportunity Assessment Worksheets .....	233
Appendix I - Ordering Pollution Prevention Publications .....	245
Appendix J - Federal Agency Pollution Prevention Programs .....	257
Appendix K - Pollution Prevention Information Clearinghouse .....	277
Appendix L - Pollution Prevention References .....	279

## FIGURES

---

	<u>Page</u>
1a State Landfill Bans .....	28
1b State Landfill Bans (continued).....	29
2 Sample Pollution Prevention Charter .....	43
3 Example of a Pollution Prevention Program Plan Summary for a Commissary .....	72
4 Example of Completed Worksheet 4 .....	80
5 Pareto Chart Example .....	87
6 Pareto Analysis .....	87

## TABLES

---

	<u>Page</u>
1 Hazardous Waste Generated at Federal Facilities .....	24
2 State Landfill Bans .....	30
3 Recyclable Items .....	32
4 Summary of Federal Agency Pollution Prevention Goals .....	69
5 Summary of Federal Agency Pollution Prevention Program Elements .....	70
6 Qualitative Assessment of Options for the Naval Supply Center, Norfolk Naval Base ..	71
7 Data Sources for Facility Information .....	76
8 PPOA Worksheet Titles .....	79
9 Example of General Pollution Prevention Options for a Federal Laboratory Site .....	85
10 Example of a Decision Matrix Used at a USPS Facility .....	89

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## LIST OF ACRONYMS

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AFIT	Air Force Institute of Technology
AEE	Agency Environmental Executive
AFB	Air Force Base
AFCEE	Air Force Center for Environmental Excellence
AMC	Army Material Command
BARC	Beltsville Agricultural Research Laboratory
CAA	Clean Air Act
CAREIRS	Conservation and Renewable Energy Inquiry and Referral Service
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFCs	chlorofluorocarbons
CWA	Clean Water Act
DLA	Defense Logistics Agency
DoD	Department of Defense
DOE	Department of Energy
DOI	Department of the Interior
ECAS	Environmental Compliance Assessment System
EM	Environmental Management
E.O.	Executive Order
EPA	Environmental Protection Agency
EPC	Environmental Protection Committee
EPCRA	Emergency Planning and Community Right-to-Know Act
FAME	Federal Agency Mini-Exchange
FAR	Federal Acquisition Regulations
FEE	Federal Environmental Executive
FEMP	Federal Energy Management Program
FFCA	Federal Facilities Compliance Act
FMECI	Federal Facilities Multimedia Enforcement/Compliance Initiative
FPPA	The Federal Procurement Policy Act
GNP	Gross National Product
GSA	General Services Administration
HDPE	high-density polyethylene
IAG	Inter-Agency Agreement
IRP	Installation Restoration Program
IRR	internal rate of return
JA	Legal Counsel



## LIST OF ACRONYMS (continued)

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LAN	local area network
LaRC	Langley Research Center
LCA	life cycle assessment
LCC	life cycle costing
LDPE	low density polyethylene
MSDS	Material Safety Data Sheets
NASA	National Aeronautics and Space Administration
NICE <sup>3</sup>	National Industrial Competitiveness Through Energy, Environment, Economics
NPDES	National Pollutant Discharge Elimination System
NPV	net present value
OCR	Office of Collateral Responsibility
ODC	ozone depleting chemicals
O&M	operations and maintenance
OMB	Office of Management and Budget
OPR	Office of Primary Responsibility
ORD	Office of Research and Development
PA	Public Affairs
PET	polyethylene terephthalate
PI	profitability index
PIES	Pollution Prevention Information Exchange System
POTWs	publicly-owned treatment works
PPA	Pollution Prevention Act
PPIC	Pollution Prevention Information Clearinghouse
PPRB	Pollution Prevention Research Branch
PPOA	pollution prevention opportunity assessment
PVC	polyvinyl chloride
RCRA	Resource Conservation and Recovery Act
RD&D	research, development and demonstration
RREL	Risk Reduction Engineering Laboratory
SARA	Superfund Amendments and Reauthorization Act
SG	Surgeon General's Office
SIMA	Shore Intermediate Maintenance Activity
SOHES	Safety, Occupational Health, and Environmental Section Office
SOP	standard operating procedure

## **LIST OF ACRONYMS (continued)**

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TCA	total cost assessment
TIPPP	Tidewater Interagency Pollution Prevention Program
TRADOC	Training and Doctrine Command
TRI	toxics release inventory
TSCA	Toxic Substances Control Act
USCG	U.S. Coast Guard
U.S. EPA	U.S. Environmental Protection Agency
USAF	United States Air Force
USDA	United States Department of Agriculture
USPS	United States Postal Service
VOCs	volatile organic compounds
WREAFS	Waste Reduction Evaluation At Federal Sites

## **TOOLS FOR POLLUTION PREVENTION**

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	Referenced <u>Page #</u>
1. Facility Pollution Prevention Guide .....	38, 42
2. Waste Reduction Evaluation At Federal Sites Assessments .....	3, 4, 71 ,85, 89
3. Pollution Prevention Information Clearinghouse, Pollution Prevention Information Exchange, International Cleaner Production Information Clearinghouse, Office of Air Quality Program and Standards – Bulletin Board Systems .....	53
4. Life Cycle Analysis, Total Cost Analysis, Cost/Benefit Analysis .....	91-93, Appendix A
5. Special Guide Series – Worksheets .....	79
6. Department of Energy, Department of Defense, and Department of Commerce Cooperatives with Environmental Protection Agency .....	60
7. Air Force Center for Environmental Excellence Training .....	52, 100
8. Pro-ACT .....	53
9. Pharmacy .....	Appendix B
10. Material Balance Experience .....	74-77
11. Programming and Funding Procedures .....	45, 53, 61
12. Agency-Specific Policy and Guidance .....	15, 48-50, 68, 69-70, Appendix J



# CHAPTER 1 OVERVIEW

## The Procedure for Conducting Pollution Prevention Opportunity Assessments

The recognized need to minimize waste



### PLANNING AND ORGANIZATION

- Get management commitment
- Set overall assessment program goals
- Organize assessment program task force

Assessment organization ↓ and commitment to proceed

### ASSESSMENT PHASE

- Collect process and facility data
- Prioritize and select assessment targets
- Select people for assessment teams
- Review data and inspect site
- Generate options
- Screen and select options for further study

Assessment report ↓ of selected options

### FEASIBILITY ANALYSIS PHASE

- Technical evaluation
- Economic evaluation
- Select options for implementation
- Review data and inspect site

Final report, including ↓ recommended options

### IMPLEMENTATION

- Justify projects and obtain funding
- Installation (equipment)
- Implementation (procedure)
- Evaluate performance



Successfully implemented pollution  
prevention projects

Select new  
assessment targets  
and reevaluate  
previous options

Repeat the process

# CHAPTER 1

## OVERVIEW

---

### 1.1 Definition of Pollution Prevention for Federal Facilities

*Pollution prevention means process or procedural change that addresses waste generation reductions for all environmental media.*

Pollution prevention has become nearly venacular in the last five years for environmental managers and regulators. Although some government agencies have coined their own versions and emphasis for what pollution prevention should mean, a common definition is fundamental for this guide. Pollution prevention is a paradigm for the ultimate environmental compliance strategy. Properly indoctrinated into an organization's culture and properly executed, it will mean wholesale new approaches to conducting business and meeting the requirements of the mission. It means a new kind of competitiveness and improved stewardship of the Nation's resources and tax dollars. Simply stated, pollution prevention is *Any practice which reduces the amount of any hazardous substance, pollutant, or contaminant entering the waste stream or otherwise released to the environment (including fugitive emission) prior to recycling, treatment, or disposal; and reduces the hazards to public health and the environment associated with the release of such substances, pollutants, or contaminants.* (Pollution Prevention Act of 1990). This definition applies equally to commerce and industry and government. The government infrastructure is, in fact, a commercial and industrial giant that has a great opportunity to excel by making pollution prevention part of its mission.

### 1.2 Purpose and Scope

The purpose of this document is to provide directed information to Federal agencies and facilities on the myriad tools and methods that have developed or been developed over the last five to eight years. It also serves

## Overview

to reinforce the concept that there is almost always a full gambit of levels of effort for performing each of the steps in pollution prevention program development for an entire facility or for conducting a specific pollution prevention project.

The case studies, resources identified for doing particular evaluations, and the methods presented are intended to eliminate the hesitations, fears, and the lack of momentum of the pollution prevention novice and to bolster the confidence of the more experienced manager. There is no reason to wait. Pollution prevention now has all the fundamental legitimacy that any Federal agency could want. It is predicated in regulation and executive orders. It has found enormous success with those who have adopted it into their mission; it simply makes good sense.

This guide cannot be comprehensive in presenting the successes and bases of pollution prevention for every Federal agency and department. Instead the guide presents random examples of the commitment, success stories, and lessons-learned from various agencies to make specific points. Further, it is extremely important that the concepts and methods in this guide be framed in the context of the agency implementing pollution prevention. The scope of this guide, however, does accommodate explanation of the current state-of-the-art for pollution prevention as it has evolved and progressed. Many positive changes have occurred over the last few years that make pollution prevention not only accessible and possible to develop, but essential.

*This guide presents the tools available to get pollution prevention actions started.*

*Each facility needs to understand the extent to which pollution prevention can become part of its culture.*

### 1.3 EPA's Objectives for this Guide

This guide is a joint initiative between the U.S. Environmental Protection Agency (EPA) Waste Reduction Evaluations At Federal Sites (WREAFS) program and the EPA's Federal Facilities Multi-Media Compliance/Enforcement Initiative (FMECI). By publishing this

## **Chapter 1**

guide, EPA intends to encourage pollution prevention techniques as a means to strengthen compliance. Each of these initiatives is described in the following subsections.

### **1.3.1 WREAFS**

*WREAFS has three goals:*

- 1) Conduct assessments*
- 2) Identify and conduct RD&D; and*
- 3) Transfer technology and information*

In keeping with the Agency's responsibility to advise and cooperate with other Federal departments on environmental risk reduction, the Office of Research and Development (ORD), – Risk Reduction Engineering Laboratory's (RREL), Pollution Prevention Research Branch (PPRB), has managed a technical research and development support effort known as the WREAFS program. WREAFS was established to conduct research and to develop and demonstrate opportunities to reduce the generation of waste from Federal activities. Since 1988, WREAFS has funded work on other Federal sites and has supported research, development, and demonstration (RD&D) activities with other Federal departments through Interagency Agreements (IAGs) sponsoring pollution prevention opportunity assessments (PPOAs), base-wide assessments, technology and product demonstrations, technology evaluations, technology and methodology development, technical assistance and technology transfer across the Federal community.

WREAFS has conducted cooperative RD&D activities with the following Federal departments and services:

- National Aeronautics and Space Administration
- Department of Defense
- Department of Treasury
- Department of Transportation
- Department of Energy
- Department of Interior
- Department of Agriculture
- Department of Veterans Affairs
- U.S. Postal Service



WREAFS continues to provide integrated environmental support for (1) primary research in pollution prevention technology; (2) expanding cooperative RD&D with other Federal departments; and (3) developing technology transfer opportunities for both public and private sector benefit.

It is anticipated that the continually increasing compliance responsibilities of Federal facility operators will result in cleaner operating practices. It is also becoming increasingly likely that the EPA will be required to include pollution prevention in this area, as in writing settlement decrees. In this framework, the PPRB will support development of cutting edge technologies within the Federal community that are driven by the compliance incentive.

### 1.3.2 FMECI

In 1993, EPA implemented the FMECI, which marks the first comprehensive, Agency-wide program to address multimedia enforcement and compliance issues at Federal facilities. The goal of this initiative is to improve Federal agency compliance and reduce environmental risks from Federal facilities through increased use of multimedia inspections, efficient use of all available enforcement authorities, and enhanced use of innovative pollution prevention approaches to achieve compliance.

The FMECI plans to assess the compliance of Federal facilities with environmental laws through EPA/State multimedia inspections. This initiative consists of at least 40 centrally coordinated multimedia team inspections conducted by all 10 EPA Regional offices at top-priority Federal facilities throughout the Nation. The facilities are selected based on the following criteria: compliance history, level of risk the facility poses to the environment, Nation, and regional program priorities (such as the Chesapeake Bay Initiative), and pollution prevention opportunities.

*The FMECI integrates pollution prevention into multimedia compliance inspections by encouraging source reduction of waste to avoid penalties.*

## Chapter 1

### 1.4 Organization

This guide has been organized to reflect the step-by-step process of conducting a PPOA. It is, by design, also organized to coincide with the processes necessary to establish a pollution prevention program plan for an entire facility or for a specific operation at a facility.

- A presentation of the current regulations and Executive Orders applicable to Federal facilities is included in Chapter 2.
- Chapter 3 shows how to foster organizational support for meeting the goals identified in Chapter 4.
- Chapter 4 describes how to set goals for a pollution prevention program (or assessment) that are most important to the agency, facility, and environmental manager.
- The important process of gathering accurate, appropriate data and information about an operation, facility, or process is presented in Chapter 5.
- Once the data are collected and evaluated, Chapter 6 shows how to identify and screen pollution prevention options and alternatives; and how to properly prioritize the options to best accomplish the specific goals.
- Chapter 7 provides insight on implementation of the options, and discusses how to measure the actual performance of the option versus that predicted.

*This guide is organized to duplicate the step-by-step process of conducting PPOAs. The steps presented also work for setting up a whole facility pollution prevention plan.*

Numerous appendices are provided at the back of this document. They are additional tools for compliance resources at the immediate disposal of the reader. These resources give order forms for published documents, access numbers and free assistance for databases, and valuable information on regulations and Executive Orders.

## **CHAPTER 2**

### **THE REGULATORY BASIS FOR POLLUTION PREVENTION**

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#### **Legislation and Executive Orders**

- The Federal Facilities Compliance Act strengthens EPA and State enforcement authority for pursuing Federal agencies who violate environmental laws.
- Under Executive Order 12856, Federal facilities are now required to develop pollution prevention programs. Under the same executive order, Federal facilities are required to comply with the report requirements under SARA Title III, Section 313, Emergency Planning and Community and Right-to-Know Act.
- Executive Orders 12780 and 12873 require Federal agencies to develop affirmative procurement programs.
- The 1990 amendments to the Clean Air Act will require some Federal facilities to comply with stricter emission standards.
- Wastewater discharges are regulated under the National Pollutant Discharge Elimination System in accordance with the Clean Water Act.
- Hazardous wastes are regulated under the Resource Conservation and Recovery Act and the Hazardous and Solid Waste Amendments.
- Municipal solid wastes are subject to Federal, State and local requirements.
- The Federal Facilities Compliance Act requires compliance with State and local hazardous and solid waste regulations.

## CHAPTER 2

# THE REGULATORY BASIS FOR POLLUTION PREVENTION

---

### *Federal Departments:*

- State
- Treasury
- Defense
- Justice
- Interior
- Agriculture
- Commerce
- Labor
- Health and Human Services
- Housing and Urban Development
- Transportation
- Energy
- Education
- Veteran's Affairs

*Executive Order 12856  
requires Federal agencies/  
facilities to prepare  
pollution prevention  
program plans.*

### 2.1 Why Is Pollution Prevention Important to Federal Facilities?

On Earth Day 1993, President Clinton said that he would issue an Executive Order (E.O.) asking Federal facilities to voluntarily reduce their releases of toxic pollutants by 50 percent by 1999. "This will reduce toxic releases, control costs associated with cleanups, and promote clean technologies. And it will help make our government what it should be, a positive example for the rest of the country," President Clinton said. Four months later on August 3, President Clinton signed E.O. 12856, Federal Compliance in Right-to-Know Laws and Pollution Prevention Requirements.

E.O. 12856 strongly supports the pollution prevention initiatives which the EPA has launched over the past decade. It sends a clear message to Federal facilities that pollution prevention is the best approach to environmental stewardship. At the same time that EPA has been promoting pollution prevention, the Agency has also taken a tougher stance on enforcing environmental regulations at Federal facilities. As a result, environmental compliance issues have moved steadily to the forefront of Federal facilities' concerns. Federal facilities have learned that the most cost-effective way to prevent compliance problems is to take a proactive pollution prevention approach to environmental management.

This chapter has five goals:

- (1) To introduce the major Federal environmental requirements that apply specifically to Federal facilities;
- (2) To introduce pollution prevention concepts;

## ***Regulations and Requirements***

- (3) To summarize the principal environmental regulations and identify pollution prevention techniques for compliance;
- (4) To provide case studies as examples of Federal facilities' pollution prevention achievements; and
- (5) To discuss the benefits of pollution prevention.

*Pollution prevention is a multimedia environmental management technique that emphasizes the reduction of waste at the source.*

The chapter is divided into three sections. Section 2.2 provides an overview of federal environmental requirements that pertain directly to Federal facilities. Section 2.3 describes the major environmental statutes and gives case studies of how Federal facilities have complied through pollution prevention. Section 2.4 discusses the benefits of pollution prevention. Section 2.5 summarizes this chapter.

## **2.2 Federal Environmental Requirements**

### **2.2.1 Overview**

Environmental compliance and waste management costs increase in proportion to the number, volume, and complexity of a facility's waste streams. Simply stated, the less waste a facility generates, the lower the treatment and disposal costs; not generating wastes is the wisest approach to waste management.

This section introduces the major environmental requirements as they apply to Federal facilities. The requirements fall under four general categories:

#### *Compliance*

- Federal Facilities Compliance Act (FFCA)

#### *Pollution Prevention*

- E.O. 12856
- Pollution Prevention Act (PPA)

#### *Reporting*

- SARA Title III

#### ***Federal agencies:***

- *Environmental Protection Agency*
- *Equal Employment Opportunity Commission*
- *Federal Deposit Insurance Commission*
- *Federal Emergency Management Association*
- *General Services Administration*
- *National Aeronautics and Space Administration*
- *Nuclear Regulatory Commission*
- *Office of Personnel Management*
- *Small Business Administration*
- *Smithsonian Institution*
- *Tennessee Valley Authority*
- *U.S. Information Agency*
- *U.S. Postal Service*

## **Chapter 2**

### *Affirmative Procurement*

- Section 6002 of the Resource Conservation and Recovery Act (RCRA) and E.O. 12780

These requirements provide Federal facilities with incentives for building strong pollution prevention programs. A summary of each requirement follows.

### **2.2.2 Compliance: Federal Facilities Compliance Act**

#### **Background**

By strengthening EPA's enforcement authority, the FFCA provides Federal facilities with a great incentive to adopt a pollution prevention approach to environmental management.

The FFCA (1992) waves sovereign immunity for Federal facilities with respect to compliance with any Federal, State, local, or interstate hazardous waste requirements. Although the Act exempts Federal employees from personal liability they are still subject criminal sanctions.

#### **Key Provisions**

The Act's major provisions include the following:

- Waiver of Sovereign Immunity — Federal facilities must comply with all of the provisions of Section 6001 of the RCRA; also, Federal employees are subject to administrative orders, penalties and fines.
- Liability — Federal employees are exempt from personal liability under the hazardous waste laws but not from criminal liability.
- Enforcement Authority — the EPA Administrator has the authority to take enforcement action against any Federal agency.
- Facility Environmental Assessments — EPA is required to conduct annual inspections of each Federally-owned/

#### ***Compliance***

- *Federal Facilities Compliance Act*

#### ***Pollution Prevention***

- *E.O. 12856*
- *Pollution Prevention Act*

#### ***Reporting***

- *SARA Title III*

#### ***Affirmative Procurement***

- *Section 6002 of RCRA and E.O.s 12780 and 12873*

**Example 1**

**Federal Employee Prosecution for Environmental Crime**

For over 5 months, Mr. Curtis, former director of the fuels division at Adak Naval Air Station, Alaska, ignored repeated employee warnings of a pipeline leak. As a result, thousands of gallons of fuel flowed into an inlet of the Bering Sea.

Mr. Curtis was indicted in October 1991 on five felony counts for knowing violations of the Clean Water Act. He was convicted in March 1992 of three counts of violating the Clean Water Act, one felony count for a knowing violation, and two lesser-included misdemeanor counts for negligent violations. He was sentenced to serve 10 months in jail.

United States v. Curtis, CR. (S.D. Ak. May 26, 1992)

operated hazardous waste treatment, storage, or disposal facility.

- Federally-Owned Treatment Works — the introduction of any hazardous waste into a Federally owned treatment works is forbidden unless specific pretreatment standards are met.

Appendix C provides a copy of the Act. The FFCA makes Federal agencies and employees responsible for violations of RCRA and state hazardous waste laws resulting from activities conducted on Federally owned or operated property. To achieve environmental compliance, Federal facilities have successfully applied pollution prevention techniques to reduce wastes.

### **2.2.3 Pollution Prevention: E.O. 12856**

#### **Background**

Signed on August 3, 1993 E.O. 12856 reaffirms the Federal government's commitment to fully implementing the concepts outlined in the PPA of 1990.

The E.O. strengthens the PPA of 1990 by specifying actions that Federal facilities should take to reduce the use and release of toxic substances. The head of each

*The FFCA clearly brings Federal facilities into the framework of meeting environmental requirements. It is the basis for the Multi-Media Enforcement Program by EPA.*

## Chapter 2

Federal agency is responsible for ensuring that the agency complies with the E.O.

### **Key Provisions**

Key E.O. provisions affecting Federal facilities include the following mandates:

- All Federal agencies develop an agency-wide pollution prevention strategy and policy statement emphasizing source reduction as the primary method of environmental protection.
- All affected Federal facilities develop a written pollution prevention plan. The plan must be designed to bring each facility into compliance with a voluntary reduction goal of 50 percent for total combined releases of toxic chemicals to the environment and off-site transfers for treatment and disposal;
- All Federal facilities require the application of life-cycle assessment (LCA) and total cost assessment (TCA) principles to the greatest extent practicable, when evaluating pollution prevention opportunities.
- All affected Federal facilities must comply with the Emergency Planning and Response provisions under Sections 302 through 312 of the Community Right-to-Know Act.

#### *Goals of the Pollution Prevention Executive Order*

- *Federal agencies will become leaders in providing information to the public concerning toxic and hazardous substances.*
- *The Federal Government will be a leader in pollution prevention.*
- *Pollution prevention will promote energy efficiency.*
- *Through pollution prevention, Federal facilities will encourage markets for recycled products.*

### **2.2.4 Pollution Prevention: PPA of 1990**

#### **Background**

In addition to the FFCA, the PPA of 1990 provides Federal facilities with an incentive to practice pollution prevention. The PPA clearly establishes pollution prevention as the Nation's preferred approach to environmental protection and waste management.

### **Key Provisions**

The Act states the following:

*The Congress hereby declares it to be the national policy of the United States that pollution should be*



## **Regulations and Requirements**

*prevented or reduced at the source whenever feasible; pollution that cannot be prevented should be recycled in an environmentally safe manner whenever feasible; pollution that cannot be prevented or recycled should be treated in an environmentally safe manner whenever feasible; and disposal or other release into the environment should be employed only as a last resort and should be conducted in an environmentally safe manner.*

*Pollution Prevention Act of 1990 establishes the hierarchy of environmental risk reduction:*

1. *Source reduction;*
2. *Recycling;*
3. *Treatment; and*
4. *Disposal*

In accordance with the PPA, EPA issued a national pollution prevention strategy in January, 1991. The strategy revolves around three key principles:

- EPA is encouraging industry and Federal facilities to take voluntary action to identify and implement pollution prevention instead of expanding its existing authority.
- EPA will continue to promulgate and enforce regulations and thereby encourage industry and Federal facilities to minimize waste.
- EPA will conduct a variety of initiatives to promote pollution prevention including projects designed to: identify and overcome barriers to pollution prevention, expand public participation and choice, expand partnerships between EPA and other Federal agencies, promote outreach and training, incorporate prevention into enforcement settlements, develop a research strategy, and promote clean technologies.

**Source reduction** - the design, manufacture, acquisition, or reuse of materials to eliminate or minimize the quantity and toxicity of waste produced. Source reduction prevents waste either by redesigning products or by otherwise changing patterns of consumption, use and waste generation.

**Recycling** - the process by which materials otherwise destined for disposal are collected, reprocessed or remanufactured, and reused.

The FFCA, E.O. 12856, and the PPA send a clear message to Federal facilities: pollution prevention is the best way to achieve environmental compliance. Two other recent Federal regulatory changes that promote pollution prevention are described below: compliance with the Superfund Amendments and Reauthorization Act (SARA) Title III reporting requirements and affirmative procurement.

## Chapter 2

### 2.2.5 Reporting: SARA Title III Emergency Planning and Community Right-to-Know Act

#### Background

Although Federal facilities were exempt from complying with the Emergency Planning and Right-to-Know (EPCRA) requirements, E.O. 12856, Federal Compliance in Right-to-Know Laws and Pollution Prevention now requires Federal facilities that manufacture, process, or use toxic chemicals to comply with both provisions.

EPCRA serves two purposes: to encourage and support emergency planning for responding to chemical accidents, and to provide local governments and the public with timely and comprehensive information about possible chemical hazards in communities.

#### Key Provisions

EPCRA requires Federal facilities to:

- 1) Report to the fire department or emergency response team the location and volume of chemicals stored onsite if the facility is storing over 10,000 pounds.
- 2) Report emissions of certain chemicals using Form R, if threshold limits are met.

EPCRA requires Federal facilities that meet the reporting requirement threshold to track and report on the annual inventory of hundreds of substances routinely used in production and equipment maintenance. The reporting form, the Toxics Release Inventory (TRI) report is public information; the public has access to all TRI reports submitted to EPA.

Whereas earlier versions of the TRI report asked facilities to voluntarily submit general information on their waste minimization programs, the 1993 edition *requires* facilities to answer detailed questions about their pollution prevention achievements.

*Reporting of manufacture, processing, or use of specific chemicals under EPCRA requires pollution prevention progress to be monitored and quantified.*

*For assistance with EPCRA, call the EPCRA hotline at 800-535-0202.*

## ***Regulations and Requirements***

Under Section 8 of the TRI report, Source Reduction and Recycling Activities, facilities must now provide information about source reduction and recycling activities related to the toxic chemical for which releases are being reported. In addition, Section 8 asks for the volume of the chemical released, recovered for energy, recycled, or treated, over a 4 year time frame.

Federal facilities must now also comply with the EPCRA laws under Sections 301 through 312. These requirements include submitting the following:

- Emergency planning notifications to the Local Emergency Planning Committee.
- Hazardous chemical inventory information to the Local Emergency Planning Committee in order to prepare comprehensive emergency response plans for the jurisdiction.
- Materials Safety Data Sheets to the Local Emergency Planning Committee.
- Emergency and Hazardous Chemical Inventory Forms to the State Emergency Response Board, the Local Emergency Planning Committee, and the local fire department.
- Emergency Notification of Releases of an Extremely Hazardous Substance to EPA and the State.

### **2.2.6 Affirmative Procurement: Section 6002 of RCRA and E.O. 12780**

#### **Background**

Affirmative procurement specifically refers to buying items made from recycled materials. By creating a demand for recyclables, the purchase of materials with recycled content makes recycling programs cost effective. Federal and State governments have focused on stimulating market development by modifying government purchasing practices.

*Some of the DOE facilities have already voluntarily begun submitting TRI reports. DOE has developed pollution prevention goals for the 17 priority chemicals identified in the EPA's 33/50 Program and reported under TRI. According to DOE's Interim Environmental Guidance (DOE publication DOE/EH-0305), the DOE's goals are the following:*

- *By the end of 1995, achieve a 50 percent reduction in releases from the 18 facilities that currently submit TRI Form R using 1988 as the baseline.*
- *By the end of 1997, achieve a 33 percent reduction in releases from facilities that are not currently reporting but meet the reporting thresholds using 1993 as the baseline.*
- *Beginning in 1993, all DOE sites must report all TRI chemicals used.*

## Chapter 2

*The recycling loop has two major components: the first is recycling existing products to produce new products; the second is specifying a preference to buy new products containing recycled materials.*

*Through affirmative procurement, the Federal and State governments are able to establish a demand for recycled goods and environmentally benign products.*

E.O. 12780, “Federal Recycling, Acquisition, and Use of Environmentally Preferable Products and Services” gives coherence and greater authority to Federal procurement policy. The current affirmative procurement policy is based on the following:

- Section 6002 of the RCRA
- E.O. 12780
- PPA of 1990
- The Federal Procurement Policy Act (FPPA)
- General Services Administration (GSA) Purchasing Requirements
- Federal Acquisition Regulations (FAR)
- Office of Management and Budget (OMB) Policy Letter 92-4
- OMB Circular A-102, A-110, and A-119

Of these, Section 6002 of RCRA and E.O. 12780 are of direct concern to Federal facilities.

### **Key Provisions**

#### ***Section 6002 of RCRA***

Under the requirements of Section 6002 of RCRA, EPA began the process of designating specific recycled items for the Federal procurement program and developing procurement guidelines. The guidelines apply to procuring agencies, defined as Federal, State, and local agencies and their contractors, that purchase more than \$10,000 per year of a guideline item using appropriated Federal funds.

EPA promotes the purchase of guideline items through the Affirmative Procurement Program, which requires procuring agencies to review and revise specifications to eliminate any barriers to recovered materials.

## ***Regulations and Requirements***

### ***E.O. 12780: Federal Agency Recycling and the Council on Federal Recycling and Procurement Policy***

E.O. 12780 issued on October 31, 1991 serves two purposes:

- 1) To stimulate implementation of RCRA Section 6002
- 2) To require cost-effective waste reduction, procurement, and recycling programs and policies within Federal agencies and to promote Federal outreach to State and local waste managers.

A summary of key provisions of E.O. 12780 follows. The order:

- Requires Federal agencies and contractors that operate government-owned/ leased facilities to promote cost-effective waste reduction and recycling.
- Directs the OMB to encourage Federal agencies to participate in the development of environmentally sound and economically efficient voluntary standards.
- Requires immediate implementation of cost-effective Federal agency affirmative procurement programs for products with recovered content and establishes reporting requirements.
- Establishes the Council on Federal Recycling and Procurement Policy to develop incentives to encourage (1) the acquisition of products that reduce waste and products made from recycled materials, and (2) active participation in economically efficient Federal waste reduction and recycling programs.

In response to RCRA Section 6002 and E.O. 12780, several Federal agencies have begun affirmative procurement programs (or programs similar in nature). Such agencies include, but are not limited to, the U.S. Department of the Interior (DOI), organizations within Department of Defense (DoD), the Bureau of Prisons, the EPA, and the GSA. E.O. 12780 is reproduced in Appendix D.

#### ***Affirmative Procurement Deadlines***

***1993 Cement and concrete containing fly ash***

***1998 Paper and paper products, lubricating oils, and retread tires***

***1999 Building insulation products containing recovered materials***

***E.O. 12780 tasks all Federal agencies with initiating a reduction and recycling program.***

## Chapter 2

### Example 2 Affirmative Procurement

#### U.S. Postal Service (USPS)

The USPS is now using a lighter weight, 100 percent recycled (25 percent post-consumer waste) stock for its Priority Mail flat-rate envelopes. As a result, the USPS saves 251 tons of cardboard annually.

Similarly, changing to a thinner, yet equally strong, cardboard for Express Mail packaging has reduced bulk by 15 percent, while also lowering shipping costs, warehousing, and post-consumer costs of disposal.

*To get your free 2-hour video on complying with Executive Order 12873, contact Rebecca O'Dell at (209) 946-6014. This video was developed as a training tool by GSA and EPA and is available at no charge to Federal agencies.*

*In addition to E.O. 12873, E.O. 12845 provides requirements for energy efficient computers.*

### ***E.O. 12873: Federal Acquisition, Recycling, and Waste Prevention***

E.O. 12873 issued on October 20, 1993 strengthens the provisions of RCRA 6002 and E.O. 12780. The Order will also strengthens the role of the Federal government as an enlightened, environmentally conscious, and concerned consumer for private and other public institutions to emulate. The Order addressed six areas concerning:

- 1) The appointment of a Federal Environmental Executive (FEE) by the President and the designation of a high-level Agency Environmental Executive (AEE) by each Federal agency.
- 2) The consideration of environmental factors in acquisition planning and the development or revision of agency affirmative procurement programs.
- 3) The revision of standards and specifications to allow the purchase of environmentally preferable products based on guidance to be provided by EPA.
- 4) The establishment of goals for solid waste prevention, recycling, and recycled product purchases.
- 5) The application of the requirements to contractors working at government-owned or government-leased facilities.
- 6) The establishment of government-wide and agency-wide awards for innovative environmental programs.

## ***Regulations and Requirements***

The FEE and AEE will play an important role in the success of the efforts required by this Executive Order.

The FEE's duties include the development of government-wide initiatives promoting this order, the distribution of waste prevention and recycling information electronically, and the provision of guidance on Agency programs. The AEE's will be responsible for coordinating all agency environmental programs and participating in interagency development of Federal environmental plans. E.O. 12873 is available for reference in Appendix D.

*As the largest single consumer in the Nation, the Federal Government has the opportunity to realize significant economic as well as environmental benefits from pollution prevention.*

### **2.3 Environmental Regulations and Pollution Prevention Techniques**

In addition to complying with the requirements specific to Federal agencies described above, Federal facilities must also comply with the general environmental regulations that apply to both the private and public sectors. Each of the major environmental regulations is summarized below and is followed with suggestions on how to comply with the regulation through pollution prevention. Case studies are provided at the end of each discussion as examples of Federal facilities' achievements and as illustrations of different pollution prevention techniques. The following areas of regulation are discussed:

- Air Quality Management: Clean Air Act (CAA)
- Wastewater Discharge: Clean Water Act (CWA)
- Hazardous Waste: RCRA
- Municipal Solid Waste: Federal, State, and Local Requirements

#### **2.3.1 Air Quality Management: Clean Air Act Provisions**

The 1990 amendments to the CAA significantly affects Federal facilities in several ways. Facilities located in nonattainment areas may be subject to more stringent emission levels on existing permitted sources such as

*Federal regulations by media:*

*Air – CAA*

*Water – NPDES*

*Solid Waste – RCRA & CERCLA*

## Chapter 2

*Selected air toxics in the list of CAA of 1990:*

- benzene
- chlorine
- hydrazine
- methanol
- lead compounds
- trichloroethylene

painting/degreasing operations, power plants, or incinerators, and new regulations on many small sources that were not regulated previously such as print shops, dry cleaning operations, and gasoline stations. The air toxics provisions are likely to mandate new or additional control equipment for new and existing sources. The list of air toxics to be regulated has grown beyond the original list of seven, to a new list of 189 substances. The expanded list of air toxics, coupled with the new provisions to reduce emissions in nonattainment areas nationwide, means that many small sources typically found at Federal facilities must now have permits.

In addition, the CAA establishes stricter vehicle emission levels and promotes the use of alternative fuels. Facility operations requiring the use of many vehicles will be affected by the new standards. Finally, all air quality permits for each installation will be revised and reissued as each State implements the new permit program contained in the 1990 Amendments.

The 1990 Amendments also affects Federal facilities in terms of enforcement. The enforcement provisions of the Act were substantially strengthened with increased civil penalties and new criminal penalties. As a result, Federal facilities will need to pay greater attention to air emissions.

### **Pollution Prevention Techniques: Air Quality**

By using pollution prevention techniques, Federal facilities can reduce air pollution emissions at the source and thereby reduce or eliminate the need for new or additional air pollution control equipment. Air pollution control equipment is both capital and labor intensive and may create additional waste streams (solid or liquid) as part of air emissions control.

The pollution prevention approach to air quality management begins with the development of a source inventory for the facility. The inventory should include all point, area, and mobile sources. For each source, the facility should compile emission and/or process data and check the regulatory compliance status of each source (Federal, State and

*The list of regulated air toxics (hazardous air pollutants) has grown from 7 to 189. Federal installations be required to have permits for many small sources previously unregulated.*



## ***Regulations and Requirements***

local regulations). Pollution prevention options should be developed for both sources that are out of compliance and those that can be eliminated through pollution prevention.

For example, to comply with volatile organic compounds (VOCs) emission standards, a Federal facility coordinator should investigate pollution prevention options rather than install costly pollution control equipment. First, the facility coordinator might conduct a survey of solvent degreasing stations. The facility would then test nonsolvent-based degreasers as a means of eliminating the source of VOCs. This pollution prevention technique, material substitution, is a source reduction measure since it eliminates the waste stream at the origin. One potential drawback with this substitution, however, is that although VOC emissions are eliminated. In some applications, a hazardous wastewater and sludge could be generated. This example makes it clear that pollution prevention coordinators must weigh environmental trade-offs when evaluating pollution prevention projects.

If the pollution prevention coordinator finds that for any reason s/he is unable to replace the solvent with an aqueous substitute, s/he should try to consolidate the operations requiring the solvent sinks to reduce the number of sinks and the volume of degreaser used. Installing sinks that maximize retention of VOCs is an example of a process modification, a second kind of source reduction measure. Training workers to close the lids on sinks when they are not in use is an example of a third source reduction measure, an operating procedure modification.

The pollution prevention approach to air quality also includes ensuring that Federal facilities are in compliance with the air quality standards in the future. Federal facilities can ensure that they are in compliance by designing new products to meet or surpass the standards. Ideally, facility engineers design new products in such a way that they do not require the use of toxic substances. Federal facilities should identify pollution prevention op-

*First Step: Conduct a source inventory or assessment to identify problem areas.*

*E.O. 12843 provides procurement requirements for reduction of ozone depleting chemical usage.*

*Use pollution prevention to avoid capital and labor costs of air pollution control measures.*

## Chapter 2

**Material Substitution -**  
*Replacing a toxic material with less toxic (or nontoxic) materials of equal performance.*

**Process Modification -**  
*Conserving resources and materials by improving the efficiency of a process such that hazardous wastes and environmental releases are reduced.*

**Procedural Modifications -**  
*Modifying procedures and standard operating practices so that hazardous wastes and environmental releases are reduced.*

opportunities when staff members are assessing existing sources, and planning for new equipment acquisitions.

For example, the Army has issued a pollution prevention guidance document to assist the Army Material Command acquisitions staff in designing weapons systems in an environmentally sound manner. The guidance teaches staff to minimize the use of hazardous substances in all phases of the product's life-cycle. LCA is an important pollution prevention tool that is discussed in greater detail in Appendix A.

### 2.3.2 Wastewater Discharges

#### Provisions

The primary regulation for wastewater management is the National Pollutant Discharge Elimination System (NPDES), developed in accordance with the Clean Water Act. The CWA requires NPDES permits for the discharge of pollutants from any point source into waters of the United States. Permits are required for industrial facilities as well as facilities treating domestic wastewater. NPDES permits typically contain limits on the quantities of specific pollutants that can be discharged from the facility. The NPDES permit system encourages Federal facilities to restrict their usage of regulated substances in order to comply with the discharge limits.

EPA has established 34 NPDES Primary Industry Categories. Any permit issued to a Federal facility included in one of these categories contains specific effluent limitations and a compliance and sampling schedule to meet the limitations. Technology-based treatment limits form the basis of most effluent limitations.

Another aspect of wastewater management which affects Federal facilities is the pretreatment program. The pretreatment program sets standards for the control of industrial wastewater discharged to publicly-owned treatment works (POTWs). The goal of the pretreatment program is to protect human health and the environment by reducing the potential of harmful substances from entering POTWs.

#### CWA

- NPDES Program
- Pretreatment Program

## ***Regulations and Requirements***

Point source discharges are those that originate from a specific location such as an outlet pipe or open channel that carries wastewater from sewage treatment or industrial process plants. Typically, all point source discharges are required to have NPDES permits that specify the maximum quantity of toxics allowed to be released. Point sources at Federal facilities include photo labs, medical clinics, cafeterias, and electroplating operations. Non-point source discharges are from operations such as agriculture, golf courses, and forest operations.

### **Pollution Prevention Techniques: Wastewater Discharges**

Pollution prevention techniques for point source discharges include material substitution to prevent the discharge of a toxic substance, recycling and reuse to reduce the volume of contaminated wastewater, and better operating practices to prevent accidental discharges of hazardous substances. In addition, equipment modifications may reduce the amount of contaminated wastewater generated during a process.

For example, Ft. Eustis, an Army Transportation Center in Virginia, uses a high pressure washer for cleaning heavy equipment. The pressure washer directs a concentrated flow of high pressure water at the soiled area, cleaning much more effectively than a low pressure hose and using less water. Other pollution prevention techniques for vehicle cleaning include reducing the frequency of vehicle washing and using fewer hazardous substances (or no additional cleaning substances) during washing. Proper treatment equipment should be installed to trap oils that may otherwise be discharged to the sewage treatment plant.

Nonpoint source pollution prevention techniques include designing construction operations in a way that minimizes surface runoff, planting vegetation to prevent soil erosion, and keeping paved surfaces to a minimum.

*The Tidewater Interagency Pollution Prevention Program (TIPPP) is a good example of a Model Community Program near Norfolk, Virginia. TIPPP is a program that incorporates Army, Navy, Air Force, and NASA installations. The program goal is to reduce releases of certain chemicals into the Chesapeake Bay, and to establish a "good neighbor" attitude with the local community.*

## Chapter 2

### 2.3.3 Hazardous Waste Regulations

#### Provisions

Table 1 gives examples of hazardous wastes generated from operations commonly found at Federal facilities.

The hazardous waste promulgated to implement RCRA and the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) specify requirements for the identification, storage, treatment, and disposal of hazardous waste. RCRA offers Federal facilities four incentives for pollution prevention:

- 1) Under the cradle to grave liability provisions, generators remain legally and financially responsible for any environmental damage from their wastes from generation to disposal. In fact, generators remain responsible for their wastes even after they have been disposed of (e.g., at a landfill).
- 2) As a result, hazardous waste management, treatment, and disposal costs have risen dramatically, giving waste generators a financial incentive to produce the least amount of waste possible.

*E.O.s have bolstered the intent of environmental regulations and now make them applicable to Federal facilities.*

**TABLE 1. HAZARDOUS WASTE GENERATED AT  
FEDERAL FACILITIES**

Operation	Hazardous Waste
Painting	Thinners, paint residues and chips, solvent for cleaning equipment
Metal Working	Coolants, quenching oils, salt baths, plating solutions and rinses, degreasers
Electronics Maintenance	Heavy metals, solvents
Vehicle Maintenance	Spent cleaning solvents, rags, oil/solvent mixtures, used oils
Construction	Spent cleaning solvents, rags, used oils, paint thinners, paint wastes

## ***Regulations and Requirements***

- 3) RCRA requires hazardous waste generators to certify that they have waste minimization programs in place whenever they sign off on a manifest.
- 4) generators are asked to voluntarily report their waste minimization achievements on the waste minimization form of the Biennial Report, which they are required to file under 40 CFR §262.41.

Although RCRA does not mandate pollution prevention reductions, 12 States have legislation requiring hazardous waste generators to submit waste reduction plans demonstrating how they will decrease waste generation over a specified planning horizon. Detailed information on State planning requirements is provided in Appendix F.

### **Pollution Prevention Techniques: Hazardous Waste**

The basic concepts illustrated through the referenced case studies on air emissions, wastewater discharge and municipal solid waste also apply to hazardous waste. In Appendix B, five case studies (Case Studies 5 through 9) are presented to illustrate how Federal facilities have reduced hazardous wastes. The case studies cover:

- Source reduction through process and equipment modifications to reduce or eliminate the generation of hazardous waste
- Source reduction through material substitution
- Improving inventory control to reduce the amount of raw material that expires on the shelf
- Recycling toxic materials

Other techniques not described in the case studies include improving operator training and providing environmental awareness training.

Although pollution prevention can dramatically reduce or even eliminate environmental releases, most Federal facilities will still have some regulated emissions or wastestreams. As in the past, having a clear understanding of the regulations is important not only in terms of

*EPA is now exercising its authority to determine the multimedia compliance status of Federal facilities in a methodical, organized program.*

## Chapter 2

complying but also to prevent the mistake of overcomplying. Many hazardous waste generators pay to treat their nonhazardous wastes as hazardous wastes simply because they feel that it is legally safer in the long run. Facility environmental coordinators should educate their hazardous waste accumulation point managers to ensure that good judgement is used in declaring wastes hazardous.

### 2.3.4 Municipal Solid Waste

#### Provisions

Municipal solid wastes, in general terms, includes all items that are discarded and are, or could be, taken to a sanitary landfill. According to an EPA report, the average office worker individually contributes more than 100 pounds of high-quality paper to landfills every year. Paper and paperboard products were the largest components of municipal solid wastes by weight (37 percent) and volume (about 32 percent), totaling nearly 66.5 million metric tons in 1990. Construction and demolition debris wastes accounts for more 25 percent of all municipal solid waste in the United States. The majority of these wastes are landfilled. Example 3 outlines several Department of Energy (DOE) sites where significant cost savings was experienced by recycling municipal solid waste.

Many State and local regulations prohibit the disposal of specific wastes at sanitary landfills. Wisconsin, for instance, bans tires and used oil. Figures 1a and 1b summarize states with landfill bans. Table 2 lists states where materials are current banned or the year the materials are anticipated to be banned. Further information on state recycling laws and State recycling goals is presented in Appendix E, F, and G.

Apart from regulatory incentives, the greatest incentive for applying pollution prevention to municipal solid wastes is the cost savings from reduced disposal fees. In addition, recycling programs may generate a small profit depending on local market conditions and the volume generated.

*Landfill restrictions can significantly impact Federal facilities at the State and local level. Besides source reduction projects, Federal facilities must look for recycling and reuse opportunities.*

## Regulations and Requirements

### Pollution Prevention Techniques: Municipal Solid Waste

There are many source reduction options for municipal solid wastes generated from offices. The U.S. Postal Service (USPS) has identified the following:

- Using old drafts for scrap or notepads
- Expanding use of voice mail for issuing short, non-confidential messages to all staff
- Specifying in orders that efficient packaging must be used
- Returning used supplies for reuse
- Procuring durable instead of disposable items

*A facility may choose to assign environmental costs to the waste generating activity/group as an incentive for improving efficiency.*

#### **Example 3 DOE DP Recycling Program**

Department of Energy (DOE) Defense Programs reports several examples where DOE facilities have realized significant cost savings by recycling municipal solid waste.

The Y-12 plant site's second hand stores recycled items with an estimated value of \$1,100,000. Ninety percent of those items were recycled within the Y-12 plant. In addition, Y-12 diverted 120 tons of paper and 50 tons of cardboard from the landfill.

Los Alamos National Laboratory's paper recycling program exceeded its goal of recycling by 50 percent. In 1990, 75 percent of the white paper was recycled. In FY92 the recycling program earned \$140,000.

Lawrence Livermore National Laboratory recycled approximately 1,397,642 pounds of nonhazardous waste in 1991 including white paper and tires. The lab's waste haulers believe they have experienced a 10 percent reduction in trash hauled to the landfill since the implementation of the white paper recycling program.

**Bar-Coding of Recycled Products:** DOE-Idaho is conducting a project to test and evaluate the use of a bar-coding system to trace the purchase of recycled products. Materials that are targeted for testing include the five items designated by EPA - paper and paper products, lubricating oils, building insulations, retread tires, and concrete and cement that contain fly ash. The project is budgeted at \$400,000 and is scheduled for completion in September 1994.

Source: DOE-DP Defense Programs Summary of Waste Minimization and Pollution Prevention Activities. Unpublished. 1993

*Costs may be "hidden" because they are not recognized. Examine procurement, inventory, operations, and disposal to determine all costs of an operation.*

## Chapter 2

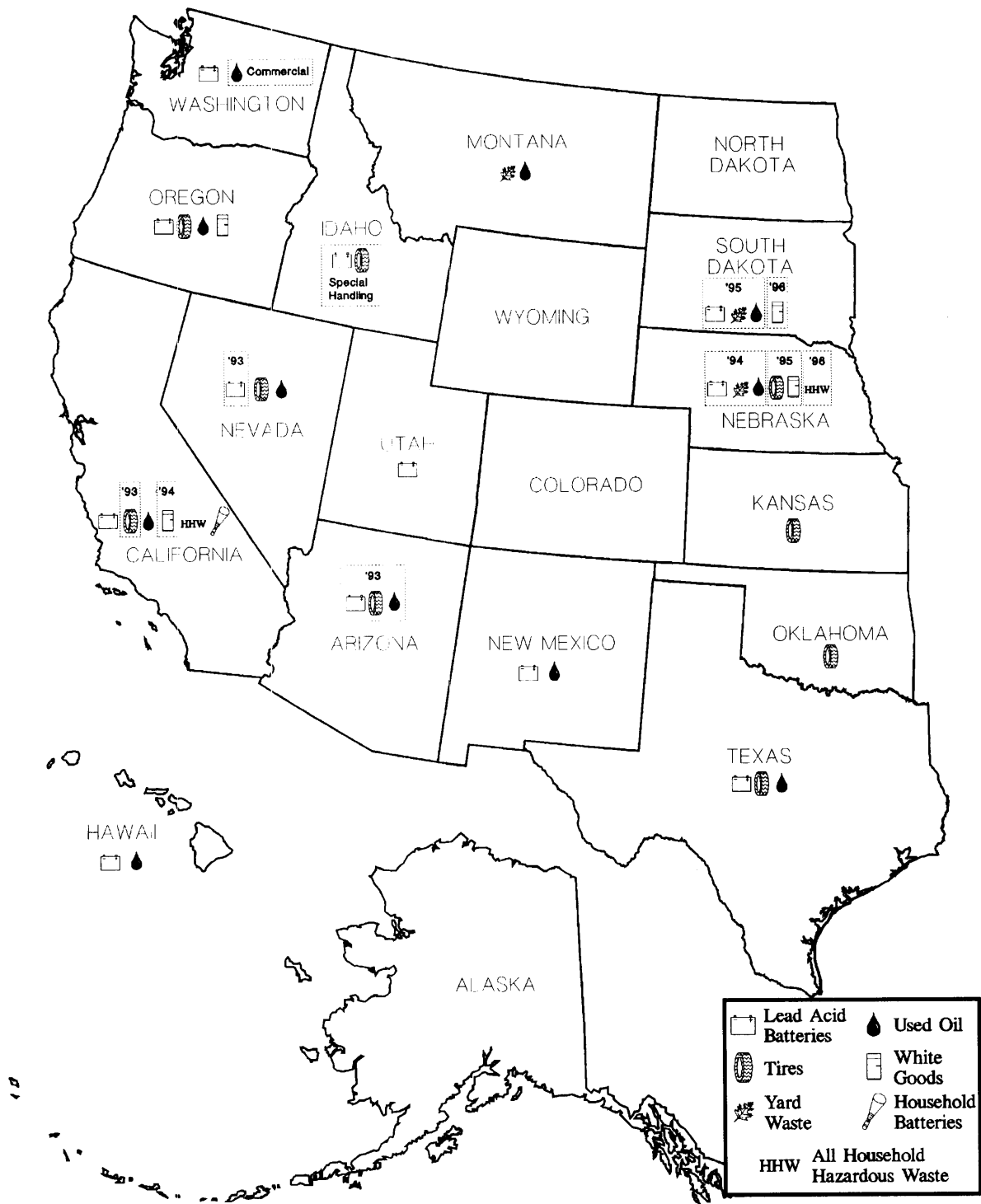
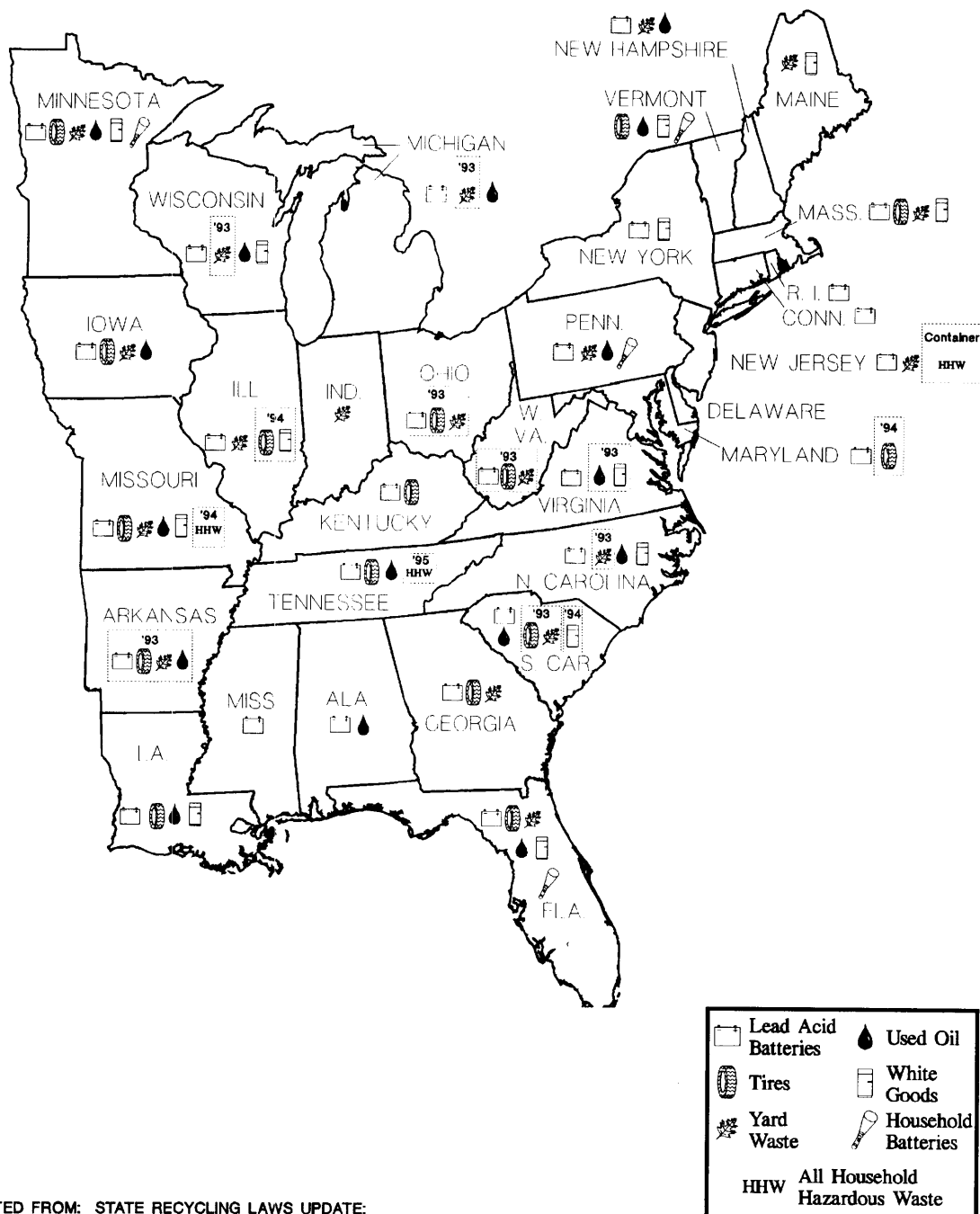


Figure 1a. State Landfill Bans (as of April 1993).



## Regulations and Requirements



ADAPTED FROM: STATE RECYCLING LAWS UPDATE:  
YEAR-END EDITION. February, 1993.

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Figure 1b. State Landfill Bans (as of April 1993).

## Chapter 2

**TABLE 2. STATE LANDFILL BANS**

Banned Material	Current	Year			
		1993	1994	1995	1996
Lead acid batteries	AL, CA, CT, FL, GA, HI, ID*, IL, IA, KY, LA, MD, MA, MI, MN, MS, MO, NC, NH, NJ, NM, NY, OR, PA, RI, SC, TN, TX, UT, VA, WA, WI	AZ, AR, NV, OH, WV	NE	SD	
Tires	FL, GA, ID*, IO, KS, KY, LA, MA, MN, MO, NV, OD, OR, TN, TX, VT		AZ, AR, CA, OH, SC, WV	IL, MD	NE
Yard waste	FL, GA, ID*, IO, KS, KY, LA, MA, MN, MO, MT, NH, NJ, PA	AR, MI, NC, OH, SC, WV, WI	NE	SD	
Used oil	AL, CA, FL, HI, IA, LA, MI, MN, MO, MT, NC, NH, NM, OR, PA, SC, TN, TX, VT, WA**, WI	AZ, AR, VA	CA, IL, SC	NE	SD
White goods	FL, LA, ME, MA, MN, MO, NC, NY, OR, VT, WI	VA	CA, IL, SC	NE	SD
All household hazardous waste	CA, NJ***		MO	TN	NE
Household batteries	CA, FL, MN, PA, VT				

\* Special handling requirements.

\*\* Commercially generated.

\*\*\* Containerized.

Pollution prevention techniques for food service operations (e.g., cafeterias) include the following:

- Evaluating all packaging to eliminate any that may be unnecessary; if necessary, issue procurement specifications requiring reduced packaging.
- Reducing the price of beverages for consumers who supply their own reusable cups.
- Serving milk from a self-service machine into reusable cups instead of individual disposable packages.
- Collecting bones, tallow, and grease for pickup by a commercial recycler.

## ***Regulations and Requirements***

- Composting food wastes.

Federal facilities can reduce construction and debris wastes through the following techniques:

- Allow salvage contractors to identify and retrieve recoverable materials prior to demolition.
- Set waste reduction goals and require contractors to prepare a waste management plan explaining how materials will be recovered and sold.

Table 3 shows items generated at Federal facilities that may be recycled although local market conditions vary greatly. Further information on recycling programs and options for these waste streams is provided in Appendix G.

### **2.4 Saving Money Through Pollution Prevention**

Federal environmental staff can develop long-term solutions for meeting the environmental regulations through pollution prevention. At the same time, implementation of pollution prevention projects can save money. Direct cost savings resulting from pollution prevention include the following:

- Raw material purchases - improved process efficiency may reduce the volume of raw materials required
- Waste treatment and disposal - reduced waste generation means lower waste treatment and disposal costs
- Labor - reduced waste generation saves manhours required to ensure proper waste management
- Equipment - improved process efficiency may increase the life of the equipment
- Operation and maintenance costs - reduced environmental releases may reduce the facility's operating and maintenance costs
- Water and energy - conservation measures may reduce water and energy costs

## Chapter 2

**TABLE 3. RECYCLABLE ITEMS**

Operation	Recyclable	Description
Offices, cafeteria, loading docks, mail handling, and industrial shops	Paper	<ul style="list-style-type: none"> <li>• High-grade white office paper (computer paper, tab cards, stationary bond, copy machine paper, miscellaneous plain paper)</li> <li>• Newspaper</li> <li>• Corrugated cardboard boxes</li> <li>• Magazines and other slick advertising</li> </ul>
Food service, industrial shops, and maintenance shop	Glass	<ul style="list-style-type: none"> <li>• Clear (flint)</li> <li>• Brown (amber)</li> <li>• Green</li> </ul>
Food service, maintenance shops, and metal working	Aluminum	<ul style="list-style-type: none"> <li>• Soda and beer cans</li> <li>• Scrap (TV dinner and foil pie plates, foil food wrap, aluminum siding, storm doors, windows, lawn furniture)</li> </ul>
Maintenance shops, vehicle maintenance, metal working, and industrial shops	Other metals	<ul style="list-style-type: none"> <li>• Tin-coated steel (food cans)</li> <li>• Bi-metals cans (tin-coated with aluminum end)</li> <li>• Scrap (cast iron, steel sheet metal, nickel, bronze, copper, brass, lead)</li> <li>• Damaged parts</li> </ul>
Loading docks, offices, cafeteria, maintenance shops, and industrial shops	Plastics	<ul style="list-style-type: none"> <li>• Polyethylene products (HDPE, PET, LDPE)</li> <li>• Mixed plastics</li> <li>• Polyvinyl chloride (PVC)</li> </ul>
Landscaping	Yard wastes	<ul style="list-style-type: none"> <li>• Grass clippings, leaves, prunings, wood, and other vegetative debris</li> </ul>
Vehicle maintenance, maintenance shops, industrial operations, boilers, and generators	Oil	<ul style="list-style-type: none"> <li>• Used motor oil</li> <li>• Synthetic oils</li> <li>• Solvents</li> <li>• Shop rags</li> </ul>

## ***Regulations and Requirements***

In addition, Federal facilities may achieve significant indirect cost savings in such areas as:

- Liability for future environmental remediation - reduced off-site waste shipments decreases liability for future remediation at Subtitle C permitted landfills
- Insurance - reduced storage of hazardous substances on-site may reduce insurance premiums
- Workman's compensation - reduced use of hazardous materials may decrease accidents and the resulting costs associated with workman's compensation
- Regulatory compliance - fines, recordkeeping, reporting, monitoring
- Onsite waste management - reduced waste generation may decrease the costs associated with proper storage and management on-site
- Onsite pollution control equipment operation - elimination or reduction of hazardous environmental releases may reduce the need for operating costly on-site pollution control equipment
- Minimized paperwork - reductions in hazardous substances and waste generation may reduce paperwork associated with tracking these materials on- and off-site

Often facilities fail to take these indirect cost savings into account because they are slightly more difficult to quantify. Indirect costs should not be overlooked because they typically represent a large percentage of the "hidden" cost of doing business.

Where information was available, examples of cost savings and cost avoidance due to pollution prevention are presented as case studies in Appendix B.

### **2.4.1 Additional Pollution Prevention Benefits**

Pollution prevention has many other benefits in addition to compliance and cost savings. These benefits are

## ***Chapter 2***

referred to as “intangible benefits” because they can not always be accurately quantified. The USPS describes the benefits of pollution prevention:

- Significantly reducing the amount of pollution released to the environment
- Getting reductions faster than might be achieved by waiting for statutes or regulations to take effect and by achieving permanent solutions where source reductions occur
- Providing the flexibility to choose cost-effective and environmentally sound solutions that will also result in improved efficiency and net economic growth
- Creating clear expectations in the form of a national goal for targeted chemicals
- Providing positive incentives through public recognition of its efforts and by working to identify regulatory barriers
- Positively changing the status of facilities that generate hazardous waste from Large Quantity Generator to Small Quantity Generator or Conditionally Exempt Small Quantity Generator status
- Reducing long-term risks of an uncertain nature and scope such as the cumulative effects of toxic substances without waiting for research.

As the public’s interest and knowledge about the environment grows, the public will pay greater attention to the environmental track records of Federal facilities. Media coverage has made the public wary of Federal facilities in their communities. Public access to the TRI reports, which Federal facilities are now required to submit, will increase local communities’ scrutiny of their Federal neighbors. As such, pollution prevention coordinators should recognize the importance of community outreach as a tool for building a good relationship with the local community.

## **2.5 Wrap-Up**

The PPA of 1990 and E.O. 12856 clearly demonstrate that pollution prevention is here to stay. Pollution prevention is the nation's policy for preventing environmental releases and waste generation. Whereas in the past, EPA concentrated the majority of its efforts in promoting pollution prevention in the private sector, EPA has launched new initiatives to encourage Federal facilities to adopt a pollution prevention approach to environmental management. EPA's efforts are backed by the E.O. which asks Federal facilities to reduce the release of toxics by 50 percent by the year 1999 and expands the EPCRA reporting requirements to include Federal facilities. Similarly, passage of the FFCA sends a clear signal to pollution prevention coordinators that the nation's laws apply equally to Federal facilities.

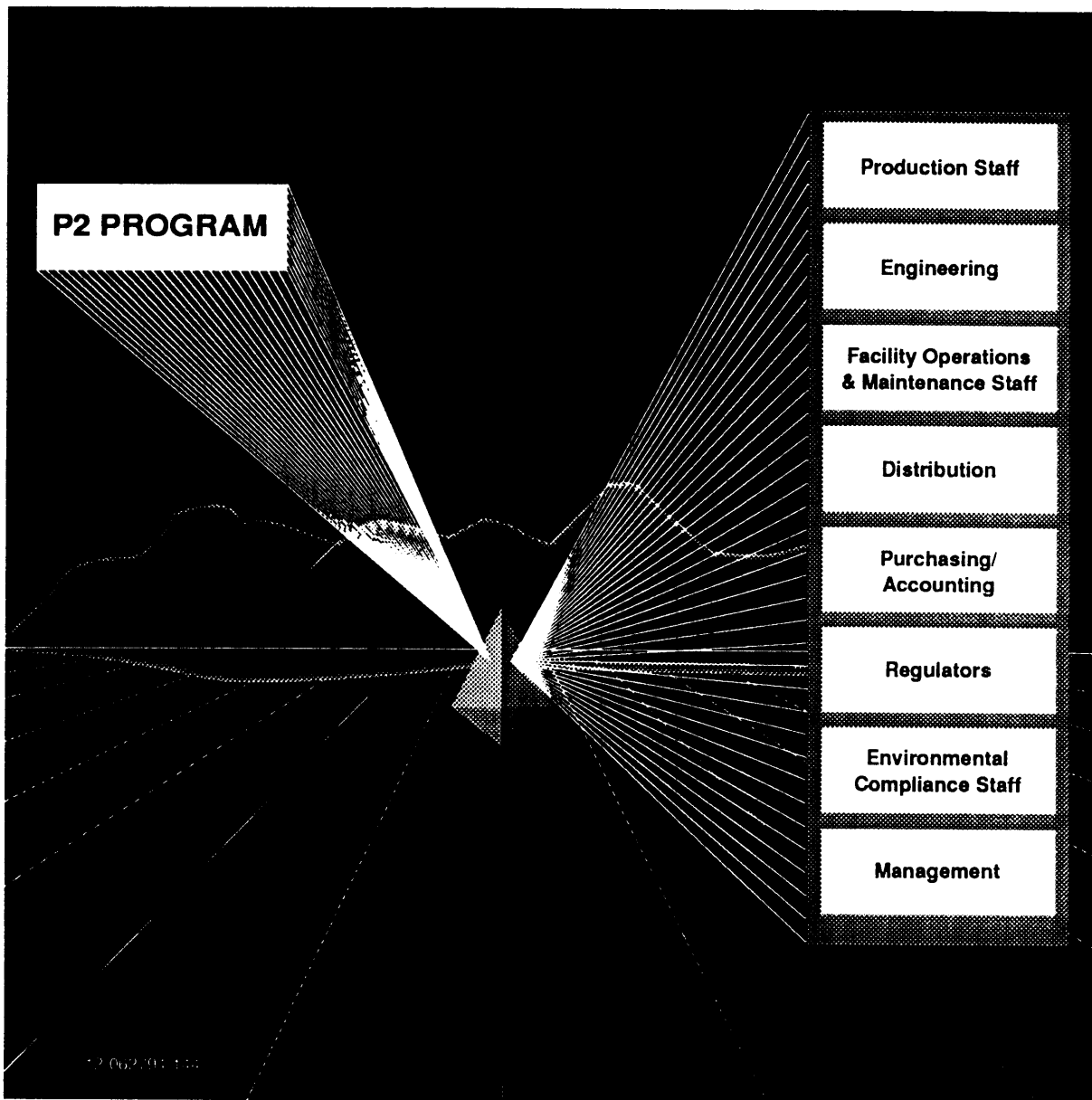




## CHAPTER 3

### ENSURING ORGANIZATIONAL SUPPORT

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## CHAPTER 3

# ENSURING ORGANIZATIONAL SUPPORT

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Experience with the WREAFS program and involvement with a variety of Federal facilities has shown that it is sometimes very difficult to know where to begin integrating pollution prevention into the overall compliance strategy. Prior to the FFCA and the more recent E.O.s, it was not always clear what specific actions were appropriate from a Federal facility, despite existing agency policies and even regulations. The process of adopting agency policy into daily activities can be slowed simply by the bureaucracy itself. This chapter describes approaches that can be taken to substantiate the level of support that exists and ways to tap that support when the project or program gets going.

As with program plan development or conducting process-specific PPOAs, many different approaches with varying levels of difficulty and sophistication can be used. A successful pollution prevention program can have as its basis single positive project that brings a facility into compliance or meets the most important goal. The program can also be a completely integral part of daily operations, such that every Federal employee thinks in terms of pollution prevention and is constantly generating ideas for consideration while the program is in progress. In either case, the fundamental mindset of a facility is changed for the better.

### *Tools for Assessments*

- *Facility Pollution Prevention Guide*
- *Specialty guides*

### 3.1 Working Up and Down the Chain of Command

The most important aspect of planning a successful pollution prevention program is a clear understanding of who can be counted on within your own organization, and which specific resources are critical to making the program progress. DoD, specifically the Air Force, assigns accountability to an

## ***Ensuring Organizational Support***

Office of Primary Responsibility (OPR) and Office(s) of Collateral Responsibility (OCR) for a program. The OPR is supposed to provide direction, initiatives, and staffing to the responsibility. The OPR must also establish management, provide funding or other necessary resources, and report on the progress or successes of the activity. An OCR is a very important component in the accomplishment of the goals and objectives, but is not explicitly assigned the accountability.

A good example of program management within this kind of government system is that of the Air Force Installation Restoration Program (IRP). The Civil Engineers are the OPR for the IRP; OCRs are the Surgeon General's office (SG), Public Affairs (PA) and Legal Counsel (JA). Although this may seem complicated, it is extremely important to put the civil engineers in charge of a program that affects every operational and planning mission function of their facilities. Vast resources and knowledge about workplace exposure, toxicology, and human health is then provided by the SG community to quantify the nature and extent of contamination at the base. PA provides the vital link to the community and to the base personnel; involvement of the lawyers with the IRP should be obvious. Although not named, other offices that are integral to a successful IRP include the accounting and finance staff, contracts, and procurement.

Similarly, in many organizations the environmental compliance responsibility has become that of Civil Engineers or the Directorate of Environmental Management (EM) in the case of much of the Air Force. Some EMs are very large and carry with their size the probability of a top-down support for pollution prevention programs. It is extremely important that the level of support from management be assessed and that the influence that the EM director has with higher authority be clearly understood. In military programs, changes in top management are inevitable, and each change can require retraining of people in these positions to keep programs or even projects on their paths. The time spent in retraining will

*The roles of major players in a program must be clearly defined, including a broad overview of which organizations should be included. The most important step in proper coordination is to include collateral organizations as soon as possible.*

## Chapter 3

be worthwhile, if the commitment to support pollution prevention appears genuine from the new management hierarchy.

*A PPOA requires:*

- *Direct involvement of the pollution prevention coordinator*
- *Support by upper management*

### **Example 4 Pollution Prevention Kickoff Meeting Fort Eustis, Virginia**

At Ft. Eustis, the installation commander signalled the importance of sound environmental management and pollution prevention when he presided over a ceremony to proclaim the Environmental Stewardship Campaign. A centerpiece of this campaign is to focus the installation's efforts on pollution prevention.

In addition, Ft. Eustis held an environmental fair on April 23, 1993, called EcoLogic '93. It supported the Army's environmental strategy and provided an opportunity to present environmental information to military and civilian personnel at Ft. Eustis and to the surrounding communities. More than 40 exhibitors participated, and the response to the event was positive.

(Source: Onsite Pollution Prevention Assessment. December 1992)

*A PPOA is a tool for:*

- *Understanding the shop's processes and wastes*
- *Identifying options for reducing waste*
- *Determining whether the options are technically, environmentally, and economically feasible.*

In cases where top-down support is lacking or weak, many successful programs have started by getting pollution prevention projects supported, programmed, funded, implemented, and measured at a facility. The way to make this happen is to solicit help from technical people in the production areas or engineers responsible for the quality of the products made at a particular shop. Another way to focus attention on a process or activity where pollution prevention methods might work is to identify a major waste generator or a high cost process. The best way to muster support for assessment of the pollution prevention opportunities for such a process is with the production, engineering, or waste management staff, with a mutually defined goal in mind to accomplish with the project.

Within the framework of Federal bureaucracy, it is preferred to use both a top-down and bottom-up strategy at the same time if at all possible. Projects can be successful by either strategy alone, but when used together they are likely to meet less resistance and to foster a cooperative spirit. That cooperation is the key to many parts of the project: data collection, data evaluation, screening and selection of alternatives, implementation, and measurement of the success.

Development of these support strategies is agency-specific, even person-specific — requiring interaction between management and production. This kind of subtlety and diplomacy is more art than science and is very dependent on personalities that foster a team approach to problem solving. The successful OPR for pollution prevention will create successful, productive relationships that work.

### **3.2 What You Need to Know**

#### **3.2.1 Policy and Programs**

The OPR for pollution prevention should begin by obtaining all relevant policies and regulations that are available. The legislation, regulations, and E.O.s that prescribe pollution prevention and that are described in this guide provide a general overview of the regulatory framework for pollution prevention. Agency-specific policy and regulations should be read with the Federal requirements in mind. The dates of issue of internal documents are noteworthy; new material may be in progress at higher headquarter levels. It is essential that both projects and pollution prevention programs get their start to accomplish the goals of internal policy and regulation. It is equally important that the intent and requirements of the Federal, State, and local mandates be met.

*A pollution prevention program plan is a compilation of pollution prevention projects that have been screened to meet specific goals. The projects are predicated on waste generation data and the documentation of interview data.*

If the pollution prevention program is in place, determine its focus and emphasis by asking the following questions:

- What are the goals and objectives of the internal program?
- Are waste streams of high priority identified?
- What projects are planned or underway?
- Which organizations are currently involved in the project being considered, relative to meeting internal or agency level accomplishments?
- Is adequate funding properly programmed to make the projects work?

## Chapter 3

- Are there clear methods of measuring the success of the projects in place?

If no program or projects exist, the OPR must first establish answers to the questions posed above. Most importantly, preparation of a pollution prevention program package, properly coordinated by people both up and down your chain of command will set the stage for the interactions and support needed later.

The next step for a new program is to identify at least one project where action must be taken. Action may be required for a specific reason, or simply to bring a process or activity into environmental compliance. A high-profile success from a pollution prevention initiative will likely ensure support for more projects and perhaps a facility or command-level program.

Development of a charter, such as that shown in Figure 2, will help establish the foundation for a pollution prevention program.

The personal roles and procedural details necessary for programming and funding pollution prevention projects must be understood; this includes the specific category of funding that can be appropriately used to fund pollution prevention activities, as well as its duration. Many Federal funds have a defined life span of one to three years. To obtain other types of funding, the programs have to be set up for months to years and be subject to nearly constant re-prioritization of projects in that category. At base level, it is not uncommon for environmental projects to compete with projects necessary for day-to-day operations and maintenance, such as air conditioning for a paint booth or a day care facility for dependents. This competition must be resolved by balancing upper management support for compliance or pollution prevention goals with knowing when it is appropriate to wait.

Pollution prevention support may exist at surprisingly high levels in the chain of command. Special funding set-asides may exist to address replacement and phase-out of ozone depleting chemicals (ODCs), for example. These special emphasis areas must be identified and used to form the

*Further information on PPOA's is found in the Facility Pollution Prevention Guide (EPA/600/R-92/088). The guide was prepared by the U.S. EPA's Pollution Prevention Research Branch of the Risk Reduction Engineering Laboratory located in Cincinnati, Ohio. It can be ordered from the Center for Environmental Research Information using the order form in Appendix I.*

## ***United States Postal Service Policy for Environmental Protection***

### ***Policy***

In performance of its mission to provide prompt, reliable, and efficient postal services to all communities, the United States Postal Service will conduct its activities in a manner protecting human health and the environment. Our concern is for the well-being of our employees, our customers, and the communities we serve. This policy applies to all postal programs, products, and services.

### ***Guidelines***

We will comply with all applicable environmental laws and regulations governing our activities, and we will not hesitate to exceed legal requirements when, in our judgment, it is in order.

In establishing postal regulations and practices, we will, as appropriate, implement policies that:

- Encourage the use of nonpolluting technologies and waste minimization in the development of equipment, products, and operations.
- Promote the sustainable use of natural resources and protection of the environment through conservation, recycling, and reuse of material in our own processes and as we work with customers in the preparation of mail.
- Include environmental considerations among the criteria by which projects, products, processes, and purchases are evaluated.
- Develop in our employees an awareness of environmental responsibilities and encourage their adherence to sound environmental practices.
- Maintain an ongoing assurance program to measure our progress toward meeting our environmental objectives.



*Anthony M. Frank*

Anthony M. Frank  
Postmaster General

*Printed on recycled paper.*

**Figure 2. Sample pollution prevention charter.**

## Chapter 3

basis for the definition of projects that will in turn form the foundation of a pollution prevention program. Similarly, it is critical that OPRs at base level be familiar with the specific research and development centers that offer assistance, contract vehicles, facilities to conduct necessary research, and share technology. For the Air Force, for example, the Corrosion Control Center is at Warner Robins Air Force Base (AFB) in Georgia; Armstrong Lab and the Air Force Center for Environmental Excellence (AFCEE) are in San Antonio; Wright Labs (as well as 100 other tenant organizations) reside at Wright-Patterson AFB in Ohio; and the Air Force Civil Engineering Support Agency is located at Tyndall AFB in Florida. These are only a few of the Air Force groups charged with conducting various support roles for pollution prevention. Analogous facilities in other services or other departments or agencies should also be identified, since they may be conducting research or evaluation studies on the exact process or activity of interest.

Although a base-level OPR could spend considerable time identifying contacts at these facilities, a worthwhile effort is simply to find someone knowledgeable in your agency or department, and talk with them to learn how your own entity gets its job done. People in research and development facilities, for example, likely know of parallel service or agency research projects and facilities, and can lead you to them and to a point of contact.

### 3.2.2 Support Infrastructure

A successful pollution prevention program (or project) needs to be broadcast to the community and to people who have made it happen. Similarly, lessons learned from the innovation of a technology or process need to be transferred to other agencies and departments. It is important to recognize the media available for conducting this type of technology or information transfer and to use them to their fullest. Example tools include agency newsletters (especially those focused on environmental issues), open houses, technical journals, presentation of papers at workshops and conferences, and electronic mail or bulletin boards.

*Getting the word out to your own organization and to the regulators may be integral to program success.*



Depending upon the particular relationship with EPA and State and local regulators, a memo or letter on the success of a pollution prevention project can foster cooperation and result in acceptance of such future projects to mitigate compliance problems. The IRP makes use of Technical Review Committees, which meet regularly to discuss the program progress and individual projects or problems. A similar forum might be developed to highlight pollution prevention and to isolate and focus on particular remedies to compliance issues.

Also within the Air Force there are Environmental Protection Committees (EPCs), which meet regularly to review overall environmental status and the progress of particular programs. Pollution prevention should play a major role in the compliance strategy for a facility, if the proper levels of support have been secured and the EPC is staffed with pollution prevention advocates.

### **3.2.3 Programming and Funding**

In Federal agencies and departments, programming and funding are the bottom line. Identification of a specific pollution prevention sponsor or fund manager can make projects happen and programs evolve. There are always counterparts to base accounting sponsors at higher headquarters levels; these people should be informed about the types and sizes of projects that are anticipated.

Beyond people, there are essential accounts that are dedicated to specific types of projects. For example, the DoD used to have a program called FastCap, which was dedicated funding for projects that accomplished their projected goals and could be quantified to have succeeded within a specific payback period. Demonstrated performance and measured success allowed new projects to be more favorably considered and funded. It is very important the OPRs for pollution prevention obtain any and all information about existing funding programs from their accounting sponsors, and documents that detail specific types of money, its purpose, its duration, its programming sequence, and any limiting factors that define how the money may be used. For example, the Air Force

*The variety of dedicated funding sources and special programs is great in the Federal government. The key lies in knowing about the programs and getting to know the people who administer them.*

## Chapter 3

Logistics Command-Maintenance organization published (internally) in late 1986, a document called "*A Summary of Current Management/Funding Programs and Technology Organizations.*" There are other internal documents that further describe the various types of funding that are available in great detail.

### 3.3 Building Teams

Ideally, all of the employees in a shop will have a role in the PPOA, such as by contributing innovative ideas, or collecting information necessary for the assessment. In the case of a small shop, a typical PPOA team would include the shop supervisor and whomever is responsible for environmental and health and safety issues. Employees with enthusiasm and genuine interest in the environment should also participate; their input can be invaluable.

Some facilities have found that PPOAs are more successful when a team from another area conducts the assessment. In such a case, the PPOA team may have a fresh outlook on a process, which enables the team to ask questions and identify opportunities that process workers, who are closely familiar with the process, might not have raised. For a larger shop, the PPOA team should include employees with different job skills and backgrounds to ensure a variety of perspectives.

*Identifying pollution prevention opportunities within the organization can greatly enhance program progress.*

PPOA teams need to receive adequate training in pollution prevention prior to doing the site visits. Each team should prepare worksheets for the process it will be visiting using information collected during the preassessment (worksheets are described in Chapter 5 and provided in Appendix H). The team coordinator's responsibility is to ensure that each team member knows what information s/he is responsible for collecting. If the team is planning to prepare a report documenting the waste generation baseline, the team coordinator should assign writing responsibilities to the team members. Assigning responsibilities will give team members a stronger feeling of participation in the project and improve coordination in collecting information.

**Example 5**  
**DOE - Sandia's MINNET**

To facilitate a change in mindset about how their R&D mission was performed, the OPR for pollution prevention at Sandia — Albuquerque established a computer-linked group of people to share ideas. The group of 60 people were spread across the facility and were appointed by their respective organizations to participate in the program.

The computerized Minimization Network has been successfully used to identify projects for PPOAs, to itemize materials that could be exchanged or utilized elsewhere in the facility, and to identify research needs.

### **3.3.1 Assigning Roles and Responsibilities**

The assignment of specific roles and responsibilities will depend on the organization's structure. In the case of the preparation of a program plan for a large facility, roles may be assigned to the facility director, the environmental department, the pollution prevention committee, the pollution prevention coordinator, and the PPOA working teams. The primary responsibility for pollution prevention, however, rests with the waste generators. Supervisors and personnel of waste generating operations must play an active role if the pollution prevention program is to succeed.

#### **Facility Director**

The director of the facility must be absolutely committed to the pollution prevention program and should demonstrate this commitment to the facility. By sending a clear signal that pollution prevention is not a short-term initiative, the facility director encourages employees to take the program seriously and is responsible for overcoming resistance to change, the "that's the way we have always done it" syndrome. Establishing clear authority for implementing the program can prevent turf battles that will hinder implementation. The facility director should maintain open lines of communication and set up an organizational structure for speeding the flow of information.

*The pollution prevention team at a facility must be organized and carefully selected.*

*"The key to Fairchild's (Air Force Base) successful waste reduction program is the support of the Commanders. Without their support, a good idea is just a good idea; with it, it becomes a good program."*

*Pollution Prevention News.  
May 1992.*

## Chapter 3

*The lead for pollution prevention typically comes from the environmental manager or department. There are numerous internal committees and mechanisms that can be used to work issues, delegate duties, and solidify the program.*

Structural changes implemented by the facility director may include setting up a pollution prevention committee, giving the environmental program the organizational status necessary for carrying out pollution prevention, and approving organization-wide changes such as developing a hazardous materials pharmacy or waste management charge-back policy.

### **Environmental Program Department**

Responsibility for actually getting the pollution prevention program underway usually rests with the facility's environmental program. The environmental program should be given the lead in guiding the development of the program plan, briefing the facility director and pollution prevention committee, and implementing projects. Specifically, the environmental program department's duties may include:

- Identifying new pollution prevention projects
- Supporting and monitoring existing projects
- Obtaining funding for projects
- Providing pollution prevention training
- Documenting projects
- Integrating pollution prevention into operations

The environmental staff will need the assistance of shop supervisors and workers to integrate pollution prevention into operations.

### **Pollution Prevention Committee**

Several Federal facilities have established pollution prevention committees for guiding program development. The U.S. Coast Guard's (USCG) Pollution Prevention Committee, for example, is divided into four subcommittees: Hazardous Material Management and Control, Solid Waste Management, Hazardous Waste Management, and Air Pollution Minimization. The committee's overall mission is the following:

*"To identify and ensure implementation of pollution prevention practices throughout the Coast Guard via*

## ***Ensuring Organizational Support***

*changes to appropriate Commandant instructions, technical manuals, and other policies and to recommend major pollution prevention initiatives to the Commandant.”*

The following describes the four subcommittees' missions.

***Hazardous Material Management and Control*** — “Minimize use of hazardous material in Coast Guard procurement, operations, and maintenance evolutions; control required hazardous material use throughout the life cycle to protect personnel and eliminate releases to the environment.”

***Solid Waste Management*** — “Minimize solid waste disposal in the Coast Guard through source reduction and recycling; ensure procurement of recycled materials where practical; oversee transfer of recycling funds to Coast Guard Morale, Recreation and Welfare Activities.”

***Hazardous Waste Management*** — “Where hazardous material must be used to accomplish the Coast Guard mission, find ways to recover, recycle, treat, or destroy hazardous materials in order to minimize hazardous waste disposal; determine and track progress of hazardous waste generation and disposal Coast Guard wide; ensure proper hazardous waste management to protect personnel and the environment.”

***Air Pollution Minimization*** — “Minimize release of airborne pollutants throughout the Coast Guard and ensure compliance with the amended Clean Air Act.”

*The USCG at Governor's Island, NY, found that by working together and sharing information they could overcome many barriers to pollution prevention. A cultural change was needed. In the past, all 22 commands reported to separate off-site commands. USCG/GI used separate waste haulers, procurement and inventory systems, etc.*

Members of the committee include the Chiefs of several departments:

- Civil Engineering
- Aeronautical Engineering
- Logistics Management
- Naval Engineering
- Research and Development
- Environmental Compliance and Restoration

## **Chapter 3**

- Safety and Environmental Health
- Acquisition Technical Support
- Procurement Management
- Planning Staff
- Liaison and Coordination
- Plans and Programs
- Environmental Law
- Commander, Maintenance and Logistics Command, Atlantic
- Commander, Maintenance and Logistics Command, Pacific

The Chief of the Civil Engineering Division is the Chairman of the Pollution Prevention Committee. The Committee meets regularly three times a year. The Committee's key functions are the following:

- Review/issue decision papers from work groups and provide feedback.
- Review/approve draft instructions, notes, policy letters, messages.
- Select winners of pollution prevention awards.
- Review progress of working groups.
- Assign tasks and establish working groups.

### **Pollution Prevention Coordinator**

The coordinator should act as a liaison among the Facility Director, the Committee, the Environmental Program, and the PPOA working teams. In a nutshell, the coordinator's primary responsibility is to keep the program moving forward. Implementing projects, clearing barriers, sharing information, and getting recognition for shops' pollution prevention achievements are a few of the coordinator's duties.

### **PPOA Working Teams**

The PPOA teams' mission is to conduct PPOAs as specified in the program plan. The teams may be responsible

*The Pollution Prevention Coordinator is the engine driving the program plan development process.*

## ***Ensuring Organizational Support***

for preparing summary reports of their assessments as well as assisting with follow-up research and project implementation.

Deciding who should lead a pollution prevention working group is perhaps the most important decision in implementing projects. Furthermore, the people at the operating level are likely to be most directly affected by the pollution prevention project. In fact, the project may alter how they do their jobs. For this reason, it is often best to allow personnel from each operating activity to appoint their own pollution prevention “champion” or working group leader.

A good candidate for pollution prevention “champion” may be someone who has had some environmental training such as the hazardous material/waste coordinator. The working group leader should possess the following qualifications:

- Believe in pollution prevention and show enthusiasm.
- Have high enough authority or “standing” in the operation activity to obtain people’s cooperation.
- Have the technical or operation experience necessary to direct work and evaluate findings.
- Have the “people skills” required to form a working group with shared goals and objectives.

### **3.4 Training and Outreach**

Many Federal agencies have extensive training programs to give employees the skills they need to carry out the agency’s mission. Since training is, indirectly, an important component of many Federal agencies’ missions, Federal agencies have the opportunity to shape the environmental outlook of future generations of students/employees. Federal facilities have found that pollution prevention training is crucial to fostering a long-lasting pollution prevention ethic. The goals of pollution prevention training are to:

1. Show students that they do have an impact on the environment both at work and at home.

*Who should be a pollution prevention coordinator?*

*Someone with operations and management experience on-site. S/he should be familiar with major activities and have a long track record on-site. The pollution prevention coordinator has a solid reputation and is going to be around for a while.*

*Involving the right people can ensure successful implementation. It is best to have a working group leader who has direct knowledge of, and responsibility for, the process being assessed. Involving people familiar with the operations and procedures builds a sense of “ownership” of the pollution prevention project.*

## Chapter 3

*A fundamental lesson of pollution prevention education is to demonstrate the potential to improve operational efficiency and thus mission accomplishment.*

2. Explain fundamental environmental concepts so that students understand that environmental damage is both difficult and costly to repair.
3. Show students what they can do to minimize the impact of their activities on the environment by using pollution prevention tools.

In addition to providing specific pollution prevention training, Federal facilities should integrate pollution prevention concepts into existing technical training courses. Training courses on hazardous waste management or basic training such as vehicle maintenance should teach students the pollution prevention ethic by demonstrating how it applies to specific tasks. The Army has moved toward this goal by instituting an Environmental Training Master Plan. Signed in December 1992, the plan is the Army's strategy for integrating environmental awareness and training into all levels of the Army school system, and providing environmental training and other informational resources in non-classroom settings for appropriate unit and facility audiences.

Several Federal agencies have begun pollution prevention outreach programs for promoting information exchange and communication. Sharing success stories, vendor information, and pollution prevention techniques reduces the time necessary for designing and implementing pollution prevention projects. Learning from others' mistakes as well as successes leads to a more effective use of limited resources.

Several methods that exist for getting the message out include:

- Prepare an environmental charter stating the goals and objectives
- Hold a public ceremony when the organization's top manager signs the environmental charter; invite local environmental groups to participate
- Host an Earth Day event to increase the community's environmental awareness
- Use internal communication resources to advertise the goals [e.g., bulletin boards, local area network (LAN) systems]

*The AFCEE has established a pollution prevention training course for Air Force employees which includes hands-on practice in conducting opportunity assessments, case studies, team-building exercises, and lectures on the tools which comprise pollution prevention. For information on the AFCEE training course, call (210) 536-3517.*



## Ensuring Organizational Support

- Issue fact sheets or news alerts
- Publish articles in the facility newsletter
- Have meetings with headquarters

There are many different kinds of outreach activities. The DOI is publishing a series of easy-to-read fact sheets on pollution prevention techniques for distribution to DOI facilities. The Air Force has established PRO-ACT, an information clearinghouse. Program elements include:

- An environmental hotline
- Technical environmental document review services (e.g., closure plans, Environmental Assessments)
- Communication services

DoD is in the process of establishing DENIX, a computer bulletin board containing pollution prevention information. DOE is also establishing a bulletin board. Both projects are in the early stages of development.

DOE-DP has a pollution prevention newsletter, the *Pollution Prevention Advisor*, which carries articles on DOE's pollution prevention efforts. Similarly, the Army has a newsletter, *US Army Environmental News*, which includes articles on the Army's pollution prevention efforts.

EPA has several newsletters; *Pollution Prevention News* and *Chemicals in Progress Bulletin* issued by the Office of Pollution Prevention and Toxic Substances are particularly informative in the area of pollution prevention. The EPA has opened a Federal Agency Mini-Exchange (FAME) for the EPA's Pollution Prevention Information Exchange System (PIES). The mini-exchange will be devoted exclusively to case studies and other information from Federal facilities. For further information, see Appendix L.

Outreach does not have to stop at the facility's fence line. Federal agencies have initiated innovative

*Numerous pollution prevention training videos and materials are available. For a list, refer to the EPA's 1993 Reference Guide to Pollution Prevention Opportunities (EPA/742/B-93-001). Copies of the document are available from the Pollution Prevention Information Clearinghouse (PPIC) by calling (202) 260-1023.*

### *Newsletter Contacts:*

*DOE-DP Pollution Prevention Advisor.  
Elizabeth McPherson  
(615)543-5422*

*DOE Federal Energy Management Program--  
Focus: Federal Energy Management Update.  
Rick Klimkos (202)586-8287*

*EPA Pollution Prevention News. US EPA, 401 M. St. SW, Washington, DC 20460*

*EPA Chemicals in Progress—Environmental Assistance Division (TS-799) Office of Pollution Prevention and Toxics, US EPA, 401 M. St. SW, Washington, DC 20460*

## Chapter 3

community outreach programs to raise environmental awareness. AFCEE has visited local elementary schools and talked about recycling. A bookmark design contest was held to get students thinking about recycling. Recognizing that excess government property could be put to good use by the local community, a DOE facility donated 4,000 low-density floppy computer diskettes to Mesa State College and also donated 454 liters of paint, lacquer, and sealing compound along with adhesive and roofing asphalt to Habitat for Humanity of Mesa County, a nonprofit organization that builds affordable housing for low income families.

### 3.5 Understanding Incentives and Barriers to Pollution Prevention

For the most part, Federal agencies/facilities face the same barriers and incentives to pollution prevention that private companies face. Commonly cited barriers are:

- Restrictive environmental regulations that impede innovative pollution prevention projects
- Lack of capital to fund projects
- Lack of technical expertise to develop pollution prevention solutions
- Organizational resistance to change.

*Federal agencies can create pollution prevention incentives.*

Incentives include:

- Mandated pollution prevention program requirements
- Stringent environmental regulations
- Rising waste treatment and disposal costs
- Improved government technical assistance programs
- More flexible enforcement strategies.

In addition to the barriers and incentives mentioned above, Federal agencies/facilities have several unique features that generate barriers and incentives.

### **3.5.1 Incentives for Promoting and Conducting Pollution Prevention**

Federal agencies have a number of incentives for institutionalizing pollution prevention in their organizations. In addition, agencies have the power to *create* pollution prevention incentives both for their organizations and for the private sector.

- *Regulatory Incentives* — The FFCA and E.O. 12856 clearly states that Federal facilities must comply with all environmental regulations and must fully implement several pollution prevention programs (details are provided in Chapter 2).
- *Acquisition of Goods and Services* — The purchasing power of Federal facilities should not be underestimated; for instance, DoD is the largest single consumer of refrigerators in the U.S. The Federal government buys about 1 percent of the total annual output of domestic auto manufacturers. This gives agencies the leverage needed to demand improved environment-friendly products (e.g., optimum energy efficiency, recycled content, VOC substitutes).

Furthermore, Federal agencies spend billions of dollars a year to procure services from contractors. Agencies have a tremendous opportunity to encourage pollution prevention internally and to the private sector by including pollution prevention provisions when issuing contracts. For example, EPA now requires contractors to submit double-sided copies of all documents. The Army Materiel Command (AMC) requires contractors to justify the use of hazardous substances in their proposed engineering designs for new weapons systems. Contractors have to explain why nonhazardous substitutes are not available.

The Federal government also distributes research grants for a variety of laboratory-based research projects every year. Agencies can modify grant proposal protocol to include pollution prevention prin-

#### *Incentives for Pollution Prevention*

- *Regulatory acquisition of goods and services*
- *Technical orders and specifications*
- *Training*
- *Cost-effective research and development*
- *Technical expertise*
- *Economic resources*

## Chapter 3

### *Technology Transfer Example*

*Sandia's Motor Pool Services Department has installed an energy recovery system that filters and blends used motor oil with diesel fuel. The blended fuel is then placed back into the vehicles and is consumed as energy. This process saves Sandia \$15,840 a year in disposal costs and saves \$12,490 a year in incineration costs for a total savings of \$28,330 a year. This technology may prove cost-effective at other Federal facility motor pools.*

ciples. Pollution prevention should be an evaluation criterion for evaluating the proposals (i.e., minimal impact on the environment resulting from the research).

- *Technical Orders and Specifications* — Federal agencies such as DoD are responsible for establishing technical orders and specifications for manufactured products. Only Federal agencies have the authority to reevaluate the orders to incorporate pollution prevention. Because of the volume of materials purchased, eliminating the use of cadmium in certain specifications, for example, can have a significant positive impact on the environment.
- *Training* — Federal agencies perform extensive training. As such, agencies can have a long-lasting effect on the education of their employees. In the short-term, incorporating pollution prevention into training courses reduces facilities' impact on the environment. In the long-term, if government employees move to the private sector, they will help spread pollution prevention.
- *Cost-Effective Research and Development* — Since many Federal facilities have identical operations, pollution prevention can result in great cost savings for the Federal government through a ripple effect. Once funds are expended on researching and implementing a project at a specific location, the results should be shared through information transfer. Pollution prevention techniques and equipment implemented at an Air Force base maintenance shop can be applied equally successfully to a USPS maintenance shop, a Bureau of Prisons facility, or a National Park Service shop.
- *Technical Expertise* — Compared with many small private companies, Federal facilities have larger environmental program staffs with educational backgrounds appropriate for pollution prevention work. Support networks and technical assistance programs to encourage pollution prevention make access to expertise relatively easy.
- *Economic Resources* — Despite the complexity of the funding processes, Federal facilities can usually obtain

funds for pollution prevention projects at levels that small to mid-sized companies cannot afford. At the same time, the Government's fiscal crisis is forcing agencies to streamline procedures and cut costs; pollution prevention, therefore, stands out as an important means to increase efficiency.

### **3.5.2 Barriers to Conducting Pollution Prevention at Federal Agencies/Facilities**

The major barrier to pollution prevention at Federal agencies/facilities stems from the organizational structure; however, as the following discussion illustrates, other barriers exist as well.

#### **Organizational Barriers**

- *Political Appointees* — The fact that some agency directors are politically appointed makes it difficult to implement long lasting institutional changes. As a result of their short tenure in office, agency directors may be reluctant to implement dramatic pollution prevention changes. Also, policy changes implemented by one agency directors may be reversed a few years later by a successor.
- *Organizational Structure* — Federal agencies tend to be highly complex hierarchies. The organizational structure makes it difficult for employees at the shop level to get approval for innovative pollution prevention ideas. A perceived lack of responsiveness from the organization may encourage employees to find ways to circumvent established procedures, often resulting in unnecessary waste generation.
- *Lack of Organizational Status for Pollution Prevention Programs* — In many cases, pollution prevention program responsibilities are combined with those of other environmental programs; as a result, pollution prevention programs may have poor infrastructure, making them susceptible to budget cuts. In addition, the lack of status and visibility makes it

#### ***Barriers to Pollution Prevention***

- *Organizational*
- *Communication*
- *Economic*
- *Waste generation*
- *Regulatory*

## Chapter 3

difficult for pollution prevention coordinators to develop effective programs. Pollution prevention roles and responsibilities are often not clearly defined and are not incorporated into job descriptions.

### Communication Barriers

- *Communication* — Federal agencies/facilities are generally not in the habit of exchanging information. In the case of pollution prevention, the lack of communication may result in double-funding research projects. Federal agencies tend to focus on immediate needs and problems rather than the future. As a result, agencies find it difficult to adjust to pollution prevention's long-term outlook.
- *Personnel Turnover* — While it may not be true for all Federal agencies, in some cases, the personnel turnover rate is high. The turnover rate can have a negative impact on the pollution prevention program's continuity and may make it more difficult to reduce waste generation costs because of the time required for new employees to become familiar with pollution prevention procedures.

### Economic Barriers

*Most Federal agencies lack budget line items for pollution prevention projects.*

- *Fiscal Year Funding Cycle* — In most cases, the Federal government obligates money for specific purposes for a 1-year life-span. Since the funds expire at the end of the year, recipients are encouraged to spend the money. It is common for shops to purchase large quantities of supplies, for example, to use up their funding at the end of the year. Often the shelf life of these supplies expires before they are consumed. Most Federal agencies lack budget line items for pollution prevention projects, making it difficult for such projects to compete for funding.
- *Base Closures* — Faced with base closures, DoD installations are competing with one another for work. The need to improve efficiency and keep costs down makes

pollution prevention attractive; however, as in the private sector, the competitive nature of the business is now a disincentive to sharing pollution prevention techniques. Pollution prevention projects have to compete with compliance projects for funds that are in short supply.

- *Cost Sensitivity* — Federal facilities are not under pressure to show a profit the way private firms are. As a result, they have less incentive to conserve materials and reduce waste.

#### **Waste Generation Barriers**

- *Fluctuations in Waste Generation* — For some agencies, waste generation may be highly episodic (e.g., DoD), requiring a pollution prevention program to be flexible and able to handle large volumes of excess materials and, potentially, reusable stock items.

#### **Regulatory Barriers**

- *State Laws* — Differences in State laws raise barriers for pollution prevention innovations. Practices that are permitted under one State's laws may be prohibited in another state.

### **3.5.3 Overcoming Barriers to Pollution Prevention**

Federal agencies/facilities can overcome both the communication and financial barriers to pollution prevention; one of the most effective ways is by improving inter-agency information exchange and technology transfer. Many agencies/facilities have already discovered ways of overcoming financial, technical, and organizational barriers to pollution prevention projects. Sharing these techniques saves time and resources that might be spent inadvertently repeating mistakes.

#### **Overcoming Communication Barriers**

The TIPPP is a model community program designed to promote environmental compliance of select

## Chapter 3

Federal facilities in the Chesapeake Bay watershed through pollution prevention. By using a well-defined community, EPA is demonstrating measurable progress and the benefits of pollution prevention. Program participants include the EPA, Langley AFB, Norfolk Naval Base, Ft. Eustis, and NASA Langley Research Center (LaRC).

### **Example 6** **Solving Problems Associated with New Practices**

Anytime a process modification is made, a certain amount of resistance can be expected. Environmental coordinators must be on the alert to identify specific implementation problems that may stem from a process modification. For example, the corrosion control shop at Dover AFB recently switched from conventional paint spray guns to high-volume low-pressure guns (HVLP). The new guns require careful cleaning. The shop used to pool the guns; all the painters shared the guns rather than each having his own gun. With the new HVLP guns, however, this system was no longer appropriate. The painters were not taking the extra time to clean the guns because they were sharing them. As a result, the guns malfunctioned. The shop manager identified the problem and solved it by assigning one gun to each painter. Under the new system, the painters do a better job cleaning because they know they will reap the benefits.

(Source: Science Applications International Corporation (SAIC) Onsite Pollution Prevention Opportunity Assessment, Dover Air Force Base, 1993).

*Better communication  
can eliminate many of  
the barriers of pollution  
prevention.*

The objective of the TIPPP is to develop and implement integrated multimedia pollution prevention plans for each participating facility, outlining short- and long-term projects that are readily transferable to other communities. The goal of the TIPPP is to institutionalize pollution prevention approaches throughout the installations, both in practice and in mindset, and for all missions and activities, to make pollution prevention the preferred environmental protection option.

Anticipated outputs of the TIPPP are designed to foster cross-agency communication and include:

- Generic guidelines to assist Federal facilities in developing and implementing pollution prevention programs and techniques.



## ***Ensuring Organizational Support***

- Case studies and fact sheets that document the development, implementation, monitoring, and results of specific pollution prevention initiatives to be included in the new FAME in EPA's PIES in FY94.
- Installation of a network of Federal facilities to transfer technical information concerning pollution prevention. This will avoid duplicate efforts and provide a forum for comparison of results.

### **Overcoming Financial Barriers**

One of the greatest barriers to prevention projects is lack of funding. Complex funding requirements, such as large-scale capital equipment expenditures or long-term pollution prevention projects, may be difficult to address in the short term. The pollution prevention coordinator's objective is to find ways to implement pollution prevention at a minimum cost, while still maintaining and enhancing the mission. A facility may be able to justify and obtain funding for expenses for prevention projects from the operation and maintenance funds. To do this, the coordinator will have to demonstrate that a prevention project may result in cost savings.

To estimate potential cost savings, the coordinator must consider all the current costs associated with the adverse impacts, including such factors as labor to manage hazardous materials and waste, costs for disposal, permitting fees, and cost of raw materials. If the coordinator can demonstrate potential cost savings that can quickly repay the investment needed to implement the prevention project, the coordinator may obtain funding from the facility command. Over time, the facility may develop a good enough track record in saving funds through pollution prevention, that the facility will be willing to fund efforts where the cost information demonstrates a longer rate of return or less clearly defined economic benefits.

*Through careful planning, facilities can obtain funds for pollution prevention projects.*

*A pollution prevention program plan that exhibits a sound methodology for identifying, prioritizing, and selecting pollution prevention projects can itself be used to attract capital investment in pollution prevention projects.*

## **Chapter 3**

### **Example 7 Naval Aviation Depot — Norfolk**

In recognition of its environmental excellence, the Naval Aviation Depot at Naval Base Norfolk was recently awarded the Navy's Environmental Quality Award for a large industrial activity in FY 1992. In addition, two individuals from the depot received environmental awards for their work in promoting the environment. John VanName, environmental engineer, received the Secretary of the Navy Individual Pollution Prevention Award for his work in waste minimization, and Kevin Summers, supervisory environmental engineer, was the runner-up for the Individual Environmental Quality Award.

Each Agency has its own set of procedures for applying for pollution prevention funding. As such, pollution prevention coordinators are encouraged to contact their headquarters organization for specific information. General tools that a coordinator might use to help in overcoming economic stumbling blocks include the following:

- Prioritizing projects based on risk
- Investigating alternative funding sources
- Preparing a cost/benefit analysis to justify the project.

## **CHAPTER 4**

# **ESTABLISHING POLLUTION PREVENTION GOALS AND OBJECTIVES**

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### **Example of Typical Pollution Prevention Goals**

- Compliance
- Hazardous materials and waste management
- Reducing disposal liability
- Reducing disposal costs
- Reducing operating and maintenance costs
- Improving mission efficiency

## CHAPTER 4

# ESTABLISHING POLLUTION PREVENTION GOALS AND OBJECTIVES

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### 4.1 Introduction

Prior to beginning information collection or forming the team, pollution prevention coordinator should identify goals. This will save time and resources. Federal facilities can select goals based directly on environmental considerations (e.g., water conservation, stormwater discharge), cost, worker health and safety, compliance or other considerations. For example, a vehicle maintenance shop's goals may be to reduce hazardous air emissions by 20 percent by the year 1995, lower waste management disposal costs by 25 percent by the year 2000, and improve worker health and safety to reduce sick days by 10 percent.

#### *Examples of Goals*

- *Environmental considerations*
- *Cost*
- *Worker health and safety*
- *Compliance*
- *Mission (product) impact*
- *Ease of implementation*

In addition to volume-based goal setting, a risk-based approach to goal setting deserves mention. Shops should evaluate processes and waste streams and assess their relative risk to human health and the environment. Using risk as a criterion can direct attention to the most important issues. While the volume of a waste stream is a significant factor, the risk a waste stream poses because of its toxicity should also be considered.

For example, using volume and waste disposal costs as the primary criterion, a shop might focus its PPOA on the waste stream with the largest volume and waste disposal costs; however, using risk as a criterion, the shop might instead choose a second waste stream with lower volume and waste disposal costs but higher toxicity and worker health and safety concerns. For instance, depending on local tipping fees, a small maintenance and repair shop may pay more to dispose of its cardboard packaging waste than to dispose of the very small amounts of hazardous degreasing solvents generated on-site. In this case, by using waste disposal costs alone, the PPOA team would focus on the cardboard waste. From a risk reduction perspective, however, the PPOA team should

## Goals and Objectives

take a closer look at the toxicity, usage, and management practices associated with the solvent usage instead of investigating the cardboard waste stream. In making risk-based decisions, shops should keep in mind the following concepts:

- Toxicity and volume of the substance.
- Exposure pathway and number of individuals affected.
- Long-term liability for the waste stream (i.e., disposal options and persistence of the substance in the environment).
- Availability of pollution prevention options to reduce risk.

*Federal facilities should develop an effective methodology for prioritizing projects under their pollution prevention program plans. This methodology should result in ordering the projects based on the plan's goals and objectives.*

Quantitative goals are preferable to qualitative goals because quantitative progress is more tangible and results in stronger evidence of success. Goals should be modified and refined as time passes to reflect changes in the shop's operations and waste generation. Pollution prevention applies to all environmental media (i.e., air, water, and solid waste emissions and releases), and shops should be open-minded when setting goals.

Developing a program plan using poorly defined goals and objectives is an inefficient use of resources. For example, the facility may end up doing more PPOAs and interviews than necessary and may spend excessive time gathering information. Training may not be targeted at the right audience, or standard operating procedures (SOPs) may not be modified in a logical order. Pollution prevention coordinators should impress upon management the importance of establishing realistic, concrete goals.

### 4.1.1 Developing Pollution Prevention Goals Using Risk Based Decision-Making

*Reducing Risk*, a report published by the Science Advisory Board's Relative Risk Reduction Strategies Committee in 1990, asserts that pollution prevention is the

#### Goals

- Targeted waste reduction
- Baseline development
- Program continuity
- Compliance
- Hazardous materials inventory control

## Chapter 4

*E.O. 12843 requires Federal agencies to modify procurement requirements and policies for ozone depleting substances. A copy of the Order is provided in Appendix D.*

best way of reducing risk to both human health and the environment. Based on the report's findings as well as those of other studies, the EPA has adopted a risk-based approach to addressing environmental problems. Although risk assessments have been conducted for many years to evaluate risk posed to human health (such as the risk of death resulting from exposure to a toxic substance in the workplace), the application of risk-based decision-making to assess environmental impacts is a new and growing field.

The major factors assessed through risk-based decision-making are not usually considered when facilities evaluate their environmental priorities. Federal facilities should use these factors to develop a hierarchy of relative risk. The factors for assessing the ecological stresses (e.g., release of a toxic substance into the atmosphere) include:

- Intensity of potential effects on the environment
- Uncertainties associated with estimates of the effect
- Type of ecological responses
- Time scale for recovery following removal of stress.

The geographical scale of the stress (local, regional, biosphere), the transport media or exposure pathway (air, water, land), and the time it takes the environment to recover (years, decades, centuries) must also be understood.

To illustrate the kinds of findings that risk-based decision-making can lead to, the following is the list of risk groups presented in *Reducing Risk*:

### **Relatively High-Risk Problems**

- Habitat alteration and destruction
- Species extinction and overall loss of biological diversity
- Stratospheric ozone depletion
- Global climate change.

## ***Goals and Objectives***

### **Relatively Medium-Risk Problems**

- Herbicides/pesticides
- Toxics, nutrients, biochemical oxygen demand, and turbidity in surface waters
- Acid deposition
- Airborne toxics.

### **Relatively Low-Risk Problems**

- Oil spills
- Groundwater pollution
- Acid runoff.

Federal facilities can integrate risk reduction into their environmental programs by targeting environmental protection efforts on the basis of opportunities for the greatest risk reduction. Risk reduction should be an important goal of the facility's pollution prevention program plan, and the plan should reflect the facility's risk-based priorities.

*Examples of criteria goals :*

- *Environmental*
- *Political*
- *Technical*
- *Economical,*
- *Practical*

*The best goals have two or more of these criteria as their basis.*

## **4.2 Goals**

### **4.2.1 Examples of Goals**

There are many different kinds of goals, the following is a summary of several categories with examples:

- **Targeted Waste Reduction** — Both environmental and economic benefits can be derived from reducing a waste stream by a specified percentage or volume. Federal facilities may choose to participate in the EPA's 33/50 program which targets 17 hazardous substances for elimination or reduction based on their risk to human health and the environment.
- **Baseline Development** — Federal facilities have found that improved mechanisms for collecting environmental information help them remain in compliance. Good information collection mechanisms are

## Chapter 4

also critical in assessing the relative risk associated with an environmental problem, identifying projects, and measuring results.

- **Program Continuity** — One of the program plan's goals may be to implement projects that help establish the pollution prevention program. Integrating pollution prevention concepts into employee training is, for example, one way of building support for pollution prevention at the facility.
- **Compliance** — The program plan can address compliance issues through its goals and objectives. Complying with State landfill bans for specific materials through source reduction and modified procurement practices could be an explicit goal. Complying with E.O. 12780 by increasing the procurement of products with recycled content could be another goal.
- **Hazardous Materials Inventory Control** — Establishing a program to improve control over the procurement, storage, and disposal of hazardous materials can significantly reduce wastes resulting from expired shelf life and overstocking.

The DOI National Park Service's *Waste Reduction Action Plan for Yosemite National Park* outlines three objectives for creating long-term structural changes to ensure that waste reduction practices are incorporated into everyday decision making and operations. The three objectives are carried out through the following:

- **Education:** Education for the public, suppliers, and employees is an effective means to increase recycling rates and reduce solid waste generation levels.
- **Procurement:** Purchasing products with recycled content causes waste reduction.
- **Oversight:** Organizations can increase the success of different waste reduction initiatives by close monitoring of participation or activity levels. The plan contains project designed to reinforce management's commitment to full program implementation.



## Goals and Objectives

Institutionalizing change is the best method to promote long-term, continuous improvement. By permanently changing new employee orientation materials or permanently modifying contract language to promote the use of recycled content products, the organization ensures that the program will outlast the personnel responsible for initiating these changes.

The pollution prevention goals and objectives for several Federal agencies are presented in Appendix J and summarized in Table 4. Table 5 summarizes the major program elements for several Federal agencies.

### 4.2.2 Strategy for Developing Goals

When developing goals, facilities should establish a timeframe for meeting the goals. Specifying short-term, intermediate, and long-term goals helps organizations understand their priorities; furthermore, goal setting encourages program continuity and creates structure. For example, the short-term goal for a facility with immediate compliance problems might be to resolve the problems through source reduction. An intermediate goal might be

**TABLE 4. SUMMARY OF FEDERAL AGENCY POLLUTION PREVENTION GOALS**

Goal	DOI	USPS	USAF	U.S. Army
Establish a pollution prevention program	✓	✓	✓	✓
Provide guidance and training	✓	✓		✓
Reduce waste generation and use of hazardous waste	✓	✓	✓	✓
Improve baseline information	✓	✓	✓	
Establish affirmative procurement program	✓	✓	✓	
Reduce energy consumption		✓		✓
Develop pollution prevention partnerships with private sector				✓
Apply new pollution prevention technologies				✓

## Chapter 4

**TABLE 5. SUMMARY OF FEDERAL AGENCY POLLUTION PREVENTION PROGRAM ELEMENTS\***

Program Elements	Federal Agency				
	DoD	DOE	DOI	DOT	USPS
Does the agency have a pollution prevention policy?	Yes	Yes	Yes	Yes	Yes
Does the agency have a target reduction goal?	No	Yes: 50% by 1995; additional 33% by 1997*	No	No	Yes; 25% reduction by 12/93; additional 25% by 12/95
What program elements does the pollution prevention policy contain?	R EC PRP HAZMIN TA PROC	R PRP HAZMIN TA PROC	R PRP HAZMIN TA PROC	R EC PRP HAZMIN TA PROC	R PRP HAZMIN TA LCA PROC
For which subjects has the agency published guidance documents?	PP R HW	PP R HW	PP R HW	PP R HW	PP R HW
Does the agency have its own dedicated pollution prevention staff or sources for technical assistance that people can call for further information?	Yes	Yes	Yes	Yes	Yes

**Legend:**

R = Recycling  
 EC = Energy conservation  
 PRP = Program planning  
 HAZMIN = Hazardous waste minimization  
 TA = Training and awareness

LCA = Life-cycle analysis  
 PROC = Procurement and awareness  
 PP = Pollution prevention  
 HW = Hazardous waste management

\* For reporting facilities that do not meet reporting thresholds.

## Goals and Objectives

to improve employee training to prevent future compliance problems, and the long-term goal might be to reduce the use of toxic substances by 35 percent by the year 2005.

While the resolution of immediate compliance problems will in most cases be a facility's top priority, Federal facilities should set goals to prevent compliance problems in the future through toxics use reduction.

Once the organization has agreed on its goals and objectives, it needs to communicate them to its members, its agency, and the local community. Table 6 provides a qualitative assessment of three options, based on established criteria of importance. Figure 3 provides an example of a pollution prevention program plan for a commissary.

**TABLE 6. QUALITATIVE ASSESSMENT OF OPTIONS FOR THE NAVAL SUPPLY CENTER, NORFOLK NAVAL BASE**

Criteria	Just-In-Time Inventory Control	Material Substitution	Employee Education
Effect on base operations	No long-term effect	No effect	No effect
Waste reduction	Positive effect	Partially compatible; will require changes in procurement policies and shop operating procedures; may require military specifications	Fully compatible
Compatibility with existing operating procedures	Partially compatible; will require changes in procurement policies and shop operating procedures	Unsure; may result in slight cost increase; further evaluation needed	Cost savings
Cost requirements compared with current costs	Unsure; may result in slight cost increase; further evaluation needed	Unsure; material specific, needed further research	Instructors are required
Additional labor requirements	None	Identification and testing of alternatives necessary before implementation can proceed; may take time to perfect new material with operations	Immediate implementation
Ease of implementation	Can be difficult to implement, depending on operational requirements	None; positive benefit	None; positive benefit
Adverse environmental impacts	None; positive benefits		

*[Source: This project was developed under RREL's WREAFS Program. Project Summary: Pollution Prevention Opportunity Assessment: Norfolk Naval Base. 1992.]*

## Chapter 4

<b>Supervisor:</b> Randolph Small				
<b>Shop Identification:</b> Commissary, Bldg. 222				
<b>Goals:</b>				
<ul style="list-style-type: none"> <li>• Reduce waste management and utility costs by 2005</li> <li>• Promote customer environmental awareness</li> </ul>				
<b>Objectives:</b>				
<ul style="list-style-type: none"> <li>• Reduce waste management costs by 10 percent by 1997 and an additional 15 percent by the year 2003</li> <li>• Reduce utility costs by 50 percent by 2001</li> <li>• Increase the number of green products offered for sale by 20 percent by 2003</li> </ul>				
<b>Project Tasks</b>				
Task	Start Date	End Date	Total Hours	Personnel
Conduct a PPOA at the commissary to identify opportunities for reducing waste management costs	9/15	9/15	8 to 10	Store manager Clerks Environmental coordinator
Conduct an energy audit at the commissary to identify opportunities	9/16	9/16	8	Store manager Clerks Facility energy manager
Research opportunities to market green products by contacting GSA and vendors	9/20	9/30	20 to 30	Store manager Environmental coordinator
Identify and screen projects	10/1	10/1	8	Store manager Clerks Environmental coordinator
Feasibility analysis	10/2	10/2	4	Store manager Environmental coordinator
Project implementation	10/5	10/15	40	Store manager Clerks
Monitor and measure progress	on-going	on-going		Store manager Clerks

**Figure 3. Example of a Pollution Prevention Program Plan Summary for a Commissary.**

# CHAPTER 5

## GATHERING APPROPRIATE DATA AND INFORMATION

Firm <u>ABC CORP</u> Site <u>LOS ANGELES</u> Date <u>MARCH, 1991</u>	Firm <u>ABC CORP</u> Site <u>LOS ANGELES</u> Date <u>MARCH, 1991</u>	Firm <u>ABC CORP</u> Site <u>LOS ANGELES</u> Date <u>MARCH, 1991</u>	Pollution Prevention Assessment Worksheets Prepared By <u>DGL</u> Checked By <u>DEP</u> Sheet <u>1</u> of <u>1</u> Page <u>6</u> of <u>18</u>
WORKSHEET 11	OPTION: Good O	WORKSHEET 6e	PRODUCTS SUMMARY
Firm <u>ABC CORP</u> Site <u>LOS ANGELES</u> Date <u>MARCH, 1991</u>	Firm <u>ABC CORP</u> Site <u>LOS ANGELES</u> Date <u>MARCH, 1991</u>	Firm <u>ABC CORP</u> Site <u>LOS ANGELES</u> Date <u>MARCH, 1991</u>	Pollution Prevention Assessment Worksheets Prepared By <u>DGL</u> Checked By <u>DEP</u> Sheet <u>1</u> of <u>1</u> Page <u>5</u> of <u>18</u>
WORKSHEET 10	WASTE Good O	WORKSHEET 6d	INPUT MATERIALS SUMMARY
Firm <u>ABC CORP</u> Site <u>LOS ANGELES</u> Date <u>MARCH, 1991</u>	Firm <u>ABC CORP</u> Site <u>LOS ANGELES</u> Date <u>MARCH, 1991</u>	Firm <u>ABC CORP</u> Site <u>LOS ANGELES</u> Date <u>MARCH, 1991</u>	Pollution Prevention Assessment Worksheets Prepared By <u>DGL</u> Checked By <u>DEP</u> Sheet <u>1</u> of <u>1</u> Page <u>4</u> of <u>18</u>
WORKSHEET 9	OPTION: Proc	WORKSHEET 6c	WASTE MINIMIZATION: Material Handling
Firm <u>ABC CORP</u> Site <u>LOS ANGELES</u> Date <u>MARCH, 1991</u>	Firm <u>ABC CORP</u> Site <u>LOS ANGELES</u> Date <u>MARCH, 1991</u>	Firm <u>ABC CORP</u> Site <u>LOS ANGELES</u> Date <u>MARCH, 1991</u>	Pollution Prevention Assessment Worksheets Prepared By <u>DGL</u> Checked By <u>DEP</u> Sheet <u>1</u> of <u>1</u> Page <u>3</u> of <u>3</u>
WORKSHEET 8	WASTE Reuse	WORKSHEET 6b	WASTE MINIMIZATION: Material Handling
Firm <u>ABC CORP</u> Site <u>LOS ANGELES</u> Date <u>MARCH, 1991</u>	Firm <u>ABC CORP</u> Site <u>LOS ANGELES</u> Date <u>MARCH, 1991</u>	Firm <u>ABC CORP</u> Site <u>LOS ANGELES</u> Date <u>MARCH, 1991</u>	Pollution Prevention Assessment Worksheets Prepared By <u>DGL</u> Checked By <u>DEP</u> Sheet <u>1</u> of <u>1</u> Page <u>2</u> of <u>18</u>
WORKSHEET 7b	WASTE	WORKSHEET 6a	WASTE MINIMIZATION: Material Handling
Firm <u>ABC CORP</u> Site <u>LOS ANGELES</u> Date <u>MARCH, 1991</u>	Firm <u>ABC CORP</u> Site <u>LOS ANGELES</u> Date <u>MARCH, 1991</u>	Firm <u>ABC CORP</u> Site <u>LOS ANGELES</u> Date <u>MARCH, 1991</u>	Pollution Prevention Assessment Worksheets Prepared By <u>DGL</u> Checked By <u>DEP</u> Sheet <u>1</u> of <u>1</u> Page <u>1</u> of <u>3</u>
WORKSHEET 7a	WASTE S	WORKSHEET 5	WASTE SOURCES
Attribute Waste ID/Name: Source/Origin Annual Generation Rate (units/year) Hazardous Component Name Annual Rate of Component(s) of Concern	Meeting Format (e.g., brainstorming, no) Meeting Coordinator Meeting Participants Suggested Waste Minimization A. General Handling Techniques Quality Control Check Return Obsolete Material to Supplier Minimize Inventory	Waste Source: Material Handling Off-spec materials Obsolete raw materials Obsolete products Spills and leaks (liquids) Spills (powders) Empty container cleaning Container disposal (metal) Container disposal (paper, plastic)	Significance at Plant Low Medium High / / / / / / /

## CHAPTER 5

# GATHERING APPROPRIATE DATA AND INFORMATION

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### ***Typical Operations and Associated Waste Streams***

*Receiving Areas (e.g.,  
loading docks)*

- *Packaging materials*
- *Off-spec materials*
- *Damaged containers*
- *Spill residue*
- *Transfer line leaking or  
dumping*

*Material and Product  
Storage Areas (e.g., tanks,  
warehouses, drum storage  
yards, storerooms)*

- *Tank bottoms*
- *Off-spec and excess  
materials*
- *Spill residue*
- *Leaking pumps, valves,  
and pipes*
- *Damaged containers*
- *Empty containers*

*Production Areas (e.g.,  
melting, curing, baking,  
distilling, washing, coating  
machinery, formulating)*

- *Washwater*
- *Solvents*
- *Still bottoms*
- *Off-spec products*
- *Catalysts*
- *Empty containers*
- *Sweepings*

### **5.1 Introduction**

Once goals have been established, the PPOA team has a better idea of what information needs to be collected during the assessment. For instance, to reach the goal of reducing air emissions by 20 percent, the team should first inventory sources of air emissions. Specific objectives for meeting the goals can be developed based on the results of the emissions inventory, for example:

- Finding substitutes for high VOC coatings
- Replacing gasoline powered vehicles with electric or natural gas powered vehicles
- Replacing solvent-based degreasers with aqueous cleaners.

The purpose of preparing a waste generation baseline is to build a comprehensive picture of the materials usage patterns and environmental impacts associated with the facility process or activity.

Whether preparing a PPOA or a program plan, the team must construct a comprehensive picture of the facility or process. The following questions need to be addressed:

1. What materials enter the facility process and in what volumes?
2. What operations occur at the facility process?
3. What wastes are generated as a result of the operations?
4. What other impacts does the facility process have on the environment?
5. How are wastes and emissions managed?

## ***Gathering Appropriate Data and Information***

6. What procedures have been established to prevent accidental releases?
7. What pollution prevention measures has the facility process already taken?

Developing a baseline is like preparing a material balance: the goal is to track the flow of materials as they enter the facility, are used in processes, and exit the facility as waste. Although in practice it may prove impossible to develop an accurate quantifiable material balance, the concept can still serve as a useful tool for understanding the facility as a whole. A list of data sources that should be compiled before a site visit is presented in Table 7.

### **5.2 Preparing the Baseline**

What kind of information should be collected for a facility PPOA baseline? The information collected depends to a large extent on the particular goals and objectives. At a minimum, however, the data collected should include the following:

#### **Raw Materials**

- Purchase cost, weight, hazardous or nonhazardous nature, and volume of procured raw materials
- Inventory practices.

*The baseline is like a material balance for evaluating materials throughout.*

#### **Waste Streams and Environmental Releases**

- Volume and characteristics of hazardous wastes generated, waste management and disposal costs
- Volume and characteristics of solid wastes generated, waste management and disposal costs
- Volume and characteristics of air emissions and waste management costs
- Volume and characteristics of wastewater discharges and management costs
- Other releases and environmental impacts.

*The baseline contains:*

- *Raw materials*
- *Waste streams and environmental releases*
- *Utilities*
- *Production.*

## Chapter 5

**TABLE 7. DATA SOURCES FOR FACILITY INFORMATION**

<b>Regulatory Information:</b> <ul style="list-style-type: none"> <li>• Waste shipment manifests</li> <li>• Emission inventories</li> <li>• Biennial hazardous waste reports</li> <li>• Waste, wastewater, and air emissions analyses, including intermediate streams</li> <li>• Environmental audit reports</li> <li>• Permits and/or permit applications</li> <li>• Form R for SARA Title III Section 313</li> </ul>	<b>Raw Material/Production Information:</b> <ul style="list-style-type: none"> <li>• Product composition and batch sheets</li> <li>• Material application diagrams</li> <li>• Product and raw material inventory records</li> <li>• Operator data logs</li> <li>• Operating procedures</li> <li>• Production schedules</li> </ul>
<b>Process Information:</b> <ul style="list-style-type: none"> <li>• Process flow diagrams</li> <li>• Design and actual material and heat balances for: <ul style="list-style-type: none"> <li>- Production processes</li> <li>- Pollution control processes</li> </ul> </li> <li>• Operating manuals and process descriptions</li> <li>• Equipment lists</li> <li>• Equipment specifications and data sheets</li> <li>• Piping and instrument diagrams</li> <li>• Plot and elevation plans</li> <li>• Equipment layouts and logistics</li> </ul>	<b>Accounting Information:</b> <ul style="list-style-type: none"> <li>• Waste handling, treatment, and disposal costs</li> <li>• Water and sewer costs, including surcharges</li> <li>• Costs for nonhazardous waste disposal, such as trash and scrap metal</li> <li>• Product, energy, and raw materials costs</li> <li>• Operating and maintenance costs</li> <li>• Department cost accounting reports</li> </ul> <b>Other Information:</b> <ul style="list-style-type: none"> <li>• Environmental policy statements</li> <li>• Standard operating procedures</li> <li>• Organizational charts</li> </ul>

### Utilities

- Utility consumption and costs
- Maintenance of on-site utilities (e.g., emergency generators).

### Production Factors

- The amount of product or service produced per year
- Number of employees, type of work schedule (shift work, "9 to 5"), and hours of labor associated with tasks of interest.



## ***Gathering Appropriate Data and Information***

Ideally, records pertaining to the information outlined above would be available for 5 years or more. Having a larger data set enables the PPOA team to discount one-time events that may skew the data for a particular year (e.g., a significant hazardous waste spill).

### **5.3 Baseline Management Recommendations**

Developing a baseline at the facility level requires careful organization and planning, particularly if the facility is large. The following suggestions may prove helpful:

- **Selecting PPOAs** — The facility should identify specific PPOAs based on its goals and objectives; conducting site visits at all facility operations is resource intensive and probably unnecessary.
- **Information Collection** — Prior to conducting the assessments, the team should conduct a preassessment and prepare worksheets tailored to the operations that the team will be assessing.
- **Establishing a Schedule** — The team coordinator should develop a logical sequence for conducting the site visits. For instance, it may make more sense for the team to finish all the site visits related to a particular issue (e.g., solvent substitution) before beginning the visits for another issue. When developing the interview schedule, the team coordinator should be careful to include time for follow-up questions and communication between the PPOA team members. Depending on the scope of the program plan, the team coordinator may find it useful to schedule general information collection interviews with upper management in addition to the site visits with the technical staff.
- **Information Management** — Once the PPOAs are underway, the team will collect pages and pages of information. The team coordinator should establish a system for ensuring that information is collected,

*The Air Force Space Command's Pollution Prevention Management Plan's baseline reflects the Air Force's goals. Baseline information will be collected for the following:*

- *Ozone depleting compound purchases*
- *EPA's 17 industrial toxic chemicals purchases*
- *Hazardous waste disposal*
- *Municipal solid waste disposal*
- *Volatile air emissions*
- *Affirmative procurement*
  - *Paper*
  - *Non-paper*

#### ***Baseline Recommendations***

- *Know where to conduct PPOAs*
- *Know how to collect information*
- *Know how to schedule PPOA's*
- *Know how to organize information*
- *Know how to identify opportunities*

## **Chapter 5**

organized, and stored in an efficient manner. A simple file system may work well, or if many documents are obtained, a computer database to track the documents may be necessary.

- **Identifying Options** — During the baseline development phase, team coordinators should encourage team members to identify pollution prevention opportunities and options. Keeping track of the opportunities during the site visit phase enables the coordinator to shift resources to the most productive areas as they are identified. Answers to technical questions can also be obtained while the team is on-site.
- **Keep Going** — The team coordinator should use his or her best professional judgement to determine when the costs associated with gathering information exceed the benefits. If a facility's environmental records are poorly maintained, the team will have to devote extra resources to information collection. Based on the preassessment interview with the facility manager, the team coordinator should be able to determine which information is worth collecting and in what situations the costs outweigh the benefits.

### **5.3.1 Developing a Baseline by Conducting a Site Visit**

After becoming familiar with the shop's goals and objectives, the PPOA team should identify areas or operations where additional information is needed. To do this, the PPOA team should conduct a preassessment.

A preassessment is particularly important if the PPOA team comprises people from outside the shop. At a minimum, the PPOA team should obtain a process description, flow diagram, product description, and reports containing waste generation statistics. The preassessment is a good opportunity to ask the environmental coordinator about the shops's pollution prevention goals and about projects that have already been identified or completed. The preassessment helps the PPOA team formulate questions and identify areas of special interest. In the case of a large facility, the information gathered during the preassessment may also help in the selection of the PPOA team members.

## ***Gathering Appropriate Data and Information***

The EPA has developed a series of worksheets to assist PPOA teams in developing the baseline. A complete set of the worksheets appears in Appendix H. The worksheet series is outlined in Table 8. Figure 4 shows a completed worksheet for assessing waste sources at a hypothetical facility.

The worksheets are only examples of the kinds of questions the PPOA team might find useful. After the preassessment, the PPOA team should tailor the worksheets to suit its needs. Teams may find that some of the worksheets are not necessary for a given facility, or, conversely, the team may need to add specific technical questions or worksheets.

During the site visit, the PPOA team should use worksheets #1 through #8a to gather the information targeted during the preassessment as well as to record observations about the operations and general appearance of

**TABLE 8. PPOA WORKSHEET TITLES**

<b>Worksheet No.</b>	<b>Title</b>
Worksheet 1	Waste Sources
Worksheet 2	Waste Minimization: Material Handling (2a, 2b, and 2c)
Worksheet 3	Input Materials Summary
Worksheet 4	Products Summary
Worksheet 5	Option Generation: Material Handling
Worksheet 6	Process Description (6a, 6b, 6c, 6d, and 6e)
Worksheet 7a	Waste Stream Summary
Worksheet 7b	Waste Minimization
Worksheet 8	Waste Minimization: Reuse and Recovery
Worksheet 9	Option Generation: Process Operation
Worksheet 10	Waste Minimization: Good Operating Practices
Worksheet 11	Option Generation: Good Operating Practices

## Chapter 5

Firm <u>Air Force Base</u> Site <u>#7</u> Date <u>8/30/93</u>	<b>Pollution Prevention Assessment Worksheets</b>  Proj. No. <u>3</u>	Prepared By <u>Sam Smith</u> Checked By <u>G. Clark</u> Sheet <u>4</u> of <u>4</u> Page <u>1</u> of <u>2</u>
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<b>WORKSHEET 4</b>	<b>INPUT MATERIALS SUMMARY</b>
------------------------	--------------------------------

Attribute	Description		
	Stream No. <u>1</u>	Stream No. <u>2</u>	Stream No. <u>3</u>
Name/ID			
Source/Supplier			
Component/Attribute of Concern	HEK		
Annual Consumption Rate	5,000 gal.		
Overall			
Component(s) of Concern	HEK, Heavy metals		
Purchase Price, \$ per <u>55 gal.</u>	\$25.00		
Overall Annual Cost	\$2,272.00		
Delivery Mode <sup>1</sup>	Truck		
Shipping Container Size & Type <sup>2</sup>	55 gal.		
Storage Mode <sup>3</sup>	Drums		
Transfer Mode <sup>4</sup>	Truck		
Empty Container Disposal Management <sup>5</sup>	DRMO		
Shelf Life	No Date		
Supplier Would			
— accept expired material? (Y/N)	N/A		
— accept shipping containers? (Y/N)			
— revise expiration date? (Y/N)			
Acceptable Substitute(s), if any	Benzyl Alcohol		
Alternate Supplier(s)	Based Product		
	N/A		

Notes:

1. e.g., pipeline, tank car, 100 bbl tank truck, truck, etc.
2. e.g., 55 gal drum 100 lb paper bag, tank, etc.
3. e.g., outdoor, warehouse, underground, aboveground, etc.
4. e.g., pump, forklift, pneumatic transport, conveyor, etc.
5. e.g., crush and landfill, clean and recycle, return to supplier, etc.

Figure 4. Completed example of Worksheet 4.

## ***Gathering Appropriate Data and Information***

the facility (e.g., evidence of leaks and spills). Other sources of facility information which the PPOA team may refer to while on-site are:

- Permits and/or permit application
- Environmental audit reports [e.g., DoD's Environmental Compliance Audit System (ECAS) reports]
- Biennial hazardous waste reports
- Material Safety Data Sheets (MSDSs)
- Product composition and batch sheets
- Operator data logs
- Waste handling, treatment, and disposal costs
- Water and energy costs
- SOPs

Although record reviews are informative, the best way to find out what is occurring is to talk to as many people at as many levels in the shop as possible. Observing the workers doing their jobs is another very important technique. The longer a PPOA team can watch a process, the better. In some cases, the team might find it necessary to return to a process during different shifts. Understanding SOPs for how paint is supposed to be mixed is one story; understanding how shop workers actually mix the paint is sometimes another.

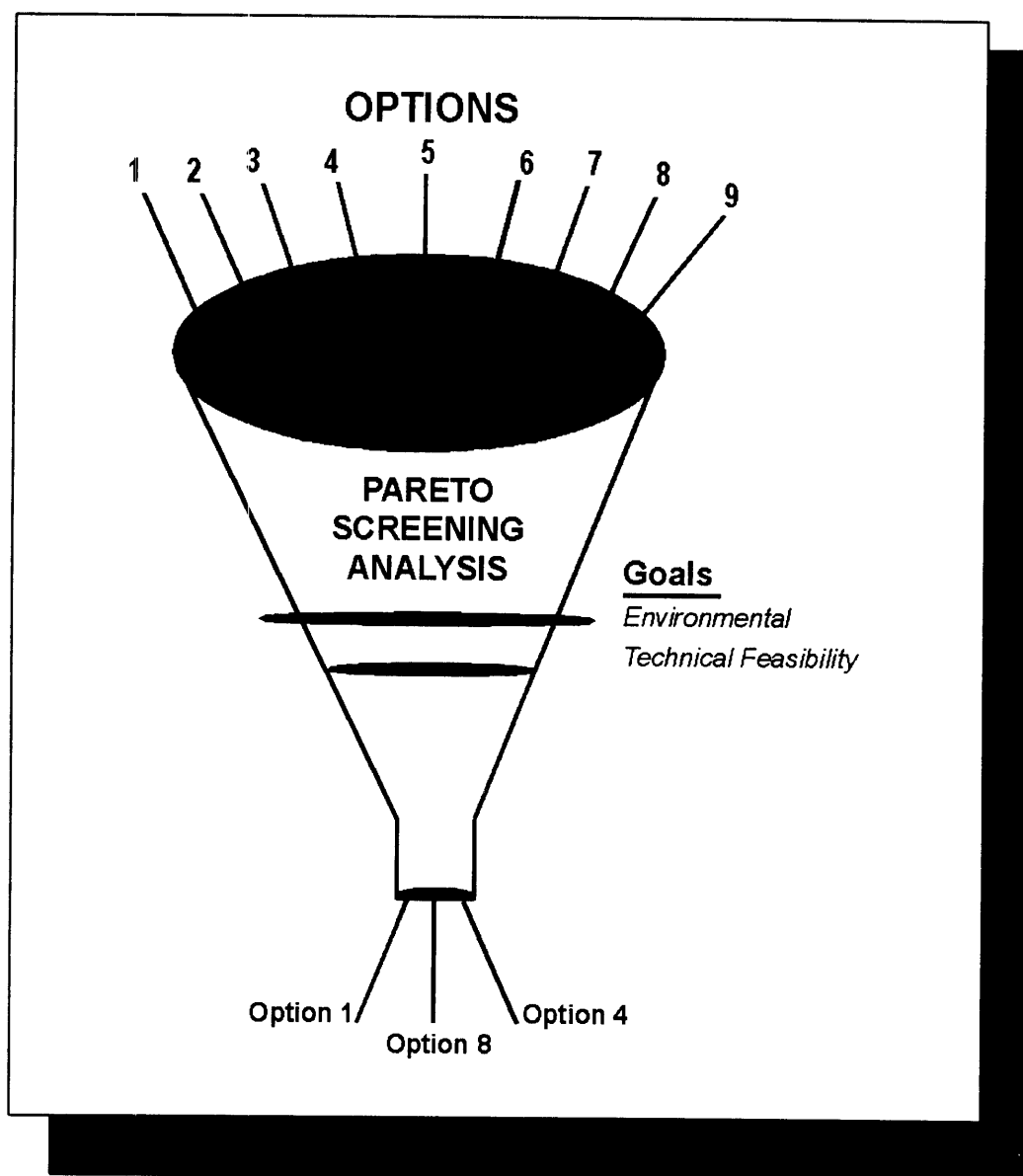
The PPOA team must keep in mind that the assessment is not intended to identify improper practices. In explaining the purpose of the PPOA to shop employees, the team should emphasize that it is not performing a compliance audit. Since shop employees are often good sources of pollution prevention ideas, the team must gain their trust and respect. The team should make an effort to document any source reduction and recycling projects that may already have been implemented.



## CHAPTER 6

### IDENTIFYING AND SCREENING POLLUTION PREVENTION ALTERNATIVES

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## **CHAPTER 6**

# **IDENTIFYING AND SCREENING POLLUTION PREVENTION ALTERNATIVES**

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During the site visit and the record review, the PPOA team will have identified several preliminary source reduction and recycling opportunities. Conducting a brainstorming session after the site visit is an effective method to get the team together to compare notes and clarify the options. Using worksheets the team can record the options and begin to identify follow-up steps. The team should hold the session immediately after the site visit to take advantage of impressions and observations that may be forgotten later.

An example of a list of general pollution prevention options for a Federal site (an agricultural laboratory) is presented in Table 9.

Because of time and resource constraints, most facilities have to prioritize their projects based on the original pollution prevention goals and criteria specific to the shop. Examples of criteria are the following:

- Complying with regulations (present and anticipated compliance issues such as a product phaseout)
- Reducing volume of waste generated
- Reducing the cost of waste disposal and raw material purchases
- Reducing toxicity — risk to human health and the environment
- Reducing the impact on regional environmental concerns (e.g., ground water contamination, endangered species habitat)

Another criterion for evaluating projects is the project's contribution to the development of a pollution prevention program either at the shop or facility level. Structuring projects that are inexpensive and easily implemented will build program recognition and acceptability.



## *Identifying and Screening Pollution Prevention Alternatives*

**TABLE 9. EXAMPLE OF GENERAL POLLUTION PREVENTION OPTIONS  
FOR A FEDERAL LABORATORY SITE**

Technique	Option
Training and assessment	<ul style="list-style-type: none"> <li>Expand on the existing pollution prevention ethic with further education and training. Successful efforts are already underway including paper recycling and source reduction in individual operations.</li> <li>Appoint a pollution prevention "officer" within each research institute to assist researchers with reduction and recycling initiatives. Pollution prevention representatives from all the institutes could meet periodically to discuss and compare efforts. Such information transfer, crucial for the adoption of pollution prevention throughout the organization, reduces repetitive pollution prevention development efforts. For example, DOE's Sandia National Laboratories has a pollution prevention network where 60 people throughout the laboratory are points of contact.</li> <li>Develop and implement a plan to conduct periodic pollution prevention laboratory assessments using suitable in-house expertise. Such assessments may uncover additional pollution prevention opportunities; they emphasize BARC's commitment to pollution prevention. They can also be used to monitor the success of pollution prevention efforts.</li> </ul>
Process or equipment modification	<ul style="list-style-type: none"> <li>Keep abreast of commercially available technology changes as they relate to laboratory pollution prevention. When new technology is too expensive for individual laboratories to implement, consider pooling resources and locating instruments at a centralized facility which may be used by several laboratories.</li> </ul> <p>Reduce atmospheric emissions of chemicals from laboratories as part of a comprehensive pollution prevention program. Glassware and automated extraction systems to reduce these emissions are commercially available. In addition, for some samples, emissions can be reduced through solid-phase extraction techniques as opposed to classical liquid evaporation techniques that release the solvent carrier into the fume hood and subsequently to the atmosphere.</p>
Waste segregation	<ul style="list-style-type: none"> <li>Segregate hazardous from nonhazardous wastes. Hazardous waste volumes are often unnecessarily increase because of the addition of waste streams that are not hazardous. Segregation alone can significantly reduce hazardous waste generation rates and disposal costs.</li> </ul>
Pollution prevention policy	<ul style="list-style-type: none"> <li>Require each laboratory to have a written waste management/reduction policy. Minimum requirements would include annual chemical inventories, the dating of chemicals as received, etc.</li> </ul>

[Source: WREAFS PPOA: U.S. EPA-RREL. USDA Beltsville Agricultural Research Center Beltsville, MD (EPA/600/SR-93/008)]

## **Chapter 6**

### **6.1 Pareto Analysis**

One of the most effective screening tools is known as the Pareto analysis. The Pareto analysis is helpful in targeting problem areas and sources as illustrated in Figures 5 and 6. A Pareto analysis examines the environmental data in a visual form to help pinpoint problem areas. Pareto analysis is accomplished with the use of the Pareto chart (see Figure 5). Pareto analysis is often used in quality management to identify quality defects or production costs. Small shops may not need a Pareto analysis since the major environmental issues at these types of shops may be obvious. Pareto analysis is more appropriate for medium to large facilities with many different operations, waste types, and potential environmental concerns and impacts which may require more in-depth targeting analysis.

To conduct a Pareto analysis, the Pollution Prevention Team and upper management should select the most important critical factors. Figure 5 is a Pareto analysis of waste data from a hypothetical Army installation. In this case, hazardous waste is the largest quantity of waste generated and also the most expensive to manage. Based on this analysis, the installation may want to focus pollution prevention efforts on reducing hazardous waste generation and/or disposal. The next step is to determine the organizations responsible for the target waste (see Figure 6). Once the organizations have been determined, specific processes need to be targeted using another Pareto analyses. The Team should continue performing the Pareto analysis until a group of targeted problem areas emerge.

An advantage to this type of analysis lies in its use of readily available data and its focus on select issues, (e.g., waste quantities and disposal costs). A drawback is that it does not account for other critical factors.

#### **6.1.1 Screening Methods**

There are two steps involved in prioritizing pollution prevention projects. The first step is to narrow the list of identified projects to a manageable number. For example, if the PPOA team has identified 50 potential options but only

### *Identifying and Screening Pollution Prevention Alternatives*

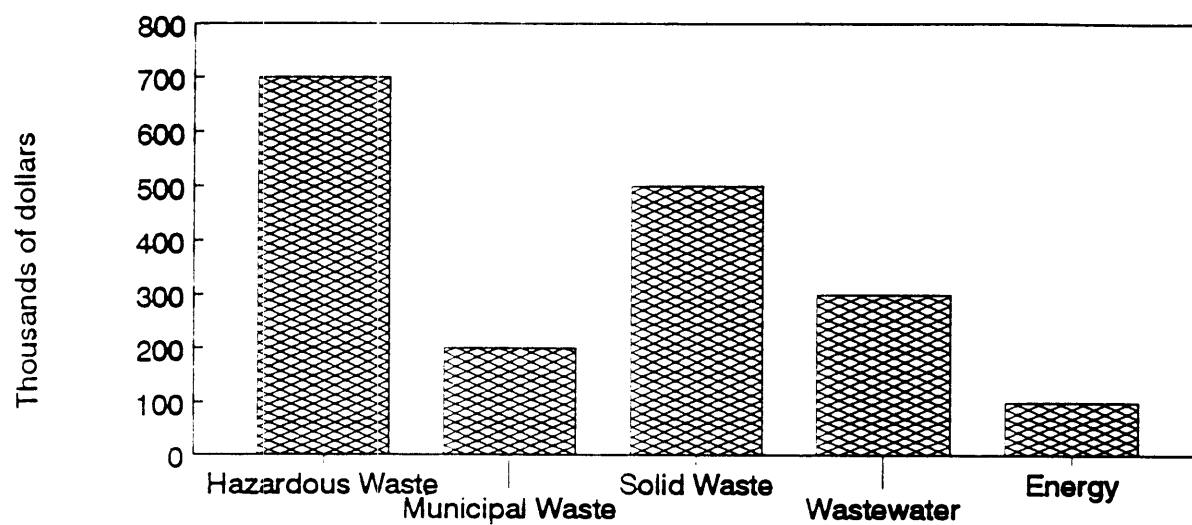


Figure 5. Pareto Chart Example.

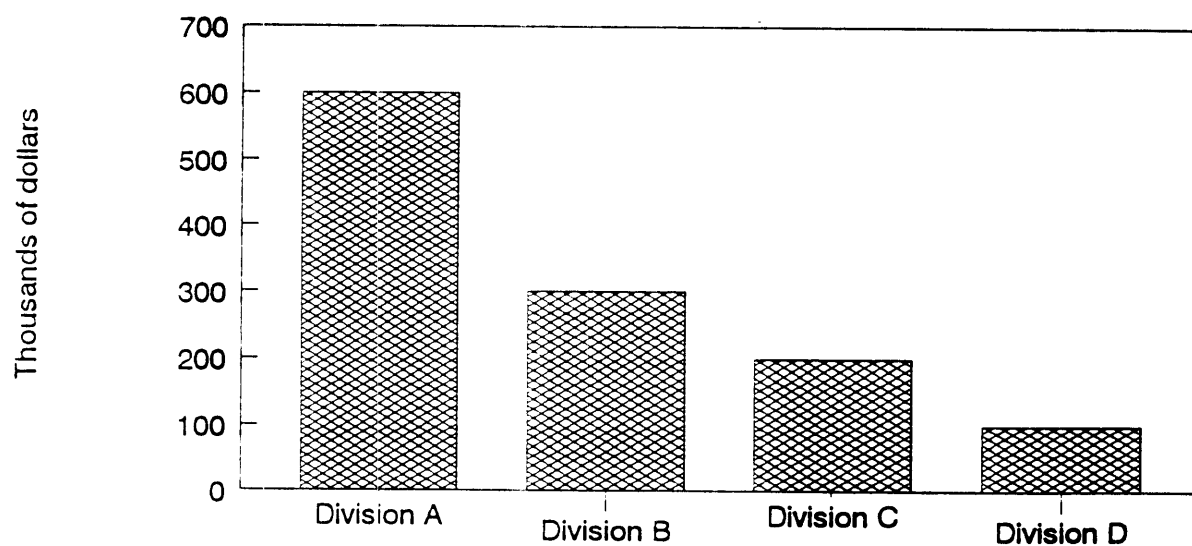


Figure 6. Pareto Analysis.

## **Chapter 6**

has resources for implementing 10, the team should first eliminate 40 options using a screening method (the 40 options should be put on hold for future evaluations).

The second step is to rank the options (in this example, 10 options) by comparing each option to the program plan criteria using a tool known as the decision matrix. Ranking the options gives the PPOA team a better understanding of each project's relative strengths and weaknesses.

### **6.1.2 The Decision Matrix**

Once the PPOA team has narrowed down the list of options using the Pareto analysis, it is ready to rank the options. The decision matrix is another powerful tool that can be used to set priorities among pollution prevention options (i.e., rank the options by a list of critical factors that are important to the facility). The decision matrix enables a simultaneous examination and comparison of different pollution preventions alternatives. It facilitates an “apples-to-apples” comparison of options based on the selected list of critical factors, and, therefore, facilitate the group decision-making process.

To use the decision matrix, one should first assign either a numerical ranking to each of the critical factors, such as 1-10, or general terms such as “high,” “medium,” or “low.” This approach can also be used if there is insufficient information for performing a quantitative ranking. In these cases, the coordinator should rely on his/her best professional judgement to assign a ranking.

The pollution prevention coordinator can also decide on appropriate weighting factors. For example, s/he may decide that estimated worker exposure issues are four times more important than future regulations. In this case, s/he would multiply the results of the criteria ranking by a factor of 4 to give this issue increased relative importance. As seen in Table 10, the final product of the decision matrix is a list of options ranked in order of priority. If several projects have the same numerical value, rank the “tied” options using additional criteria such as:

## ***Identifying and Screening Pollution Prevention Alternatives***

- Projected ease of reducing waste
- Downtime considerations
- Availability of people from the operating activity to participate on the pollution prevention working team
- Necessity of revising SOPs, military specifications, or technical orders
- Impact on the facility's mission.

*Typical technical evaluation criteria:*

- *Will the project reduce waste?*
- *Is the system safe for workers?*
- *Will product quality be improved or maintained?*
- *Are the new equipment, materials, or procedures compatible?*

After the decision matrix ranking process is complete, a ranked list of those options that deserve the most immediate attention will be generated.

A quantitative ranking of pollution prevention options for a USPS facility is presented in Table 10.

Once the list of projects has been narrowed down, based on the ranking process, additional research may be required to determine whether the projects are truly feasible. This reality check includes a technical evaluation to ensure that a project is technically appropriate, an environmental evaluation to weigh the project with regard to environmental goals, and an economic evaluation to assess the costs.

**TABLE 10. EXAMPLE OF A DECISION MATRIX USED AT A USPS FACILITY**

Criteria	Water Borne Coating	HVLP Spray Gun	Gun Washer Station
Reduction in occupational hazard	5	5	5
Reduction of a RCRA-regulated waste	5	5	4
Reduction of a 33/50 Program chemical	5	4	4
Reduction of environmental impact	4	4	2
Capital cost	3	4	2
Ease of implementation	2	2	3
Total	24	24	22

5 = very positive; 4 = positive; 3 = neutral; 2 = negative; 1 = very negative

(Source: Adapted from the USPS Pollution Prevention Opportunity Assessment at a Vehicle Maintenance Facility, Buffalo, NY.)

## Chapter 6

*Upper management  
should always be in the  
loop.*

The key to a successful reality check is making sure that the right people are involved. If the project requires either purchasing new equipment or changes to operating procedures, the shop should seek the opinions of the staff who will be most directly affected by the changes. Building staff support early on in the implementation phase helps pave the way for later cooperation.

In the case of equipment purchases, technical expertise may have to be sought from outside the shop either at the facility level or from other organizations. One of the best ways to avoid purchasing a white elephant is to talk to people who have already purchased similar equipment. By taking advantage of outreach programs such as the EPA's PIES system, a computer bulletin board, contacts can be identified in an efficient manner.

Some vendors are willing to perform an on-site equipment demonstration at no cost. Vendors may also lease equipment on a trial basis. Operator training and follow-up troubleshooting and repairs are other services that vendors typically provide.

The purpose of the environmental evaluation is to weigh the advantages and disadvantages of a proposed pollution prevention option with regard to the environment. True pollution prevention results in the elimination or reduction of an environmental pollutant rather than simply shifting the pollutant from one medium to another, for example, trading an air release for a water release. The environmental trade-offs should be carefully considered during project evaluation. Projects that do create new releases of pollutants should be carefully assessed. In some cases, trade-offs may be necessary because of the nature of the operation, for example, parts washing.

Replacing a hot caustic washing system with an aqueous jet washer reduces the use of toxic substances and air emissions; however, the jet washer releases contaminated wastewaters. A true source reduction option would be to prevent the part that needs to be cleaned from becoming soiled in the first place, or if that is impossible, to clean only when it is absolutely necessary.

## ***Identifying and Screening Pollution Prevention Alternatives***

Another example of an environmental trade-off decision is whether to switch from stocking plastic grocery bags to paper bags for use at a commissary. Plastic bags are petroleum-derived products, and they degrade slowly in a landfill. Incineration may contribute to the release of hazardous substances to the atmosphere. On the other hand, the process for manufacturing paper bags is energy intensive and involves hazardous chemicals. Residence times in landfills is also very long.

Another pollution prevention option for a commissary may be to reduce packaging wastes by buying time-sensitive products in bulk; however, if the inventory is not assessed accurately, buying in bulk may result in an increase in expired materials.

### **6.2 Economic Screening Methods**

This topic can be very complex in terms of the economic tools available to assess costs, to calculate the time value of money, and to define the variables affecting the costs of a pollution prevention option. However, the most common method of determining cost and ranking projects is that of the payback calculation. A payback calculation simply involves a determination of how much time will pass before the proposed pollution prevention option saves enough money or avoid enough costs to pay for itself. To assess this situation, the pollution prevention team should collectively discuss the pros and cons of each option and attempt to estimate the costs associated with both tangible and intangible aspects of its implementation. Program managers need to review the costs estimated to ensure that as many of the avoided costs and as accurate an estimate of capital and annual operating and maintenance costs have been assessed as possible. This will mean review of the notes and calculation sheets of the team, especially those coming from the vendor of the equipment or technology. Payback calculations can be as simple as the following equation:

$$\frac{\text{Startup costs}}{(\text{avoided costs} - \text{annual costs})} = \text{Payback}$$

## Chapter 6

A simple example of a payback calculation is presented below in Example 8.

This type of analysis does not delve into intangible costs (e.g., training of the operators of the recycling unit) or benefits (e.g., reduced worker exposure to antifreeze and the mixture). It does, however, cover the majority of the funding requirements for the option and allows prioritization of this option with others based on payback.

### Example 8 A Simple Payback Calculation

A motorpool desires an economic evaluation of an option to install an antifreeze recycling system, with 5 independent collectors carts to better manage the antifreeze change-outs. The motorpool disposes of 3,175 gallons of waste antifreeze mixture each year; the mix is 60 percent coolant and 40 percent water. The start-up costs are estimated to be \$9,360, based on:

5 collector units at \$928 each =	\$4,640
1 recycler unit at \$4,720 each =	<u>\$4,720</u>
	\$9,360

Avoided costs, based on 85 percent recovery from the recycler, reduced raw material costs, reduced disposal costs (including both the cost to dispose of bottles and antifreeze volumes), and reduced rental costs for the disposal bin are calculated:

Disposal volume cost avoided =	\$ 9,960
Raw material cost avoided =	\$ 8,712
Bottle disposal avoided =	\$ 109
Reduced container rental =	<u>\$ 1,215</u>
	\$ 19,996

Annual costs were estimated to include electricity, deionized water (DI) and enough inhibitor to treat the recycled antifreeze. Also, disposal of the 15 percent volume of antifreeze mix not recyclable is included. The annual costs estimated for this option are:

Utilities, DI water, and inhibitor =	\$1,620
Disposal costs =	<u>\$1,500</u>
	\$3,120

The payback calculation for this example is then:

$$\frac{\$9,360}{\$19,996 - \$3,120} = .55 \text{ years, or 6.6 months}$$



## ***Identifying and Screening Pollution Prevention Alternatives***

This type of calculation parallels the cost/benefit ratio that is performed using Worksheet 9 of the *Facility Pollution Prevention Guide*. More sophisticated calculations to determine net present value and internal rate of return may be conducted. In addition, a “Primer for Financial Analysis of Pollution Prevention Projects” has been published and is available as EPA/600/R-93/059.

The Air Combat Command of the U.S. Air Force has recently published a “Memorandum for Pollution Prevention Program Managers on Justifications for Pollution Prevention Equipment and Projects.” It defines 10 sub-categories of environmental benefit to be derived:

1. Reduce the demand for the EPA 17 Industrial Toxics Project Chemicals.
2. Reduce the demand for other hazardous materials.
3. Recycle hazardous material.
4. Recycle nonhazardous material.
5. Reduce hazardous waste disposal volume.
6. Reduce hazardous material disposal toxicity.
7. Reduce harmful air emissions.
8. Reduce harmful water emissions.
9. Reduce municipal solid waste volume.
10. Intangible benefits: improved image of the Air Force, easier compliance reduced potential cleanup liability, etc.

More definition of economic terms and concepts, as well as applications of the more sophisticated LCA, LCC, and TCA is provided in Appendix A.



## CHAPTER 7

# IMPLEMENTING AND MEASURING THE SUCCESS OF POLLUTION PREVENTION

### The Procedure for Conducting Pollution Prevention Opportunity Assessments

The recognized need to minimize waste



#### PLANNING AND ORGANIZATION

- Get management commitment
- Set overall assessment program goals
- Organize assessment program task force

Assessment organization ↓ and commitment to proceed

#### ASSESSMENT PHASE

- Collect process and facility data
- Prioritize and select assessment targets
- Select people for assessment teams
- Review data and inspect site
- Generate options
- Screen and select options for further study

Assessment report ↓ of selected options

#### FEASIBILITY ANALYSIS PHASE

- Technical evaluation
- Economic evaluation
- Select options for implementation
- Review data and inspect site

Final report, including ↓ recommended options

#### ➤ IMPLEMENTATION

- Justify projects and obtain funding
- Installation (equipment)
- Implementation (procedure)
- Evaluate performance



Successfully implemented pollution  
prevention projects

Select new  
assessment targets  
and reevaluate  
previous options

Repeat the process

# CHAPTER 7

## IMPLEMENTING AND MEASURING THE SUCCESS OF POLLUTION PREVENTION

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*A pollution prevention program plan that exhibits a sound methodology for identifying, prioritizing, and selecting pollution prevention projects can itself be used to attract capital investment in pollution prevention projects.*

### 7.1 Implementing Pollution Prevention

The schedule for implementing pollution prevention projects or a program should be closely tied to the facility's short-, mid-, and long-term goals. Designing a schedule is similar to devising a personal investment strategy: an investor typically selects a mixture of stock, bond, and money market options, each associated with varying degrees of risk and dividends. Scheduling the tasks and projects that make up the pollution prevention program plan is a balancing act to ensure that projects with a longer payoff come to maturity at the desired time; low-cost projects with a quick payback should be implemented early on to gain program recognition. Understanding the nature of the projects is, therefore, important.

#### 7.1.1 Understanding Project Types

Pollution prevention projects fall into three general types: foundation, action, and support. Most program plans will probably contain a few of these three project types. A discussion of the three types of pollution prevention projects follows; examples are provided using projects identified in the Yosemite National Park Waste Reduction Action Plan.

##### *Project Types*

- *Foundation — contribute to the development of the pollution prevention program*
- *Action — specific prevention activities*
- *Support — foster a pollution prevention ethic*

#### **Foundation Projects**

Foundation projects contribute to the development of the pollution prevention program. These projects often take the majority of funding in the initial years. When the basic support is in place, the funding needs for foundation projects virtually disappear.

## ***Implementing and Measuring the Success of Pollution Prevention***

Examples of foundation projects are developing hazardous material tracking systems, surveying fugitive emissions, or installing utility meters on individual processes. Additional analysis is often required to characterize the exact nature of a process that appears to present a pollution prevention opportunity. Without sufficient data, defining the exact nature of the pollution prevention opportunity is impossible.

Process-specific PPOAs, discussed in Chapter 3, are another type of foundation project. Pollution prevention process analyses are fundamental to the definition and implementation of specific prevention projects. The program planning process is used to identify the processes, operations, and activities that should be analyzed first.

### **Action Projects**

Action projects are specific prevention activities that directly reduce environmental impacts and wastes. Action projects are identified primarily during baseline development and from process-specific pollution prevention opportunity assessments. These projects often involve modifying processes or operations, for example with new equipment, improved housekeeping practices, revised SOPs, toxic use reduction techniques, toxic material substitutions, and material conservation practices. To implement process and operation modifications, the facility may need to buy and install equipment and/or change operating procedures. These projects often include testing, development, and training activities as part of their implementation.

Action projects also include policy changes to institutionalize pollution prevention. Many prevention activities will require policy modifications to formally adopt the new practice or procedure into the facility's mission. Further, existing policies may prohibit the favored prevention option or may even be directly responsible for generating waste. In such instances, facility or agency-wide policies may need to be modified so that they support pollution prevention.

*Yosemite National Park's Action Plan includes a project for evaluating the feasibility of implementing a comprehensive food and yard waste composting program.*

*Yosemite National Park will field test the use of re-refined motor oil in National Park Service vehicles. If the field tests are positive, the park will increase the purchase and use of recycled content products.*

*Yosemite National Park's Waste Reduction Action Plan calls for reviewing each of the Concessioner Operational Performance Standards used in the park. Suggestions will be offered on how to change the standards so they encourage (or require) recycling, composting, source reduction, and the purchase and use of recycled content of less toxic materials.*

*Yosemite National Park's Waste Reduction Action Plan includes a project to develop waste reduction and recycling education materials targeting visitors before they arrive at the Park to increase recycling levels and reduce solid waste.*

## Chapter 7

*Support activities help foster a pollution prevention ethic.*

*In order to secure long-term support and commitment, carefully select projects that are:*

- *Achievable in a realistic and short time frame*
- *High-profile, yielding extraordinary successes with small investments in time and money*
- *Action oriented rather than research and development oriented.*

*By emphasizing these criteria pollution prevention successes should come quickly, establishing the program and attracting future resources.*

### Support Projects

Support activities help foster a pollution prevention ethic both for the facility's personnel and the local community. Training is a typical support project. Training introduces pollution prevention to those who will be instrumental in making it happen. For example, training can teach the pollution prevention working teams how to implement a specific prevention technique, or it can teach shop personnel how to use a new piece of pollution preventing equipment.

Community outreach to inform the community of prevention projects and to solicit public support is another type of support project. Prevention projects may require the participation of the community to succeed, (e.g., implementing a recycling program).

From the start, the early success of the pollution prevention program may depend on showing successes very quickly. Upper management may buy into the concept of pollution prevention, but they may only give financial support for the concept once the facility has demonstrated how well it works. Therefore, the facility may choose to begin by implementing low cost projects with a high payback.

As the program progresses, the facility can then implement projects that are more time and resource intensive. This is not to say that easy-to-do projects should be pursued at the expense of large-investment, large-return projects. However, facilities should pursue a proper balance of projects to achieve results in the short term as well as the long term.

It is important to realize that straightforward prevention solutions can yield significant prevention gains. For example, a facility may dispose of solvents from parts cleaners (solvent sinks). This may constitute a simple pollution prevention opportunity that might be realized through the following types of techniques:

- Dispose of the solvent only when completely saturated with grease, oil, or other dirt (to the point where the solvent is unusable) rather than at scheduled intervals.
- Preclean dirty parts with a brush.

## ***Implementing and Measuring the Success of Pollution Prevention***

- Make sure all tanks are properly covered to minimize fugitive losses.
- Segregate waste solvent from other wastes such as oily wastes.

These actions can result in significant waste reduction, yet they are simple and can be implemented immediately without large capital investments. Meanwhile, a facility should also be looking at more significant pollution prevention options, for example:

- Substitute less hazardous alternative cleaning substances.
- Identify just how clean parts must be (e.g., whether some processes require parts to be cleaned at all).
- Identify whether operators are utilizing solvent sinks properly.

While it is important to initiate simple projects first, it is equally important to remember that more complex efforts may also be appropriate. In the long-term, *it is crucial that no prevention options be discarded on the basis of being difficult or expensive.*

*With the first series of projects underway, begin to raise longer term issues that will require investment as the short-term achievements are being demonstrated and documented.*

### **7.1.2 Techniques for Developing a Schedule**

Many pollution prevention coordinators find it helpful to develop a schedule for implementing specific pollution prevention actions. In general, the schedule is useful for the following:

- Planning each effort and sequences of efforts
- Establishing milestones
- Defining staffing needs for each project
- Documenting roles and responsibilities
- Establishing monitoring efforts
- Obtaining funding

## Chapter 7

The complexity of the schedule should match the facility's needs. If there are only a few projects, the facility may be able to schedule each independently. Keeping track of a few projects can be accomplished easily. For programs that involve numerous projects, however, the pollution prevention coordinator should define a schedule for initiating these actions. This is particularly important for projects requiring multiple actions simultaneously.

In the long run, many variables will impact and often delay the schedule. One of the most important variables is the availability of funding. To plan for interruptions, consider developing a schedule for the first 12 to 18 months of the program. Then, after 6 months, review and revise the schedule to reflect any changes. After the initial 12 to 18 months, the coordinator should review the prevention plan (see Step 6) to revise and refine it as needed. At this time, the coordinator can also extend and modify the implementation schedule.

Project implementation consists of three basic steps:

- Getting management commitment
- Making the modifications
- Evaluating the results.

### Getting Management Commitment

Upper management commitment is a critical component of project implementation. Ideally, the pollution prevention coordinator should secure upper management commitment prior to beginning the PPOA. Getting management on board can help remove organizational barriers and ensure that implementation proceeds smoothly. Regardless of whether the project ends up being successful or not, upper management should always be in the loop.

#### 7.1.3 Making the Modifications

Many pollution prevention projects will require changes in operating procedures, purchasing methods, or materials inventory control. Policies and procedures may also be affected by the changes. For projects that involve

*A PPOA requires:*

- *Direct involvement of the pollution prevention coordinator and facility staff*
- *Support by upper management*

*A fundamental lesson of pollution prevention education is to demonstrate the potential to improve operational efficiency and thus mission accomplishment.*

*The Air Force Center For Environmental Excellence (AFCEE) has established a pollution prevention training course for Air Force employees which includes hands-on practice in conducting opportunity assessments, case studies, team-building exercises, and lectures on the tools which comprise pollution prevention. For information on the AFCEE training course, call (210) 536-3517.*



## ***Implementing and Measuring the Success of Pollution Prevention***

equipment modifications or new acquisitions, getting a project off the ground is essentially the same as any other capital improvement project. The phases of the project include planning, design, procurement, construction, and operator training. As with other equipment acquisitions, it is important to get warranties from vendors prior to installation of the equipment. Training and incentive programs may be needed to get employees used to the new pollution prevention procedures and equipment.

Once a shop has implemented a project, the pollution prevention coordinator should take the time to evaluate and document its performance. Project implementation is always a learning experience, and conducting a thorough analysis is one way of streamlining the implementation process for future projects. Quantitative evaluation is the most straightforward way to determine whether the shop's pollution prevention goals are being met. The shop should choose criteria to use as measurements of progress prior to project implementation. The criteria for screening options (as discussed above) may overlap with the criteria for measuring progress.

### **7.2 Monitoring and Evaluation**

The pollution prevention program will change over time as projects are implemented and priorities shift. The planning process described in this manual is an iterative approach to reducing waste through pollution prevention. In most cases, pollution prevention team members work with the pollution prevention coordinator to solve identified problems, after which they return to the planning process and target another problem area.

Throughout this process, the pollution prevention coordinator, as the principal monitoring agent, must examine the progress in meeting specified objectives. For example, the coordinator might develop a checklist to monitor progress. This checklist could include the following questions:

- Are the shops making progress towards their pollution prevention objectives?

*No need to reinvent the wheel! Numerous pollution prevention training videos and materials are available. For a list, refer to the EPA's 1993 Reference Guide to Pollution Prevention Opportunities (EPA/742/B-93-001). Copies of the document are available from the Pollution Prevention Information Clearinghouse by calling (202) 260-1023.*

#### ***Newsletter Contact:***

*DOE-DP Pollution Prevention Advisor.  
Elizabeth McPherson  
(615)543-5422*

*DOE Federal Energy Management Program—  
Focus: Federal Energy Management Update.  
Rick Klimkos (202)586-8287*

*EPA Pollution Prevention News. U.S. EPA 401 M. St. SW, Washington, DC 20460*

*EPA Chemicals in Progress—Environmental Assistance Division (TS-799) Office of Pollution Prevention and Toxics, U.S. EPA 401 M. St. SW, Washington, DC 20460*

## Chapter 7

- Is the facility meeting the milestones that it laid out for itself during the goal setting exercise?
- Are certain team members acting as leaders in implementation and others acting as laggards?
- What issues are contributing to any lack of success?
- What is working well?

*A program that can measure and demonstrate the success is best able to attract future commitment of resources.*

Monitoring and evaluating pollution prevention progress is a last step in the program development process, and it is the only method for tracking the effectiveness of specific projects. The pollution prevention coordinator needs to measure the program's progress against the objectives selected by the Pollution Prevention Steering Committee. In areas where the facility falls short of expectations, the coordinator will need to adjust the program plan.

### 7.2.1 Monitoring Progress

In light of Executive Order No. 12856, Federal Agencies may begin to require facilities to submit progress reports documenting their pollution prevention achievements.

It is important for the pollution prevention coordinator to stay abreast of implementation problems and to address them in some manner. If implementation is not going well or if there are barriers to program implementation that cannot be overcome, it is the pollution prevention coordinator's responsibility to try to solve these problems. One mechanism for steering the program in the right direction is to develop a tracking system to monitor each project. The sophistication of the tracking system will depend on the size of the facility and the complexity of the processes.

For a small facility with few complex processes, tracking may be as simple as observing working team meetings or obtaining the working team meeting notes. At large facilities, however, a spreadsheet program that tracks milestones may be required. In addition, frequent discussions with team leaders and individuals involved in the operating activities will assist in comprehensive tracking.

*Project tracking systems are simple, effective tools for monitoring progress.*

## ***Implementing and Measuring the Success of Pollution Prevention***

### **7.2.2 Evaluating Progress**

To effectively demonstrate implementation of the pollution prevention program, it is important to measure and evaluate progress. To do this, the coordinator needs to compare the baseline data to the data obtained for the tracking program. The choice of indicators depends on the nature of the project being tracked.

*Monitoring and evaluating progress is critical to the long-term success of a facility's pollution prevention program.*

#### **Program Evaluators**

- Measure the ratio of waste generated to a specific unit of production or activity, before and after implementation.
- Monitor the number of violation notices before and after project implementation.

#### ***Air Emissions***

- Compare air emissions before and after program implementation.

#### ***Cost***

- Quantify savings attributed to reduced raw material costs and/or waste disposal costs.
- Identify savings from utility conservation and efficiency.
- Monitor profits from revenue generating programs such as recycling.

#### ***Training***

- Track the number of students trained in pollution prevention.

#### ***Recycling***

- Monitor the number of waste streams collected and the volume recycled.

## ***Chapter 7***

### ***Policies and Procedures***

- Track the number of SOPs, technical orders, and MILSPECs revised to incorporate pollution prevention.

For industrial operations, another important indicator is worker health, safety, and job satisfaction. Implementing pollution prevention projects may result in the following:

- A reduction in the number of work-related accidents
- A reduction in the number of sick days due to a healthier working environment
- A lower turnover rate as workers opt to remain on the job because of improved working conditions.

# **APPENDIX A**

## **ECONOMIC ANALYSES METHODS**

## Appendix A

# TOOL: COST BENEFIT ANALYSIS FOR POLLUTION PREVENTION PROJECTS

## Overview

*...there are always alternative uses for the resources used in a project. Dollar values can be assigned to those alternative uses in order that the true total cost of a project can be identified.*

Implementing most pollution prevention projects requires spending capital. In order to determine whether the project's benefits are worth the costs, facilities routinely perform economic assessments. The tool which Federal facilities most commonly use is cost-benefit analysis. Cost-benefit analysis investigates the costs and benefits of each of a set of alternatives so that a decision maker can better understand the consequences of a policy decision. Cost-benefit analysis is primarily concerned with economic efficiency, the consideration of whether total benefits outweigh the total costs of providing them.

Cost-benefit analysis is also an important aid for decision makers to use when evaluating the economic efficiency of a pollution prevention project. Unlike the private sector where the primary consequences of a project that are of concern to a firm are those that affect profitability, the public sector is more concerned with a much broader range of consequences, including environmental effects. When used with care, cost benefit analyses can help decision-makers consider both economic and environmental aspects of a pollution prevention project.

There are several different ways to perform cost-benefit analysis for pollution prevention projects. While it is beyond the scope of this guide to give a complete explanation of this topic, this section provides a short summary of two methods which are mostly commonly used.

## Major Concepts

Every project will provide tangible and intangible benefits, as well as costs. The challenge in applying conventional economic assessment tools to environmental projects lies in accurately evaluating the intangible benefits accruing from project implementation. Intangible benefits are benefits which are difficult to quantify (e.g., assigning a monetary value to species preservation). Improving methods for

*...a dollar invested today will be worth something more than a dollar 1 year from now.*

assessing costs and benefits for environmental projects is an active area of research; Federal facilities should try to keep abreast of new developments in the field.

To use cost benefit analysis, it is necessary to understand three concepts, opportunity cost, the time value of money and uncertainty.

### **Opportunity Cost**

The concepts of cost are fundamental to the comparison of project alternatives. The most fundamental concept of an action, decision, or allocation being “costly” is that there are alternative uses for the resources used in a project. This concept is referred to as the opportunity cost of a project.

There are two main categories of opportunity cost: private opportunity cost and social opportunity cost. The private opportunity cost approach acknowledges that public funds are withdrawn from private sectors where they would otherwise earn some rate of return. By devoting them to or investing them in some project, the rate of return is given up as an opportunity cost. That cost represent by the minimum interest rate or discount rate that the funds could otherwise earn should be used in evaluating public projects.

*Making an investment involves giving up capital in the hope of getting more in return.*

The social opportunity cost of using resources in one activity is the value foregone by not using them in the best alternative activity. For example, when a government agency decides to fund a certain project, it is simultaneously deciding not to fund another project even though the alternative project has redeeming features. Social opportunity cost is difficult to quantify because the costs are subjective: valuing the preservation of a species; the pristine quality of a lake; the healthy life of a human being. However, there are methods available to assign costs even to qualitative issues.

*The uncertainty, or risk, associated with a project is the chance that the anticipated benefits may not be realized.*

### **Time Value of Money**

The basic concept of all project evaluations and long-term financial plans is the time value of money. This

## ***Appendix A***

concept captures the opportunity cost of a given project. The discount rate, similar to an interest rate, is the mechanism that equates today's dollar with its value at some point in the future.

The time value of money describes the principal that a dollar invested today will be worth something more than a dollar 1 year from now. At a simple interest rate of 5 percent, a dollar today is worth \$1.05 one year from now. This is referred to as the "present value" of one dollar one year from now at an interest rate of 5 percent.

The selection of an appropriate discount rate is one of the most difficult aspects of a cost-benefit analysis, but it is also one of the most important. For evaluating long-lived projects, such as dams, the identification of an accuracy discount rate is crucial: a project that looks favorable using a 3 percent discount rate may look very unattractive at a 10 percent rate.

The time value of money means that money that is available today to be spent or invested is more valuable than money that will not be available to earn a return until sometime in the future. Put simply, a thousand dollars in a shop's budget today is worth more than the expectation of gaining a thousand dollars in the future as pay off from an investment.

For an investment to be cost-beneficial, it must return more dollars in the future (i.e., benefit) than the amount of dollars spent in the present (i.e., the cost of the investment) to account for this difference in value. In other words, the dollar benefits gained in the future must be greater than the initial investment.

### **Uncertainty**

Another basic principle related to project evaluation is the issue of uncertainty. Making an investment involves giving up capital (i.e., dollars) in the hope of getting more in return. For example, a supervisor buying an antifreeze recycling unit expects the investment to pay for itself in terms of reduced operating costs (i.e., avoided costs) within 3 years. After the unit has paid for itself, the money saved on avoided



operating costs can be used for other purposes. The risks associated with the investment are the chances that the unit might break down after only two years and that the annual savings may not be as great as expected.

For environmental projects, the degree of uncertainty can be particularly high and stems from two conditions: (1) the complexity of assessing risks associated with the use, transport, and exposure to hazardous substances; and (2) the rapidly changing regulations and shifts in judicial decisions that define and continually alter costs. Thus, a cost-benefit analysis should include a mechanism to account for these risks. This mechanism is known as the “risk premium.” Risky projects have to earn a higher return than “safe” projects to compensate for the uncertainty inherent in the project.

The two cost benefits analysis techniques described below do not take into account risk. As a result, they are easier to use; however, they are more likely to produce misleading results. Other cost benefit analysis techniques are available which consider both the time value of money and risk (e.g., present value and risk). Two cost benefit methods are summarized in Table A-1. Typically, Federal facility managers use the first method, payback analysis, when justifying projects.

*Payback analysis does not take into account the time value of money.*

### **Key Terminology**

For readers who are new to cost-benefit analysis, this section explains frequently used terms. Many of these terms are used in Table A-1.

### **Net Annual Benefit**

Net annual benefit is the benefit in dollar terms gained at the end of the year. To calculate the net annual benefit, subtract the annual operating costs (e.g., labor, equipment maintenance, energy costs) from the (gross) annual benefit. The annual benefit may be the avoided costs resulting from the project (i.e., the waste disposal costs in the antifreeze recycling example).

## Appendix A

**TABLE A-1. COST BENEFIT ANALYSIS METHODS**

Method	How to Apply the Method	Advantages/Disadvantages
Payback Analysis	<p>1. Obtain the projects' net annual benefits by subtracting the expected annual operating costs from the expected annual benefits:</p> $\text{Net annual benefits} = \text{annual benefits} - \text{annual costs}$ <p>2. Divide the total project development cost by the average net annual benefit. A less accurate shortcut is to simply use the net annual benefit. The result is the number of years the facility can expect to wait before it recovers the amount of money spent in the development of the system.</p> $\text{Payback period} = \frac{\text{Total project development cost}}{\text{average net annual benefit}}$	<p>Advantage: Simple to use. Federal facilities typically requires a payback period of three years in order to receive funding. Method express savings in terms of the number of years before an investment pays for itself.</p> <p>Disadvantage: This is the least appropriate method. It fails to consider the fact that the time needed for project development may be long in some cases (e.g., setting up a recycling program). Although benefits may be limited during the early years of implementation, they will increase over time as the facility personnel become accustomed to the project.</p> <p>This method does not take into account that the current dollars are spent on the development of the project, but because of the time value of money, less valuable dollars are returned in the future. In addition, payback analysis does not consider the risk that a facility may not receive the required benefits from the project.</p>
Net Present Value Analysis	<p>1. Obtain the net annual benefits of the project by subtracting the expected annual operating costs from the expected annual benefits:</p> $\text{Net annual benefit} = \text{annual benefits} - \text{annual costs}$ <p>2. Discount the net annual benefits during the life of the project using the following formula:</p> $\text{Discount factor} = \frac{\text{net annual benefits}}{(1 + i)^n}$ <p>Where:</p> <p>i = discount rate organization's minimum expected rate of return</p> <p>n = number of years benefit will be received</p> <p>3. Subtract the total development cost from the total of the discounted net benefits, the results must be greater than zero if the new system is to be cost-beneficial</p> $\text{Discounted net benefits} - \text{total development costs} = \text{net present value}$	<p>Advantages: Takes into account time value of money</p> <p>Disadvantages: Does not take into account the risk of not fully receiving the benefits of the new project.</p>

Source: Adapted from Richard T. Due "Determining Economic Feasibility: Four Cost/Benefit Analysis Methods". Journal of Information Systems Management. pp 14-19, 1989.

### **Project Development Cost**

The implementation costs associated with the project, including capital costs, administrative, permitting.

### **Discount Rate**

The discount rate is used to relate the value of a dollar at one date to its value at a later date. It is similar to an interest rate used in the private sector.

### **Net Present Value**

Net present value (NPV) is the present value of total benefits (i.e., the generated cash flow) minus total costs (i.e., cost of the investment). A project with an NPV greater than zero will be adopted; a negative NPV project will be rejected.

### **Rate of Return**

Rather than select a particular discount rate for the present value analysis, various rates are tried until the present value of the costs equals the present value of the benefits. This rate is the rate of return. A project is economically worthwhile if its rate of return exceeds the cost of borrowing funds.

### **Payback**

As discussed previously, payback period analysis is the investment performance indicator used historically by Federal agencies. The disadvantage of the payback method is that it does not take the time value of money into consideration. Despite this drawback, many Federal agencies still use this form of project analysis. For those that do, Total Cost Assessment (TCA) principles can still be integrated into the payback calculations. Simply by expanding the cost and benefits inventory tabulated, expanding the time horizon of the project evaluation, and by properly allocating costs and benefits, the payback calculation will more accurately reflect the true payback period for the pollution prevention project option.

## **Appendix A**

*A PPOA requires:*

- *Direct involvement of the pollution prevention coordinator*
- *Support by facility staff and upper management*

### **NPV Method**

Under the NPV method, the present value of each cash flow, both costs and savings, is calculated, using an appropriate discount rate. The present value of total benefits minus total costs is the project's NPV. A positive NPV means a project is worth pursuing and a negative NPV indicates that it should be rejected. For example:

$$\text{Discounted savings} - \text{discounted costs} = \text{NPV}$$

$$\$300,000 \text{ discounted savings} - \$200,000 \text{ discounted costs} = \$100,000$$

Thus, this project would be adopted, unless there was an alternative project choice that had a NPV higher than \$100,000.

### **Internal Rate of Return**

The Internal Rate of Return (IRR) method is based on the same theory as NPV, but the unknown in the equation is the interest, or discount, rate. The IRR method calculates the discount rate that equates the present value of a project's expected savings to the expected costs, making NPV equal to zero. A project is worthwhile if its internal rate of return exceeds the cost of borrowing funds. The project alternative with the greatest IRR will be the preferred option. For example, if an investment choice indicated an IRR of 10 percent it would be adopted unless there was an alternative investment choice that had an IRR higher than 10 percent.

## **TOOLS: LIFE-CYCLE COSTING, TOTAL COST ASSESSMENT, AND LIFE-CYCLE ANALYSIS**

*Major Concepts:*

- *LCC is a tool to evaluate the private and societal costs across the entire life of a pollution prevention project.*
- *In LCC, social costs are quantified, and when that is to possible, they are addressed qualitatively.*

### **Overview**

Over the years, Federal facilities have used a variety of decision making tools to quantify the effects of alternative strategies in the facility acquisition, operation and disposition process. These tools reflect the nature of the more pressing facility management issues of the day, and are similar to the methods applied by the private sector.

During the past decade, *economic analysis* tools have matured, and techniques for comparing the costs and benefits

of alternative Federal facility strategies have become more rigorously specified by the OMB and implementing Federal agencies. More recently, the *environmental effects* of alternative facility management strategies have received greater attention, particularly in the field of pollution prevention.

Tools for estimating the environmental effects associated with a project can be valuable when justifying pollution prevention projects. Pollution prevention projects are difficult to justify because environmental benefits are often intangible, meaning that assigning a dollar value is not always possible. In recent years, tools for a more comprehensive analysis of the costs and benefits associated with a project have been developed. Similarly, comparing the environmental effects associated with a proposed project requires using special tools. For example, would a process modification reduce a hazardous waste stream but result in an increase in pollutants discharged to wastewater?

At this point in time, there are three tools available to Federal facilities for evaluating pollution prevention projects:

- Life-Cycle Costing (LCC);
- Total Cost Assessment (TCA); and
- Life-Cycle Assessment (LCA).

Table A-2 illustrates the users and applications of these three tools.

**TABLE A-2. ANALYTICAL TOOLS**

	<u>Application</u>		<u>Users</u>		<u>Focus</u>	
	Economic Criteria	Environmental Criteria	Public Sector	Private Sector	Limited	Holistic
Life-Cycle Costing	✓		✓	✓	✓	
Total Cost Assessment	✓	✓		✓	✓	
Life-Cycle Assessment			✓	✓		✓

## ***Appendix A***

### **Life-Cycle Costing**

Life-cycle costing (LCC) has been used for many years by both the public and private sector. It associates economic criteria and societal costs with individual pollution prevention opportunities. Managers use LCC analyses to evaluate the costs and benefits of different pollution prevention opportunities. Typical decisions include disposal versus recycling, replacement versus limited repairs, and hazardous materials versus less toxic materials. LCC should not be confused with TCA and LCA. To dispel any doubts over the differences, this section explains LCC in greater detail. The purpose of LCC is to quantify a series of time-varying costs for a given opportunity over an extended time horizon, and to represent these costs as a single value. These time varying cost usually include the following:

- Capital Expenditures - Costs for large, infrequent investments with long economic lives (e.g., new structures, major renovations and equipment replacements)
- Nonrecurring Operations and Maintenance (O&M) - Costs reflecting items that occur on a less frequent than annual basis that are not capital expenditures (e.g., repair or replacement of parts in a solvent distillation unit)
- Recurring O&M - Costs for items that occur on an annual or more frequent basis (e.g., oil and hydraulic fluid changes)
- Energy - All energy or power generation related costs. Although energy costs can be included as a recurring O&M cost, they are usually itemized because of their economic magnitude and sensitivity to both market prices and building utilization.
- Residual Value - Costs reflecting the value of equipment at the end of the LCC analysis period. Considers the effects of depreciation and service improvements.

By considering all costs, a LCC analysis can quantify relationships that exist between cost categories. For example, certain types of capital improvements will reduce operations,

## ***Economic Analyses Methods***

maintenance, and energy costs while increasing the equipment's residual value at the end of the analysis period. When energy costs are broken out from recurring O&M costs, there is the potential for the application of environmental criteria, but this is generally not the focus of traditional LCC analysis.

Societal costs such as those resulting from health and ecological damages related to unregulated air emissions, wetland loss, and deforestation can also be reflected in a LCC analysis either in a quantitative or qualitative manner. LCC includes the following cost components:

- Extraction of Natural Resources - The cost of extracting the material for use and any direct or indirect environmental cost for the process.
- Production of Raw Materials - All of the costs of processing the raw materials.
- Making the Basic Components and Product - The total cost of material fabrication and product manufacturing.
- Internal Storage - The cost of storage of the product before it is shipped to distributors and retail stores.
- Distribution and Retail Storage - The cost of distributing the products to retail stores including transportation costs, and the cost of retail storage before purchase by the consumer.
- Product Use - The cost of consumer use of the product. This could include any fuels, oils, maintenance, and repairs which must be made to the equipment.
- Product Disposal or Recycling - The cost of disposal or recycling of the product.

### **Total Cost Assessment**

Justifying pollution prevention projects is not an easy task, as many Federal facility coordinators have discovered. In the competition for scarce resources, facilities are more likely to fund projects aimed at resolving

#### ***Major Concepts***

- *Total Cost Assessment is a tool for identifying the true economic and environmental costs associated with current processes.*
- *Total Cost Assessment can be used to evaluate pollution prevention projects using both direct and indirect costs.*
- *Total Cost Assessment analyzes: direct costs, indirect costs, liability costs, less tangible benefits.*

*For further information on TCA, refer to the EPA's Total Cost Assessment: Accelerating Industrial Pollution Prevention Through Innovative Project Financial Analysis (EPA/741/R-92/002). May, 1992.*

## Appendix A

immediate compliance violations than projects that could prevent such problems in the long-run. Accounting procedures typically lump environmental costs together in a single overhead account, or add them to other budget line items where they cannot be disaggregated easily. As a result, facilities are often unable to identify the processes that cause the greatest environmental expenditures. Using total cost assessment, facilities can customize accounting systems to gather the information necessary for an accurate identification of costs related to environmental management. Facilities can also use TCA to demonstrate potential costs savings from specific pollution prevention projects.

The TCA tool is especially interesting because it employs *both* economic and environmental criteria. TCA was originally intended for use primarily by private sector users engaged in a production process. EPA has begun to study how TCA can be used to assess pollution prevention projects. As with the LCC analysis, the TCA study is usually focused on a particular process as it affects the bottom-line costs to the user. Environmental criteria are not explicit, i.e.; success is not measured by waste reduction or resource conservation, but by cost savings. However, since the *purpose* of TCA is to change accounting practices by internalizing otherwise external (environmental) costs, environmental goals are met by cost reductions.

Because of its focus on cost and cost effectiveness, TCA shares many of the features of LCC analysis by tracking direct costs (capital expenditures, and O&M expenses/revenues). However, TCA also includes indirect costs, liability costs and less tangible benefits—subjects that are not customarily included in LCC analysis. A summary of costs included in TCA is presented in Table A-3. By factoring in these indirect environmental costs, TCA achieves both economic and environmental goals. Because of its private sector orientation, TCA not only uses NPV as an economic criteria but Internal Rate of Return (IRR) and Profitability Index (PI) as well.

### Major Concepts

- *LCA is a tool to evaluate the environmental consequences of a product or activity across its entire life.*
- *A complete LCA consists of three components: Inventory, Impact and Improvement Analyses.*
- *Life-cycle inventory analysis can be used in process analysis, material selection, product evaluation, product comparison, and policy-making.*
- *LCA does not usually include cost assessment.*
- *Life-cycle inventory analysis can be used by acquisitions staff, new product design staff, and staff involved in pollution prevention*
- *LCA is an evolving tool*



**TABLE A-3. TCA COST CATEGORIES**

Direct Costs	Indirect or Hidden Costs	Liability Costs
<ul style="list-style-type: none"> <li>• Capital Expenditures <ul style="list-style-type: none"> <li>- Buildings</li> <li>- Equipment</li> <li>- Utility connections</li> <li>- Equipment installation</li> <li>- Engineering</li> </ul> </li> <li>• Operation and Maintenance Expenses/Revenues <ul style="list-style-type: none"> <li>- Raw materials</li> <li>- Labor</li> <li>- Waste disposal</li> <li>- Utilities</li> <li>- Value of recovered material</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Compliance Costs <ul style="list-style-type: none"> <li>- Permitting</li> <li>- Reporting</li> <li>- Monitoring</li> <li>- Manifesting</li> </ul> </li> <li>• Insurance</li> <li>• On-Site Waste Management</li> <li>• Operation of Onsite Pollution Control Equipment</li> </ul>	<ul style="list-style-type: none"> <li>• Penalties and Fines</li> <li>• Personal injury and property damage</li> </ul>

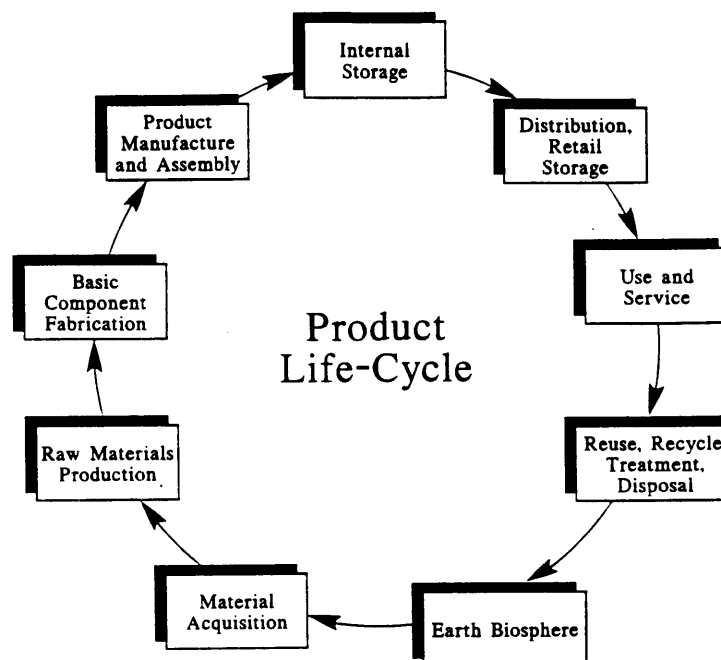
**Life-Cycle Assessment**

As its name implies, LCA is a departure from LCC and TCA because it does not utilize economic criteria, consequently the word “cost” is not included in the LCA terminology. Historically, LCA has been used by both the public and private sector to identify and evaluate opportunities to reduce the environmental effects associated with a specific product, production process, package, material, or activity. The uses of LCA are to:

- Conserve resources
- Prevent pollution
- Preserve diverse, sustainable ecosystems
- Maintain long-term, viable economic systems

Figure A-1 illustrates the typical product life cycle.

## Appendix A



**Figure A-1. Product life-cycle.**

*Inventory analysis quantifies:*

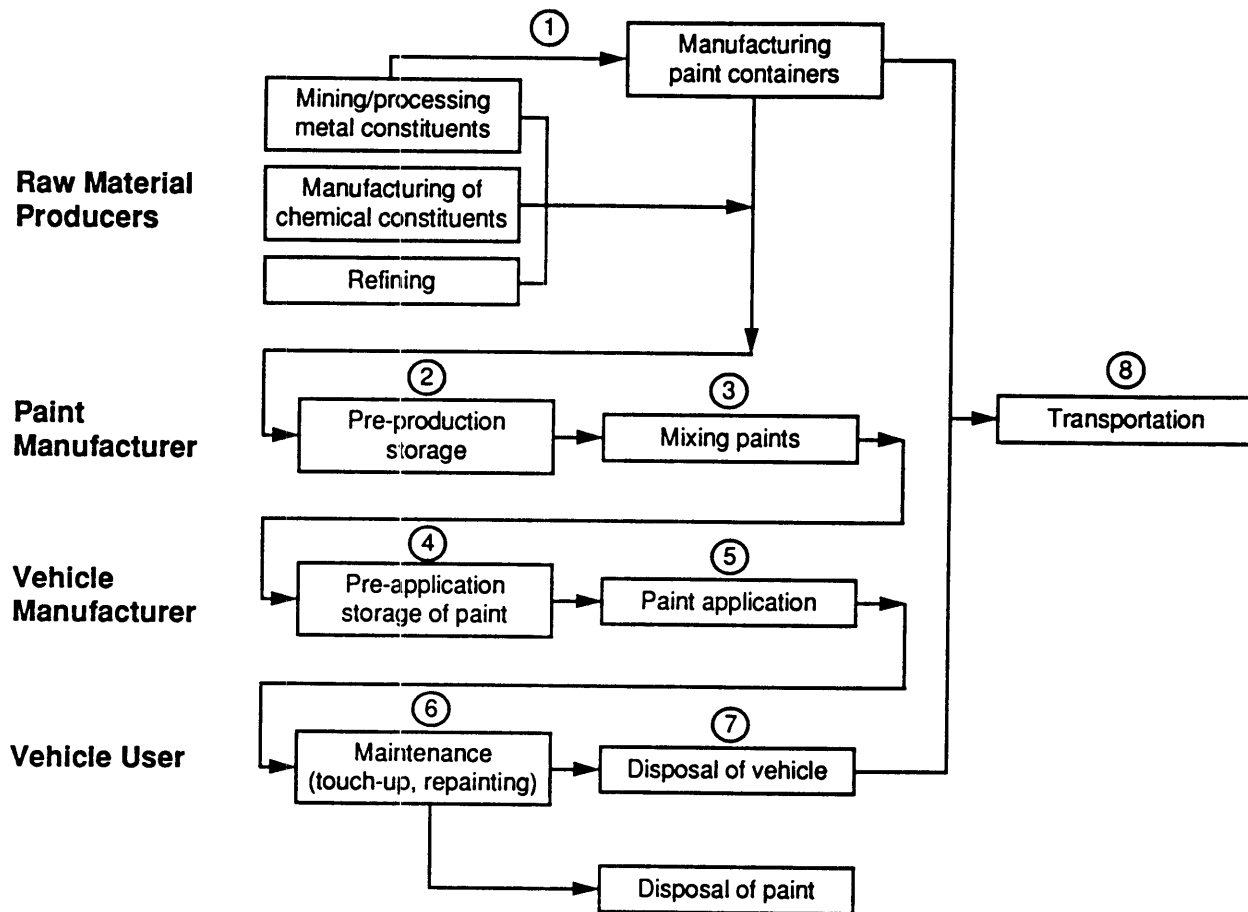
- Energy requirements
- Raw materials
- Environmental releases

*GSA's Environmental Products Guide (RCPG-0001), formerly the Recycled Products Catalogue, is a good source of information.*

EPA defines LCA as a tool for examining the environmental releases and impacts of a specific product by tracking its development from a raw material through its production and to eventual disposal. The main reason for using LCA is to evaluate proposed changes to product or process designs so that environmental trade-offs can be identified (see Figure A-1).

The U.S. Postal Service encourages its facilities to adopt a LCA approach when making decisions that might impact the environment. Figure A-2 reproduces an LCA for the manufacturing of Postal Service vehicles which is published in the USPS *Waste Reduction Guide*.

As Figure A-1 makes clear, LCA is much less focused on a single process, product or user. Instead, LCA takes a truly look at atmospheric emissions, waterborne wastes, solid wastes, coproducts, resource and energy outputs, and other releases of environmental concern on the basis of product/emission relationships as consumable goods percolate through the economy. LCA analyzes all the processes including extraction and processing of raw materials; manufacturing, transportation and distribution; use/reuse/maintenance;



1. Mining/processing and manufacturing of paint raw materials
2. Pre-production storage of raw materials for paint
3. Mixing of paints
4. Pre-application storage of paint
5. Application of paint to vehicles
6. Paint maintenance
7. Disposal of vehicles
8. Transportation

Source: Baker, Rachel D., and John Warren. "Management of the Product Life Cycle to Promote Pollution Prevention." Pollution Prevention Review. Autumn 1991.

**Figure A-2. LCA for U.S. Postal Service vehicles.**

## Appendix A

*What is Design for the Environment?*

*EPA's Design for the Environment (DfE) program promotes building the use of safer chemicals, processes, and technologies into products during their earliest design stages. The DfE program has three cornerstones: the gathering of comparative risk and performance data; the development of analytical tools for assessing that data; and the dissemination of both data and analytical tools to people in various industries for use in making environmentally responsible choices. For information on participating in the DfE program, contact Jean E. (Libby) Parker, Economics, Exposure and Technology Division (TS-779), U.S. EPA, 401 M Street, S.W., Washington, D.C. 20460; telephone (202) 260-0667.*

*Reprinted from Chemicals in Progress Bulletin Office of Pollution Prevention and Toxics Vol 14/No. 2 June 1993.*

*LCA and new product design go hand-in-hand.*

recycling and composting; and final disposition. Instead of using cost as a criterion, LCA uses environmental impact criteria such as emissions, waste generation, and effluent volume. These criteria enable Federal facility coordinators to quantify the impacts of a specific product on the full range of environmental media.

LCA is a very useful and evolving tool for the holistic quantification of impacts without the constraints normally associated with a rigorous cost analysis with a narrow focus. The three main components of a life-cycle analysis include (1) inventory analysis: identifying and quantifying energy and resource use and environmental releases to air, water, and land; (2) impact analysis: characterizing and assessing the impact on the environment; (3) improvement analysis: evaluating and implementing opportunities to reduce environmental burdens. Of the three components, inventory analysis is the best developed tool to date.

### *Inventory Analysis*

Facilities use inventory analysis to quantify the energy and raw material requirements, and all environmental releases (e.g., air emissions, solid waste, wastewater discharge) during the life cycle of a product, package, process, material, or activity. As such, LCA is best viewed as a process for researching, confirming and disclosing the important quantifiable environmental relationships that exist during each phase of a product, process, material, or activity's life cycle. Facility personnel involved directly with new design work and acquisitions should become familiar with LCA as well as anyone involved in choosing pollution prevention opportunities. For example, a facility coordinator may adopt a life cycle approach to determine whether replacing a solvent degreaser with a caustic cleaner makes sense in terms of the total impact on the environment. Does the elimination of VOC emissions offset the discharge of heavy-metal laden caustic cleaner to the wastewater treatment plant? Does replacing paper towels in the restrooms with reusable cloth or hand dryers decrease the impact on the environment?

LCA is particularly appropriate for those involved in

acquisitions and new product design. Acquisitions can include anyone at a Federal facility that orders supplies, from office staff ordering supplies out of a Federal supply catalogue, to process design engineers ordering hazardous substances. When ordering office supplies, for instance, staff should be aware that the GSA catalogue indicates which products contain recycled materials (e.g., paper products). It isn't necessary to perform a complete LCA to realize that from an environmental standpoint, staff should purchase products with recycled content if possible.

Design engineers (e.g., DoD weapons acquisition staff) can use the LCA approach to design or redesign products to make them environmentally compatible. Typically design engineers focus exclusively on the product's quality, performance, and production price. With an LCA approach, environmental design criteria are given equal footing with traditional criteria. Design criteria which are commonly used include whether a design requires the use of hazardous substances, consumes too much energy or water, or is not readily recycled or reused. Stating these criteria up-front helps ensure that products are environmentally compatible from the manufacturing stage, and through operation and maintenance, and final disposal.

Environmental criteria to consider in designing products:

- Use renewable natural resource materials
- Use materials with recycled content
- Use fewer toxic substances
- Reuse scrap and excess material from production
- Produce goods with a longer life expectancy
- Manufacture products that can be recycled at the end of their life cycle

LCA is still a relatively new tool, but research and development are underway. The EPA, the Society for Environmental Toxicology and Chemistry, and many industry

*For further information, see the EPA Risk Reduction Engineering Laboratory's publications: Life-Cycle Assessment: Inventory Guidelines, (EPA/600/R-92/245) this publication describes the three components of a life-cycle assessment and develops guidelines for implementation; and Principles and Life-Cycle Design Manual: Environmental Requirements and the Product System (EPA/600/R-92/226) provides guidance on life-cycle design principles. Life-cycle design promotes the reduction of environmental impacts and health risks through a system approach to design.*

## ***Appendix A***

trade groups are actively involved in promoting the development of consistent, consensus-based guidelines on the conduct of LCA.

### **3.6.3 Summary**

In order to take full advantage of the tools described in this section, Federal facility coordinators must be willing to devote time and energy into collecting the necessary cost and environmental data. A facility with good environmental recordkeeping and audits should be able to prepare a suitable data-set within a reasonable period of time. Although developing the data-set requires an initial investment of time, Federal facility coordinators will then have the means to prepare more accurate justifications of pollution prevention projects.

## **APPENDIX B**

### **CASE STUDIES**

## **Appendix B**

### **CASE STUDY 1: Air Emission Reductions, Robins Air Force Base**

Opportunity Type: Source Reduction — Material Substitution

**Project Description:**

Robins Air Force Base (AFB) is testing a new technology for corrosion protection coatings that promises to reduce air pollution. Many standard primers and topcoat paints (such as two-part epoxies and polyurethanes, alkyd enamels, and Chemical Agent Resistance Coatings) release volatile organic chemicals when they cure. Considered toxic, these chemicals also contribute substantially to atmospheric pollution. In addition, the unused paint residues are classified as hazardous waste.

Robins AFB is checking manufacturers' claims that their new plastic powder coatings outperform standard coatings. Specifically, the base is conducting tests to flame-spray these coatings on ground support equipment, mobile communications vans, and munitions and munitions handling equipment in the field. The coated panels are currently undergoing tests for chemical resistance properties and accelerated aging.

If test results are favorable, the Air Force will select one or more coatings for field testing at bases experience serious corrosion problems.

Cost: Not available.

Technology Status: Preliminary testing stage.

(Source: *SAIC Newsgram* Spring 1993.)



**CASE STUDY 2: Air Emission Reductions, U.S. Navy**

Opportunity Type: Source Reduction — Material Substitution

**Project Description:**

In 1992, the Navy received an EPA Administrator's Award for Pollution Prevention for the development and implementation of a new paint called Unicoat. Unicoat was developed by the U.S. Navy Exploratory Development Program for aircraft and other industrial applications. With no toxic chromate pigments, the new paint reduces volatile organic compounds and hazardous waste from the painting process by 67 percent. At the same time, Unicoat provides equivalent or superior performance to the toxic paints the Navy and Air Force have used in the past.

The traditional painting system for aircraft consists of an epoxy primer for adhesion and control inhibition, and a polyurethane topcoat for aesthetics, durability, and additional protection against degradation. This two-coat primer and topcoat painting system contains high levels of VOCs and carcinogenic chromates. Unicoat, in contrast, is a self-priming topcoat designed to replace the two coatings with a blend of organic and inorganic zinc compounds that are nontoxic.

Cost: Not available.

Technology Status: Unicoat is being used in Navy and Air Force applications; efforts are underway to transfer the technology to the commercial airline and industrial communities.

(Source: adapted from *U.S. EPA Pollution Prevention News*, May 1992.)

## **Appendix B**

### **CASE STUDY 3: Air Emission Reductions, DOE**

Opportunity Type: Source Reduction — Material Substitution

Project Description:

Many Federal agencies have started testing and evaluating commercially available substitutes for processes such as degreasing. The Materials Substitution Committee at Los Alamos National Laboratory identified and tested 20 solvent substitutes for 1,1,1 Trichloroethane.

Criteria for selecting the substitutes included (1) easily accessible and commercially available, (2) suitability for a wide variety of cleaning operations, (3) non-generator of a hazardous waste, and (4) perform as well as existing solvent cleaners. Of the 20 products tested, Inland Technology's X-Caliber performed the best. The toxicological effects of M-pyrol, a constituent of X-caliber, are currently being tested.

For a summary of the project, contact the Waste Minimization Program Office at 505-665-8294. The Office will continue identifying substitute solvents that perform effectively, evaporate quickly, and serve as alternatives to chlorofluorocarbons.

Cost: Not available.

Technology Status: Fully developed products; may require testing prior to use.

(Source: adapted from an article published in the US DOE - Defense Programs newsletter, *Pollution Prevention Advisor*, Spring 1993, Vol 3, No. 2.)

**CASE STUDY 4: Cadmium-Free Electroplating,  
U.S. Army, Defense Logistics Agency**

Opportunity Type: Source Reduction — Material Substitution, Operating Procedures

**Project Description:**

The Defense Logistics Agency Hazardous Material Minimization Program has modified more than 50 specifications to use alternatives to cadmium-based plating. The discharge of cadmium-contaminated plating rinsewaters requires costly wastewater treatment procedures to remove the cadmium. Cadmium contaminated sludges and process residuals must be handled as a Resource Conservation and Recovery Act (RCRA) hazardous waste. The Defense Construction Supply Center, Columbus Ohio, identified more than 40 specifications that have potential for change. Thirteen specifications have been changed, ranging from dog collars to automotive radiator caps.

The Defense Personnel Support Center, Philadelphia, Pennsylvania, has changed specifications for hospital furniture to have an alternative surface finish coating without cadmium.

The Defense Electronics Supply Center, Dayton, Ohio, is looking for cadmium replacements for fasteners and other related hardware items. Out of 200,000 cadmium-plated items, the Defense Electronics Supply has changed the specification for 460 to replace cadmium with zinc chromate.

Cost: Not available.

Technology Status: Some specifications fully developed, others under development.

(Source: Defense Logistics Agency. *Hazardous Material Minimization Program*. Unpublished)

## Appendix B

### **CASE STUDY 5: Hazardous Waste Reduction From Depainting Operations, U.S. Coast Guard Support Center, Governors Island, New York**

Opportunity Type: Source Reduction — Process Modification

**Project Description:**

This project was developed under RREL's Waste Reduction Evaluations At Federal Sites (WREAFS) Program. The method the Coast Guard employed to remove paint and rust from buoys was to use a steel shot blasting method. About 24.0 tons of steel shot were purchased annually at a cost of \$17,040. The shot passes through the system an average of five times before it is too fragmented to be effective. Approximately, 120 drums (55-gallon) were disposed of as hazardous waste annually due to the presence of lead. The cost for disposal is \$0.23/lbs or an annual cost of \$20,700.

The pollution prevention opportunity identified by the WREAFS team for this process was to convert from steel shot to plastic media. This conversion can be made relatively easily and with minimal capital investment. Some minor equipment changes may be necessary; however, the conversion would markedly reduce the weight of the residual blasting media as a result of the lighter density material (steel at 299.65 lbs/ft<sup>3</sup> versus plastic bead at 49.94 lbs/ft<sup>3</sup>) and the increased recycle capability (20 cycles anticipated with the plastic versus five cycles for steel shot).

**Cost:**

Total capital investment: \$6,830

Annual Net Operating Costs Savings: \$24,120/yr

Estimated payback for the plastic media blasting system is 3.4 months

Technology Status: Fully developed.

(Source: US EPA. *Waste Minimization Opportunity Assessment. U.S. Coast Guard Support Center, Governors Island, New York. 1990.*)

**CASE STUDY 6: Hazardous Waste Reduction of Solvents  
by an Aqueous Parts Washer, Naval Base Norfolk**

Opportunity Type: Source Reduction -- Process Change

**Project Description:**

To reduce solvent use in the parts cleaning process, aqueous parts washers were installed aboard the *U.S.S. Theodore Roosevelt* and at the Shore Intermediate Maintenance Activity (SIMA) Norfolk. These parts washers use high-pressure water and water-based cleaners, rather than chemical solvents, to clean the equipment. The parts washers on the *U.S.S. Theodore Roosevelt* represent the first such systems aboard ship; Naval Base Norfolk is working with other ships to install additional systems. Many other commands at the base and surrounding area have seen demonstrations of this technology and have procured or are in the process of procuring additional parts washers.

**Cost Savings:** The installation of the parts washer at SIMA Norfolk resulted in the cancellation of the base's single largest Safety Kleen solvent contract which will eliminate solvents and the procurement and disposal of rags, immediately saving the base \$24,000 a year. More than \$100,000 can be saved in labor cost the first year.

**Technology Status:** Fully developed.

(Source: U.S. EPA. *Tidewater Interagency Pollution Prevention Progress Report*. 1993)

## **Appendix B**

### **CASE STUDY 7: Hazardous Waste Reduction of Solvents by Installation of a Jet Parts Washer, Dover Air Force Base**

Opportunity Type: Source Reduction — Equipment Modification

**Project Description:**

Dover Air Force Base's Jet Engine Repair shop used to rely on a three-stage process for cleaning aircraft engine assemblies and associated parts. The first tank contained a descaler (potassium hydroxide), which is used for removing carbon deposits from the aircraft parts; the second tank was a degreaser, which removed lubricants; and the third (Citrisolve — a limonene extract) was a bearing cleaner, which removed grit. The open, heated tanks created a hazardous working environment. Fumes and exhaust from the tanks made breathing difficult while spills from transferring dripping parts increased the risk of accidents. The spent solvents were classified as a RCRA hazardous waste because of corrosivity.

The shop manager worked with the base environmental program staff to identify an alternative cleaning system. Research included visiting a Boeing facility that had already installed a jet parts washer and working closely with vendors. The environmental staff prepared a cost analysis as part of the request for obtaining funding. An estimated annual savings of \$6,000 was projected. Dover has purchased two jet parts washers for the Jet Engine repair shop; they are awaiting funding for installation. The base also has several more washers on order.

Although this pollution prevention project eliminated the generation of a RCRA hazardous waste, it resulted in the production of a contaminated wastewater that may require pretreatment prior to discharge.

**Cost:**

Total equipment cost (approximately): \$30,000

Annual cost of detergent: \$500

Annual cost of disposal: \$1,000

Total Annual Cost: \$1,500

Total annual savings in comparison to current system is \$6,000. Estimated payback for the system is 2.5 years.

Technology Status: Full-scale operational.

(Source: SAIC Onsite Pollution Prevention Opportunity Assessment. 1993)

**CASE STUDY 8: Hazardous Material Pharmacy,  
U.S. Air Force Center for Environmental Excellence (AFCEE)**

Opportunity Type: Source Reduction — Inventory Control

**Project Description:**

The Air Force is setting up hazardous material pharmacies at bases to reduce the volume of hazardous materials with expired shelf lives that are disposed of as hazardous wastes. The hazardous material pharmacy is an improved hazardous materials control program, which is based on four elements:

1. Centralized control and management of hazardous material inventory replenishments — The pharmacy is the sole source of hazardous materials to the base.
2. Regulated distribution of hazardous materials — Only limited quantities of hazardous materials are issued to customers at one time.
3. Material reuse, alternative use, and recycling — The pharmacy serves as a base-wide waste exchange service to find users for hazardous materials that are turned in as excess.
4. Reduction in the hazardous material and hazardous waste management burden placed on functional organizations — the base ensures compliance with the waste storage provisions of RCRA by removing wastes from work areas for accumulation at a small number of sites under the control of specially trained staff.

Upon request, the pharmacy issues materials to base organizations that have an established need for the material and have met all regulatory, training, and health, and environmental protection precautions required for the use of the material. The amount of material released matches the current need. The pharmacy records each material issued and maintains a history of materials issued to each customer organization.

**Cost Savings:** Hill Air Force Base's material acquisition costs dropped from \$14 million to \$4 million between 1990 and 1992. Point Magu Naval Air Station's hazardous material purchases fell from \$132,000 to \$55,000 during the first year of the program with only one directorate participating.

**Technology Status:** Fully developed.

(Source: Air Force Center for Environmental Excellence. *Hazardous Material Pharmacy: Commanders' 'How To Guide'*. 1993)

## **Appendix B**

### **CASE STUDY 9: Recycling, Savannah River Site, DOE**

Opportunity Type: Recycling Antifreeze and Paint Solvent Wastes

**Project Description:**

Bechtel Savannah River Inc. (BSRI), the principal subcontractor for Westinghouse Savannah River Co. at the Savannah River Site, has instituted a pollution prevention program that includes antifreeze recycling and paint solvent waste recycling. The antifreeze recycling equipment includes mechanical filtration and chemical treatment. Spent filters are disposed of as a nonhazardous waste. The recycled antifreeze meets or exceeds ASTM-3306 standards for protection and performance. In 1991, more than 14,005 liters of antifreeze were recycled and returned to service in construction equipment and passenger vehicles.

With respect to the paint solvent wastes, BSRI installed two 28 liter distillation units in 1991. Within the next 3 months, more than 757 liters of solvent were reclaimed and reused as cleaning solvent. This reduced the volume of hazardous waste by 85 to 90 percent.

Cost Savings: Antifreeze — \$11,500 in 1991; Solvent distillation — a savings of \$13,400 in the first three months of operation offset the purchase cost of the two distillation units.

Technology Status: Fully developed.

(Source: U.S. DOE - Defense Programs. *Pollution Prevention Advisor*. Vol. 3, No. 3. Summer 1993.)



**CASE STUDY 10: Recycling Program, Fort Eustis, VA**

Opportunity Type: Recycling

Project Description:

In response to Federal, State and Army requirements (Training and Doctrine Command), Fort Eustis established a recycling program. The program recycles many types of materials, including white paper, computer paper, white ledger, colored or coated paper, manila folders, tab cards, cardboard, pressboard, car batteries, pallets, #1 and #2 plastic, tin cans, wood, technical manuals, and metals. Ft. Eustis has also implemented curbside recycling service for the residential areas. The curbside service accepts newspapers, magazines, aluminum cans, and glass.

In 1992, Fort Eustis recycled approximately 1.6 million kilograms of material for an annual recycling rate of 22 percent, surpassing the State of Virginia requirements. In addition, the base recycled the following amounts of materials from March 1990 to November 1992:

- More than 992.25 tons of paper
- More than 1,543.5 tons of metal
- More than 462.6 tons of cardboard
- More than 158 tons of glass
- More than 73.5 tons of aluminum cans

In recognition of its success, the recycling program was given the 1992 Training and Doctrine Command (TRADOC) Pollution Prevention and Recycling Award and has been nominated for the Army Pollution Prevention and Recycling Award.

Cost Savings: (1992) avoided landfill disposal cost is \$57,780; revenue from sale of recycled materials is \$67,414.

(Source: US EPA. *Tidewater Interagency Pollution Prevention Program Progress Report*. 1993).

## Appendix B

### CASE STUDY 11: Pollution Prevention in the Home, HUD, EPA

Opportunity Type: Policy and Regulatory Development

#### Project Description:

EPA, Department of Housing and Urban Development (HUD), and 18 other Federal organizations have organized a Federal interagency task force to reduce the exposure of children to lead-based paint. In 1991, EPA completed a comprehensive strategy for dealing with exposure to lead from all sources, including paint. HUD also developed a lead strategy. In 1992, Congress strengthened these efforts by passing the Residential Lead-Based Paint Hazard Reduction Act (Title X of the Housing and Community Development Act of 1992).

The new law mandates activities to reduce hazards posed by lead exposure in housing and establishes an infrastructure for a national program to eliminate childhood lead poisoning. Congress assigned EPA and HUD primary responsibility for implementing the act. The Office of Pollution Prevention and Toxic Substances is taking the lead for EPA.

The act's key requirements fall into four categories:

- Training, accreditation, and contractor certification
- Laboratory programs
- Public education
- Hazard identification

In April 1993, EPA and other Federal agencies opened a clearinghouse for disseminating technical and nontechnical lead-related information. A toll free hotline was established in November 1992, the phone number is (800) LEAD-FYI.

Eliminating lead from interior and exterior paints was a true pollution prevention opportunity. While reducing lead exposure does not fall under the traditional definition of pollution prevention, it is an example of actions Federal agencies can take to reduce the risks associated with hazardous substances.

(Source: Adapted from U.S. EPA Office of Pollution Prevention and Toxics *Chemicals in Progress Bulletin* Vol. 14 No. 2, June 1993.)

**CASE STUDY 12: Miscellaneous Cost Savings**

The Defense Logistics Agency (DLA) reports the following cost savings through pollution prevention:

**Packaging:** Revision to the packaging standard for isopropyl alcohol reduced air transport preparation time to a fraction of its previous allocation, but also saved more than \$8,000 in the first year.

**Chlorofluorocarbons (CFCs):** Requirements were set for elimination of CFCs as a propellant for all DGSC-managed items by using carbon dioxide gas or a simple pump mechanism instead. Specification revisions have eliminated 240.0 tons of CFC from being consumed annually and have saved \$540,000 in CFC excise tax.

**Solvents:** MIL-0-11090, a cleaning compound, is now replaced by aromatic naptha, a less hazardous and noncarcinogenic cleaning compound. On an annual basis, this results in 75,003 gallons and saves more than \$200,000.

(Source: Defense Logistics Agency, undated)

The Department of Energy's Defense Programs office reports the following costs savings through pollution prevention:

**Ethylene glycol:** the Nevada Test Site has begun using an additive in its fleet operations which greatly extends coolant life. As a result, Nevada Test Site will no longer need to replace or dispose of 20,000 gallons of antifreeze annually resulting in a cost avoidance of \$245,000.

**Oil filters:** the Nevada Test site has installed filter crushers for engine oil and hydraulic filters, fluids are collected and recycled through an off-site vendor. This has resulted in a cost savings of \$428,000 in waste disposal costs.

**Chemicals:** recycling of chemicals at Sandia National Laboratory (Albuquerque, NM) through implementation of the Chemical Exchange Program has resulted in a cost avoidance of \$81,500.

**Electroplating wastes:** Lawrence Livermore National laboratory is saving \$400,000 per year as a result of implementing waste minimization technologies in the electroplating and metal finishing facility. Changes included: relocation of cyanide solutions, eliminating chromium plating, changing rinsing practices, and the elimination of vapor degreasers.

(Source: U.S. DOE -Defense Program. *Summary of Waste Minimization and Pollution Prevention Activities*, undated)

## Appendix B

### CASE STUDY 13: Spent Parts Washer Solution, Fort Riley, KS

Opportunity: Recycling -- Equipment Modification

#### Project Description:

Under the Waste Reduction Evaluations of Federal Sites (WREAFS) program, a PPOA team assessed a maintenance operation at Fort Riley, Kansas, a U.S. Army Forces Command facility. The maintenance shop generated a spent aqueous alkaline detergent solution resulting from cleaning automotive parts. The waste stream contaminants included trace concentrations of lead, chromium, and cadmium at a pH greater than 12, as well as the oils, grease, and dirt removed from the automotive parts.

Although the waste stream had been classified as nonhazardous, it was being reclassified as a RCRA hazardous waste because of its characteristics. As a result, the shop's goal was to reduce or eliminate this waste stream. The assessment team examined records to determine the annual volume of the waste generated, its characteristics, the current disposal cost, and the cost of raw materials (i.e., the replacement cost of the fresh detergent).

The team proposed that the shop install a system to remove the oily contaminants from the detergent through emulsification, skimming, and filtration. With replenishment with minor amounts of fresh detergent, the cleaned washwater would then be recirculated to the parts washer. Buildup of impurities in the recycled washwater would be prevented by purging 25 percent of the used alkaline detergent and recycling 75 percent. The material being purged would be neutralized with an appropriate amount of waste battery acid (obtained from the facility's battery shop), treated to remove precipitated trace heavy metals, and disposed of as a nonhazardous waste.

Cost Savings: \$107.00 per year with a payback of .18 years.

(Source: This project was developed under RREL's Waste Reduction Evaluation At Federal Sites (WREAFS) Program. *WMOA Report and Project Summary - Ft. Riley, Kansas*. EPA/600/S2-90/031)

**CASE STUDY 14: General Pollution Prevention Techniques,  
USDA Beltsville Agricultural Research Laboratory**

Under the Waste Reduction Evaluations of Federal Sites (WREAFS) program, a PPOA team assessed a major USDA research laboratory, Beltsville Agricultural Research Laboratory (BARC). BARC employs approximately 900 scientists and technicians who perform research work in all areas related to the Department of Agriculture activities. State of the art research is conducted on livestock diseases, animal and human nutrition, animal genetics and physiology, plant productivity and diseases, and a host of other topics.

The BARC facility generates approximately 22.5 tons of hazardous waste annually at a disposal cost of approximately \$423,000. A strong site-wide hazardous waste management program is led by the Safety, Occupation Health, and Environmental Section (SOHES) Office. This program includes: state of the art facilities for solvent bulking; site-wide hazardous waste training; the presence of collateral hazardous waste duty officers in each research institute; an E-mail system for trading chemicals on-site; recycling programs; and many others. An existing strong incentive for pollution prevention on the site is the charge-back policy. A charge-back policy is a means of making waste generators responsible for paying for their waste disposal costs. Once generators are financially responsible for their wastes, they have an incentive to reduce. This incentive, coupled with the environmental ethic of many researchers and their desire to minimize raw material costs, has already led to significant pollution prevention on-site. Additional approaches to pollution prevention identified by the PPOA team are presented in Table 9 in Chapter 6 of this report.

(Source: US EPA. *Pollution Prevention Opportunity Assessment: USDA Beltsville Agricultural Research Laboratory*. EPA/600/SR-93/008).



**APPENDIX C**  
**FEDERAL FACILITIES COMPLIANCE ACT**

***Appendix C***

LEVEL 1 - 1 OF 1 SECTION

**UNITED STATES CODE SERVICE  
ADVANCE LEGISLATIVE SERVICE**

**(c) 1992 THE LAWYERS CO-OPERATIVE PUBLISHING COMPANY**

**Public Law 102-386**

**102nd Congress**

**[H.R. 2194]**

**102 P.L. 386; 1992 H.R. 2194; 106 Stat. 1505**

**SYNOPSIS:**

An Act

To amend the Solid Waste Disposal Act to clarify provisions concerning the application of certain requirements and sanctions to Federal facilities.

OCT. 6, 1992 -- PUBLIC LAW 102-386

TEXT: Be it enacted by the Senate and House of Representatives of the United States of American in congress assembled,

**TITLE I -- FEDERAL FACILITY COMPLIANCE ACT**

[\*101] SEC. 101. SHORT TITLE.

This title may be cited as the "Federal Facility Compliance Act of 1992".

[102] SEC. 102. APPLICATION OF CERTAIN PROVISIONS TO FEDERAL FACILITIES.

(a). In General. Section 6001 of the Solid Waste Disposal Act (42 U.S.C. 6961) is amended -- (1) by inserting "(a) In General. " after "6001."; (2) in the first sentence, by inserting "and management" before "in the same manner"; (3) by inserting after the first sentence the following: "The Federal, State, interstate and local substantive and procedural requirements referred to in this subsection include, but are not limited to, all administrative orders and all civil and administrative penalties and fines, regardless of whether such



## ***Federal Facility Compliance Act***

penalties or fines are punitive or coercive in nature or are imposed for isolated, intermittent, or continuing violations. The United States hereby expressly waives any immunity otherwise applicable to the United States with respect to any such substantive or procedural requirement (including, but not limited to, any injunctive relief, administrative order or civil or administrative penalty or fine referred to in the preceding sentence, or reasonable service charge). The reasonable service charges referred to in this subsection include, but are not limited to, fees or charges assessed in connection with the processing and issuance of permits, renewal of permits, amendments to permits, review of plans, studies, and other documents, and inspection and monitoring of facilities, as well as any other nondiscriminatory charges that are assessed in connection with a Federal, State, interstate, or local solid waste or hazardous waste regulatory program.”; and (4) by inserting after the second sentence the following: “No agent, employee, or officer of the United States shall be personally liable of any civil penalty under any Federal, State, interstate, or local solid or hazardous waste law with respect to any act or omission within the scope of the official duties of the agent, employee, or officer. An agent, employee, or officer of the United States shall be subject to any criminal sanction (including, but not limited to, any fine or imprisonment) under any Federal or State solid or hazardous waste law, but no department, agency, or instrumentality of the executive, legislative, or judicial branch of the Federal Government shall be subject to any such sanction.”.

(b) Administrative Enforcement Actions. Such section is further amended by adding at the end the following new subsections:

“(b) Administrative Enforcement Actions. (1) The Administrator may commence an administrative enforcement action against any department, agency, or instrumentality of the executive, legislative, or judicial branch of the Federal Government pursuant to the enforcement authorities contained in this Act. The Administrator shall initiate an administrative enforcement action against such a department, agency, or instrumentality in the same manner and under the same circumstances as an action would be initiated against another person. Any voluntary resolution or settlement of such an action shall be set forth in a consent order.

“(2) No administrative order issued to such a department, agency, or instrumentality shall become final until such department, or agency, or instrumentality has had the opportunity to confer with the Administrator in the same manner and under the same circumstances as an action would be initiated against another person. Any voluntary resolution or settlement of such an action shall be set forth in a consent order.

“(c) Limitation on State Use of Funds Collected From Federal Government. Unless a State law in effect on the date of the enactment of the Federal Facility Compliance Act of 1992 or a State constitution requires the funds to be used in a different manner, all funds collected by a State from the Federal Government from penalties and fines imposed for violation of any substantive or procedural requirement referred to in subsection (a) shall

## ***Appendix C***

be used by the State only for projects designed to improve or protect the environment or to defray the costs of environmental protection or enforcement.”.

(c) Effective Dates. -- (1) In general. Except as otherwise provided in paragraphs (2) and (3), the amendments made by subsection (a) shall take effect upon the date of the enactment of this Act.

(2) Delayed effective date for certain mixed waste. Until the date that is 3 years after the date of the enactment of this Act, the waiver of sovereign immunity contained in section 6001(a) of the Solid Waste Disposal act with respect to civil, criminal, and administrative penalties and fines (as added by the amendments made by subsection (a)) shall not apply to departments, agencies, and instrumentalities of the executive branch of the Federal Government for violations of section 3004(j) of the Solid Waste Disposal Act involving storage of mixed waste that is not subject to an existing agreement, permit, or administrative or judicial order, so long as such waste is managed in compliance with all other applicable requirements.

(3) Effective date for certain mixed waste. (A) Except as provided in subparagraph (B), after the date that is 3 years after the date of enactment of this Act, the waiver of sovereign immunity contained in section 6001(a) of the Solid Waste Disposal Act with respect to civil, criminal, and administrative penalties and fines (as added by the amendments made by subsection (a)) shall apply to departments, agencies, and instrumentalities of the executive branch of the Federal Government for violations of section 3004(j) of the Solid Waste Disposal Act involving storage of mixed waste.

(B) With respect to the Department of Energy, the waiver of sovereign immunity referred to in subparagraph (A) shall not apply after the date that is 3 years after the date of the enactment of this Act for violations of Section 3004 (j) of such Act involving storage of mixed waste, so long as the Department of Energy is in compliance with both -- (i) a plan that has been submitted and approved pursuant to section 3021(b) of the Solid Waste Disposal Act and which is in effect; and (ii) an order requiring compliance with such plan which has been issued pursuant to such section 3021(b) and which is in effect.

(4) Application of waiver to agreements and orders. The waiver of sovereign immunity contained in section 6001(a) of the Solid Waste Disposal Act (as added by the amendments made by subsection (a)) shall take effect on the date of the enactment of this Act with respect to any agreement, permit, or administrative or judicial order existing on such date of enactment (and any subsequent modifications to such an agreement, permit, or order), including, without limitation, any revision of an agreement, permit, or order that addresses compliance with section 3004(j) of such Act with respect to mixed waste.

(5) Agreement or order. Except as provided in paragraph (4), nothing in this Act shall be construed to alter, modify, or change in any manner any agreement, permit, or administrative or judicial order, including, without limitation, any provision of any agree-

## ***Federal Facility Compliance Act***

ment, permit, or order -- (i) that addresses compliance with mixed waste; (ii) that is in effect on the date of enactment of this Act; and (iii) to which a department, agency, or instrumentality of the executive branch of the Federal Government is a party.

### **[\*103] SEC. 103. DEFINITION OF PERSON.**

Section 1004(15) of the Solid Waste Disposal Act (42 U.S.C.6903(15)) is amended by adding the following before the period: “and shall include each department, agency, and instrumentality of the United States”.

### **[\*104] SEC. 014. FACILITY ENVIRONMENTAL ASSESSMENTS.**

Section 3007(c) of the Solid Waste Disposal Act (42 U.S.C. 6927(c)) is amended as follow: (1) the first sentence is amended by striking out “Beginning” and all that follows through “undertake” and inserting in lieu thereof “The Administrator shall undertake”.

(2) The first sentence is further amended by striking out “Federal agency” and inserting in lieu thereof “department, agency, or instrumentality of the United States”.

(3) The section is further amended by inserting after the first sentence the following new sentence: “Any State with an authorized hazardous waste program also may conduct an inspection of any such facility for purposes of enforcing the facility’s compliance with the State hazardous waste program.”.

(4) The section is further amended by adding at the end the following: “The department, agency, or instrumentality owning or operating each such facility shall reimburse the Environmental Protection Agency for the costs of the inspection of the facility. With respect to the first inspection of each such facility occurring after the date of the enactment of the Federal Facility Compliance Act of 1992, the Administrator shall conduct a comprehensive ground water monitoring evaluation at the facility, unless such an evaluation was conducted during the 12-month period preceding such date of enactment.”.

### **[\*105] SEC. 105 MIXED WASTE INVENTORY REPORTS AND PLAN.**

(a) Mixed Waste Inventory Reports. -- “(1) Requirement. Not later than 180 days after the date of the enactment of the Federal Facility Compliance Act of 1992, the Secretary of Energy shall submit to the Administrator and to the Governor of each State in which the Department of Energy stores or generates mixed wastes the following reports: “(A) A report containing a national inventory of all such mixed wastes, regardless of the time they were generated, on a State-by-State basis.

“(B) A report containing a national inventory of mixed waste treatment capacities and technologies.

## ***Appendix C***

“(2) Inventory of wastes. The report required by paragraph (1)(A) shall include the following: “(A) A description of each type of mixed waste at each Department of Energy Facility in each State, including, at a minimum, the name of the waste stream.

“(B) The amount of each type of mixed waste currently stored at each Department of Energy facility in each State, set forth separately by mixed waste that is subject to the land disposal prohibition requirements of section 3004 and mixed waste that is not subject to such prohibition requirements.

“(C) An estimate of the amount of each type of mixed waste the Department expects to generate in the next 5 years at each Department of Energy facility in each state.

“(D) A description of any waste minimization actions the Department has implemented at each Department of Energy facility in each State of each mixed waste stream.

“(E) The EPA hazardous waste code for each type of mixed waste containing waste that has been characterized at each Department of Energy facility in each State for each mixed waste stream.

“(F) An inventory of each type of waste that has not been characterized by sampling and analysis at each Department of Energy facility in each State.

“(G) The basis for the Department’s determination of the applicable hazardous waste code for each type of mixed waste at each Department of Energy facility and a description of whether the determination is based on sampling and analysis conducted on the waste or on the basis of process knowledge.

“(H) A description of the source of each type of mixed waste at each Department of Energy facility in each State.

“(I) The land disposal prohibition treatment technology or technologies specified for the hazardous waste component of each type of mixed waste at each Department of Energy facility in each State.

“(J) A statement of whether and how the radionuclide content of the waste later or affects use of the technologies described in subparagraph (I).

“(3) Inventory of treatment capacity and technologies. The report required by paragraph (1)(B) shall include the following:

“(A) An estimate of the available treatment capacity for each waste described in the report required by paragraph (1)(A) for which treatment technology exist.

“(B) A description, including the capacity, number and location, of each treatment unit considered in calculating the estimate under subparagraph (A).

“(C) A description, including the capacity, number and location, of any existing treatment unit that was not considered in calculating the estimate under subparagraph

## ***Federal Facility Compliance Act***

(A) but that could, alone or in conjunction with other treatment units, be used to treat any of the wastes described in the report required by paragraph (1)(A) to meet the requirements of regulations promulgated pursuant to section 3004(m).

“(D) For each unit listed in subparagraph (C), a statement of the reasons why the unit was not included in calculating the estimate under subparagraph (A).

“(E) A description, including the capacity, number, location and estimated date of availability, of each treatment unit currently proposed to increase the treatment capacities estimated under subparagraph (A).

“(F) For each waste described in the report required by paragraph (1)(A) for which the Department has determined no treatment technology exists, information sufficient to support such determination and a description of the technological approaches the Department anticipates will need to be developed to treat the waste.

“(4) Comments and revisions. Not later than 90 days after the date of the submission of the reports by the Secretary of Energy under paragraph (1), the Administrator and each State which received the reports shall submit any comments they may have concerning the reports to the Department of Energy. The Secretary of Energy shall consider and publish the comments prior to publication of the final report.

“(5) Requests for additional information. Nothing in this subsection limits or restricts the authority of States or the Administrator to request additional information from the Secretary of Energy.

“(b) Plan for Development of Treatment Capacities and Technologies. -- “(1) Plan requirement. (A)(i) For each facility at which the Department of Energy generates or stores mixed waste, except any facility subject to a permit, agreement, or order described in clause (ii), the Secretary of Energy shall develop and submit, as provided in paragraph (2), a plan for developing treatment capacities and technologies to treat all of the facility’s mixed wastes, regardless of the time they were generated, to the standards promulgated pursuant to section 3004(m).

“(ii) Clause (i) shall not apply with respect to any facility subject to any permit establishing a schedule for treatment of such wastes, or any existing agreement or administrative or judicial order governing the treatment of such wastes, to which the State is a party.

“(B) Each plan shall contain the following:

“(i) For mixed wastes for which treatment exist, a schedule for submitting all applicable permit applications, entering into contracts, initiating construction, conducting systems testing, commencing operations, and processing backlogged and currently generated mixed wastes.

## **Appendix C**

“(ii) For mixed wastes for which no treatment technologies exist, a schedule for identifying and developing such technologies, identifying the funding requirements for the identification and development of such technologies, submitting treatability study exemptions, and submitting research and development permit applications.

“(iii) For all cases where the Department proposes radionuclide separation of mixed wastes, or materials derived from mixed wastes, it shall provide an estimate of the volume of waste generated by each case of radionuclide separation, the estimated costs of waste treatment and disposal if radionuclide separation is used compared to the estimated costs if it is not used, and the assumptions underlying such waste volume and cost estimates.

“(C) A plan required under this subsection may provide for centralized, regional, or on-site treatment of mixed wastes, or any combination thereof.

“(2) Review and approval of plan. (A) For each facility that is located in a State (i) with authority under State law to prohibit land disposal of mixed waste until the waste has been treated and (ii) with both authority under State law regulate the hazardous components of mixed waste and authorization from the Environmental Protection Agency under section 3006 to regulate the hazardous components of mixed waste, the Secretary of Energy shall submit the plan required under paragraph (1) to the appropriate State regulatory officials for their review and approval, modification, or disapproval. In reviewing the plan, the State shall consider the need for regional treatment facilities. The State shall comments in making its determination on the plan. The State shall approve, approve with modifications, or disapprove the plan within 6 months after receipt of the plan.

“(B) For each facility located in a State that does not have the authority described in subparagraph (A), the Secretary shall submit the plan required under paragraph (1) to the Administrator of the Environmental Protection Agency for review and approval, modification or disapproval.

A copy of the plan also shall be provided by the Secretary to the State in which such facility is located. In reviewing the plan, the Administrator shall consider the need for regional treatment facilities. The Administrator shall consult with the State or States in which any facility affected by the plan is located and consider public comments in making a determination on the plan. The Administrator shall approve, approve with modifications, or disapprove the plan within 6 months after receipt of the plan.

“(C) Upon the approval of a plan under this paragraph by the Administrator or a State, the Administrator shall issue an order under section 3008(a), or the State shall issue an order under appropriate State authority, requiring compliance with the approved plan.

“(3) Public participation. Upon submission of a plan by the Secretary of Energy to the Administrator or a State, and before approval of the plan by the Administrator or State, the Administrator or State shall publish a notice of the available to the public on request.

## ***Federal Facility Compliance Act***

“(4) Revisions of plan. If any revisions of an approved plan are proposed by the Secretary of Energy or required by the Administrator or a State, the provisions of paragraphs (2) and (3) shall apply to the revisions in the same manner as they apply to the original plan.

“(5) Waiver of plan requirement. (A) A State may waive the requirement for the Secretary of Energy to develop and submit a plan under this subsection for a facility located in the State if the State (i) enters into an agreement with the Secretary of Energy that addresses compliance at the facility with section 3004(j) with respect to mixed waste, and (ii) issues an order requiring compliance with such agreement and which is in effect.

“(B) Any violation of an agreement or order referred to in subparagraph (A) is subject to the waiver of sovereign immunity contained in section 6001(a).

“(C) Schedule and Progress Reports -- “(1) Schedule. Not later than 6 months after the date of the enactment of the Federal Facility Compliance Act of 1992, the Secretary of Energy shall publish in the Federal Register a schedule for submitting the plans required under subsection (b).

“(2) Progress reports. (A) Not later than the deadlines specified in subparagraph (B), the Secretary of Energy shall submit to the Committee on Environment and Public Works of the Senate and the Committee on Energy and Commerce of the House of Representatives a progress report containing the following: “(i) An identification, by facility, of the plans that have been submitted to States or the Administrator of the Environmental Protection Agency pursuant to subsection (b).

“(ii) the status of State and Environmental Protection Agency review the approval of each such plan.

“(iii) The number of orders requiring compliance with such plans that are in effect.

“(iv) For the first 2 reports required under this paragraph, an identification of the plans required under such subsection (b) that the Secretary expects to submit in the 12-month period following submission of the report.

(B) The Secretary of Energy shall submit a report under subparagraph (A) not later than 12 months after the date of the enactment of the Federal Facility Compliance Act of 1992, 24 months after such date, and 36 months after such date.”.

(2) The table of contents for subtitle C of the Solid Waste Disposal Act (contained in section 1001) is amended at the end the following new item:

“Sec 3021. Mixed waste inventory reports and plan.”.

(b) Definition. Section 1004 of the Solid Waste Disposal Act (42 U.S.C. 6902) is amended by adding at the end the following new paragraph: “(41) The term ‘mixed waste’ means

## ***Appendix C***

waste that contains both hazardous waste and source, special nuclear, or by-product material subject to the Atomic Energy Act of 1954 (42 U.S.C. 2011 et seq.).”.

(c) GAO Report -- (1) Requirement. Not later than 18 months after the date of the enactment of this Act, the Comptroller General shall submit to Congress a report on the Department of Energy’s progress in complying with section 3021(b) of the Solid Waste Disposal Act.

(2) Matters to be included. The report required under paragraph (1) shall contain, at a minimum, the following: (A) The Department of Energy’s progress in submitting to the State or the Administrator of the Environmental Protection Agency a plan for each facility for which a plan is required under section 3021(b) of the Solid Waste Disposal Act and the Status of State or Environmental Protection Agency review and approval of each such plan.

(B) The Department of Energy’s progress in entering into orders requiring compliance with any such plans that have been approved.

(C) An evaluation of the completeness and adequacy of each such plan as of the date of submission of the report required under paragraph (1).

(D) An identification of any recurring problems among the Department of Energy’s submitted plans.

(E) A description of treatment technologies and capacity that have been developed by the Department of Energy since the date of the enactment of this Act and a list of the wastes that are expected to be treated by such technologies and the facilities at which the wastes are generated or stored.

(F) The progress made by the Department of Energy in characterizing its mixed waste streams at each such facility by sampling and analysis.

(G) An identification and analysis of additional actions that the Department of Energy must take to -- (i) complete submission of all plans required under such section 3021(b) for all such facilities; (ii) obtain the adoption of orders requiring compliance with all such plans; and (iii) develop mixed waste treatment capacity and technologies.

### **[\*106] SEC. PUBLIC VESSELS.**

(a) Amendment. Subtitle C of the Solid Waste Disposal Act (42 U.S.C. 6921 et seq. ) is further amended by adding at the end the following new section:

#### **“SEC. 3022 PUBLIC VESSELS.**

(a) Waste Generated on Public Vessels. Any hazardous waste generated on a public vessel shall not be subject to the storage, manifest, inspection, or recordkeeping require-



## ***Federal Facility Compliance Act***

ments of this Act until such waste is transferred to a shore facility, unless-- “(1) the waste is stored on the public vessel for more than 90 days after the public vessel is placed in reserve or is otherwise no longer in service; or “(2) the waste is transferred to another public vessel within the territorial waters of the United States and is stored on such vessel or another public vessel for more than 90 days after the date of transfer.

“(b) Computation of Storage Period. For purposes of subsection (a), the 90-day period begins on the earlier of -- “(1) the date on which the waste was generated is placed in reserve or is otherwise no longer in service; or “(2) the date on which the waste is transferred from the public vessel on which the waste was generated to another public vessel within the territorial waters on the United States; and continues, without interruption, as long as the waste is stored on the original public vessel (if in reserve or not in service) or another public vessel.

“(c) Definitions. For purposes of this section: “(1) The term ‘ public vessel’ means a vessel owned or bareboat chartered and operated by the United States, or by a foreign nation, except when the vessel is engaged in commerce.

“(2) The terms ‘in reserve’ and ‘in service’ have the meanings applicable to those terms under section 7293 and sections 7304 through 7308 of title 10, United States Code, and regulations prescribed under those sections.

“(d) Relationship to Other Law. Nothing in this section shall be construed as altering or otherwise affecting the provisions of section 7311 of title 10, United States Code.”.

(b) Technical Amendment. The table of contents for subtitle C of such Act (contained in section 1001) is further amended by adding at the end the following new item:

“Sec. 3022. Public vessels.”.

### **[\*107] SEC. 107 MUNITIONS.**

Section 3004 of the Solid Waste Disposal Act ( 42 U.S.C. 6924) is amended by adding at the end the following new subsection:

“(y) Munitions. (1) Not later than 6 months after the date of the enactment of the Federal Facility Compliance Act of 1992, the Administrator shall propose, after consulting with the Secretary of Defense and appropriate State officials, regulations identifying when military munitions become hazardous waste for purposes of this subtitle and providing for the safe transportation and storage of such waste. Not later than 24 months after such date, and after notice and opportunity for comment, the Administrator shall promulgate such regulations. Any such regulations shall assure protection of human health and the environment.

“(2) For purposes of this subsection, the term ‘military munitions’ includes chemical and conventional munitions.”

## ***Appendix C***

[\*108] SEC > 108. FEDERALLY OWNED TREATMENT WORKS.

(a) Amendment. Subtitle C of the Solid Waste Disposal Act (42 U.S.C. 6921 et seq.) is further amended by adding at the end the following new section:

### **“SEC. 3023. FEDERALLY OWNED TREATMENT WORKS.**

“(a) In General. For purposes of section 1004(27), the phrase ‘but does not include solid or dissolved material in domestic sewage’ shall apply to any solid or dissolved material introduced by a source into a federally owned treatment works if -- “(1) such solid or dissolved material is subject to a pretreatment standard under section 307 of the Federal Water Pollution Control Act (33 U.S.C. 1317), and the source is in compliance with such standard;

“(2) for a solid or dissolved material for which a pretreatment standard has not been promulgated pursuant to section 307 of the Federal Water Pollution Control Act (33 U.S.C. 1317), the Administrator has promulgated a schedule for establishing such a pretreatment standard which would be applicable to such solid or dissolved material not later than 7 years after the date of enactment of this section, such standard is promulgated not before the date established in the schedule, and after the effective date of such standard the source is in compliance with such standard;

“(3) such solid or dissolved material is not covered by paragraph (1) or (2) and is not prohibited from land disposal under subsections (d), (e), (f), or (g) of section 3004(m); or

“(4) notwithstanding paragraphs (1), (2), or (3), such solid or dissolved material is generated by a household or person which generates less than 100 kilograms of hazardous waste per month unless such solid or dissolved material would otherwise be an acutely hazardous waste and subject to standards, regulations, or other requirements under this Act notwithstanding the quantity generated.

“(b) Prohibition. It is unlawful to introduce into a federally owned treatment works any pollutant that is a hazardous waste.

“(c) Enforcement. (1) Actions taken to enforce this section shall not require closure of a treatment works if the hazardous waste is removed or decontaminated and such removal or decontamination is adequate, in the discretion of the Administrator or, in the case of an authorized State, of the State, to protect human health and the environment.

“(2) Nothing in this subsection shall be construed to prevent the Administrator or an authorized State from ordering the closure of a treatment works if the Administrator or State determines such closure is necessary for protection of human health and the environment.

## ***Federal Facility Compliance Act***

“(3) Nothing in this subsection shall be construed to affect any other enforcement authorities available to the Administrator or a State under this subtitle.

“(d) Definition. For purposes of this section, the term ‘federally owned treatment works’ means a facility that is owned and operated by a department, agency, or instrumentality of the Federal Government treating wastewater, a majority of which is domestic sewage, prior to discharge in accordance with a permit issued under section 402 of the Federal Water Pollution Control Act.

“(e) Savings Clause. Nothing in this section shall be construed as affecting any agreement, permit, or administrative or judicial order, or any condition or requirement contained in such an agreement, permit, or order, that is in existence on the date of the enactment of this section and the requires corrective action or closure at a federally owned treatment works or solid waste management unit of facility related to such a treatment works.”.

(b) Technical Amendment. The table of contents for subtitle C of such Act (contained in section 1001) is further amended by adding at the end the following new item:

“Sec. 3023. Federally-owned treatment works.”.

### **[\*109] SEC. 109 SMALL TOWN ENVIRONMENTAL PLANNING.**

(a) Establishment. The Administrator of the Environmental Protection Agency (hereafter referred to as the “Administrator”) shall establish a program to assist small communities in planning and financing environmental facilities. The program shall be known as the “Small Town Environmental Planning Program”.

(b) Small Town Environmental Planning Task Force. (1) The Administrator shall establish a Small Town Environmental Planning Task Force which shall be composed of representatives of small towns from different areas of the United States, Federal and State governmental agencies, and public interest groups. The Administrator shall terminate the Task Force not later than 2 years after the establishment of the Task Force.

(2) The Task Force shall -- (A) identify regulations developed pursuant to Federal environmental laws which pose significant compliance problems for small towns; (B) identify means to improve the working relationship between the Environmental Protection Agency (hereafter referred to as the Agency) and small towns; (C) review proposed regulations for the protection of the environmental and public health and suggest revisions that could improve the ability of small towns to comply with such regulations; (D) identify means to promote regionalization of environmental treatment systems and infrastructure serving small towns to improve the economic condition of such systems and infrastructure; and (E) provide such other assistance to the Administrator as the Administrator deems appropriate.

## ***Appendix C***

(C) Identification of Environmental Requirements. (1) Not later than 6 months after the date of the enactment of this Act, the Administrator shall publish a list of requirements under Federal environmental and public health statutes (and the regulations developed pursuant to such statutes) applicable to small towns. Not less than annually, the Administrator shall make such additions and deletions to and from the list as the Administrator deems appropriate.

(2) The Administrator shall, as part of the Small Town Environmental Planning Program under this section, implement a program to notify small communities of the regulations identified under paragraph (1) and of future regulations and requirements through methods that the Administrator determines to be effective to provide information to the greatest number of small communities, including any of the following: (A) Newspapers and other periodicals.

(B) Other news media.

(C) Trade, municipal, and other associations that the Administrator determines to be appropriate.

(D) Direct mail.

(d) Small Town Ombudsman. The Administrator shall establish and staff an Office of the Small Town Ombudsman. The Office shall provide assistance to small towns in connection with the Small Town Environmental Planning Program and other business with the Agency. Each regional office shall identify a small town contact. The Small Town Ombudsman and the regional contacts also may assist larger communities, but only if first priority is given to providing assistance to small towns.

(e) Multi-Media Permits. (1) The Administrator shall conduct a study of establishing a multi-media permitting program for small towns. Such evaluation shall include an analysis of -- (A) environmental benefits and liabilities of a multi-media permitting program; (B) the potential of using such a program to coordinate a small town's environmental and public health activities; and

(C) The legal barriers, if any, to the establishment of such a program.

(2) Within 3 years after the date of enactment of this Act, the Administrator shall report to Congress on the result of the evaluation performed in accordance with paragraph (1). Included in this report shall be a description of the activities conducted pursuant to subsections (a) through (d).

(f) Definition. For purposes of this section, the term "small town" means an incorporated or unincorporated community (as defined by the Administrator) with a population of less than 2,500 individuals.

(g) Authorization. There is authorized to be appropriated the sum of \$ 5000,000 to implement this section.

## ***Federal Facility Compliance Act***

### **[\*110] SEC. 110 CHIEF FINANCIAL OFFICER REPORT.**

The Chief Financial Officer of each affected agency shall submit to Congress an annual report containing, to the extent practicable, a detailed description of the compliance activities undertaken by the agency for mixed waste streams, and an accounting of the fines and penalties imposed on the agency for violations involving mixed waste.

## **TITLE II -- METROPOLITAN WASHINGTON WASTE MANAGEMENT STUDY ACT**

### **[\*201] SEC. 201. SHORT TITLE.**

This title may be cited as the “Metropolitan Washington Waste Management Study Act”.

### **[\*202] SEC. 202. FINDINGS.**

The Congress finds that the I-95 Sanitary Landfill, in Fortune, Virginia, is located on Federal land, and the ultimate responsibility for maintaining environmental integrity at such landfill is on the Federal Government, as well as the signatories to the July 1981 I-95 Sanitary Landfill Memorandum of Understanding.

### **[\*203] SEC 203 ENVIRONMENTAL IMPACT STATEMENT**

(a) Environmental Impact Statement. Except as provided in subsection (b), in order to assure environmental integrity in and around properties owned by the Government of the United States, no expansion of the I-95 Sanitary Landfill shall be permitted or otherwise authorized unless-- (1) an environmental impact statement, pursuant to the National Environmental Policy Act, regarding any such proposed expansion has been completed and approved by the Administrator; and (2) the costs incurred in conducting and completing such environmental impact statement are paid (A) from the landfill's so-called enterprise fund established pursuant to the July 1981 I-95 Sanitary Landfill Memorandum of Understanding, or (B) in accordance with some other payment formula based on past and projected percentage of the jurisdictional usage of the landfill.

(b) Exception. (1) Notwithstanding subsection (a), the I-95 Sanitary Landfill may be expanded for the purpose of the ash monofill planned by the parties to the July 1981 I-95 Sanitary Landfill Memorandum of Understanding if such monofill, subject to paragraph (2), is used solely for the disposal of incinerator ash from such parties.

(2) The ash monofill referred to in paragraph (1) may be used for the disposal of solid waste for a maximum of 30 days whenever a resource recovery facility, or an incinerator and a resource recovery facility, operated for or by the parties to the July 1981 I-95 Sanitary Landfill Memorandum of Understanding is completely unavailable because of an emergency shutdown.

## ***Appendix C***

(c) Limitation. After December 31, 1995, the I-95 Sanitary Landfill, including any expansions thereof, shall not be available to receive or dispose of municipal or industrial waste of any kind other than incinerator ash unless the conditions enumerated in subsection (a) are met.

(d) General. Notwithstanding any other provisions of this title, the parties of the July 1981 I-95 Sanitary Landfill Memorandum of Understanding, together with the Federal Government, shall continue to be responsible for maintaining environmental stability at the I-95 Sanitary Landfill, including any expansion, in accordance with applicable laws of the United States, the Commonwealth of Virginia, and the local jurisdictions in which the I-95 Sanitary landfill is located.

### **[\*204] SEC. 204 DEFINITIONS.**

For purposes of this title: (1) The term “expansion” includes any development or use, after May 31, 1991, of any lands (other than those lands which were used as a landfill on or before May 31, 1991) owned by the Government of the United States in and around Lorton, Virginia, for the purpose of, or use as, a sanitary landfill in accordance with the July 1981 I-95 Sanitary Landfill Memorandum of Understanding. The term also includes variances or exemptions from any elevation requirements relating to landfill operations established by the laws of the Commonwealth of Virginia, or any subdivision thereof, in connection with any such lands used on or before May 31, 1991.

(2) the term “lands owned by the Government of the United States” includes any lands owned by the United States, and any such lands with respect to which the Government of the District of Columbia has beneficial ownership.

(3) The term “July 1981 I-95 Sanitary Landfill Memorandum of Understanding” means the document titled “Memorandum of Understanding I-95 Resource Recovery, Land Reclamation, and Recreation Complex” that was executed July 22, 1981, and subsequently amended by supplemental agreements executed before May 31, 1991.

Speaker of the House of Representatives

Vice President of the United States and President of the Senate

**APPENDIX D**  
**PRESIDENTIAL EXECUTIVE ORDERS**

April 17, 1991

**EXECUTIVE ORDER 12759**

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**FEDERAL ENERGY MANAGEMENT**

By the authority vested in me as President by the Constitution and the laws of the United States of America, including the Energy Policy and Conservation Act, as amended (Public Law 94—163, 89 Stat. 871, 42 U.S.C. 6201 *et seq.*), the Motor Vehicle Information and Cost Savings Act, as amended (15 U.S.C. 1901 *et seq.*), section 205(a) of the Federal Property and Administrative Services Act, as amended (40 U.S.C. 486(a)), and section 301 of title 8 of the United States Code, it is hereby ordered as follows:

**Section 1.** *Federal Energy Efficiency Goals for Buildings.* Each agency shall develop and implement a plan to meet the 1995 energy management goals of the National Energy Conservation Policy Act, as amended, 42 U.S.C. 8251 *et seq.*, and by the year 2000 reduce overall energy use of Btu's per gross square foot of the Federal buildings it operates, taking into account utilization, by 20 percent from 1985 energy use levels, to the extent that these measures minimize life cycle costs and are cost-effective in accordance with 10 CFR Part 436.

**Sec. 2.** *Federal Energy Efficiency Goals for Other Facilities.* Each agency will prescribe policies under which its industrial facilities in the aggregate increase energy efficiency by at least 20 percent in fiscal year 2000 in comparison to fiscal year 1985, to the extent that these measures minimize life cycle costs are cost-effective in accordance with 10 CFR Part 436. Each agency shall establish appropriate indicators of energy efficiency to comply with this section.

**Sec. 3.** *Minimization of Petroleum Use in Federal Facilities.* Each agency using petroleum products for facilities operations or building purposes shall seek to minimize such use through switching to an alternative energy source if it is estimated to minimize life cycle costs and which will not violate Federal, State, or local clean air standards. In addition, each agency shall survey its buildings and facilities to determine where the potential for a dual fuel capability exists and shall provide dual fuel capability where practicable.

**Sec. 4.** *Implementation Strategies.* (a) Except as provided by paragraph (b) and (c) of this section, each agency shall adopt an implementation strategy, consistent with the provisions of this order, to achieve the goals established in sections 1, 2, and 3. That strategy should include, but not be limited to, changes in procurement practices, acquisition of real property, participation in demand side management services and shared savings agreements offered by private firms, and investment in energy efficiency measures. The mix and balance among such measures shall be established in a manner most suitable to the available resources and particular circumstances in each agency.



## ***Executive Orders***

(b) The Secretary of Defense may, if he determines it to be in the national interest, issue regulations exempting from compliance with the requirements of this order, any weapons, equipment, aircraft, vehicles, or other classes or categories of real or personal property which are owned or operated by the Armed Forces of the United States (including the Coast Guard) or by the National Guard of any State and which are uniquely military in nature.

(c) The Secretary and the Attorney General, consistent with their protective and law enforcement responsibilities, shall determine the extent to which the requirements of this order shall apply to the protective and law enforcement activities of their respective agencies.

**Sec. 5. *Procurement of Energy Efficient Goods and Products.*** In order to assure the purchase of energy efficient goods and products, each agency shall select for procurement those energy consuming goods or products which are the most life cycle cost-effective, pursuant to the requirements of the *Federal Acquisition Regulation*. To the extent practicable, each agency shall require vendors of good to provide appropriate data that can be used to assess the life cycle costs of each good or product, including building energy system components, lighting systems, office equipment, and other energy using equipment.

**Sec. 6. *Participation in Demand Side Management Services.*** Each agency shall review its procedures used to acquire utility and other related services, and to the extent practicable and consistent with its strategy established pursuant to section 4, remove any impediments to receiving, utilizing, and taking demand side management services, incentives, and rebates offered by utilities and other private sector energy service providers.

**Sec. 7. *Energy Efficiency Requirement for Current Federal Building Space.*** Each agency occupying space in Federal buildings shall implement the applicable rules and regulations regarding Federal property and energy management.

**Sec. 8. *Energy Efficiency Requirements for Newly Constructed Federal Buildings.*** Each agency responsible for the construction of a new Federal building shall ensure that the building is designed and constructed to comply with the energy performance standards applicable to Federal residential and commercial buildings as set forth in 10 CFR Part 435. Each agency shall establish certification procedures to implement this requirement.

**Sec. 9. *Vehicle Fuel Efficiency Outreach Programs.*** Each agency shall implement outreach programs including, but not limited to, ride sharing and employee awareness programs to reduce the petroleum fuel usage by Federal employees and by contractor employees at Government-owned, contractor-operated facilities.

**Sec. 10. *Federal Vehicle Fuel Efficiency.*** Consistent with its mission requirements, each agency operating 300 or more commercially designed motor vehicles domestically shall develop a plan to reduce motor vehicle gasoline and diesel consumptions by at least 10 percent by 1995 in comparison with fiscal year 1991. The Administrator of General Services, in consultation with the

## ***Appendix D***

Secretary of Energy, shall issue appropriate guidance concerning vehicles to be covered, the use of alternative/blended fuels, initiatives to improve fuel efficiency of the existing fleet, the use of modified energy life cycle costing consistent with life cycle costing methods in 10 CFR 436, and limitations on vehicle type and engine size to be acquired. Each agency electing to use alternative fuel motor vehicles shall receive credit for such use.

**Sec. 11. *Procurement of Alternative Fueled Vehicles.*** The Secretary of Energy, with the cooperation of other appropriate agencies, and consistent with other Federal law, shall ensure that the maximum number practicable of vehicles acquired annually are alternative fuel vehicles as required by the Alternative Motor Fuels Act of 1988 (42 U.S.C. 6374.) Subject to availability of appropriations for this purpose, the maximum number practicable of alternative fuel vehicles produced by original equipment vehicle manufacturers shall be acquired by the end of model year 1995.

**Sec. 12. *Federal Funding.*** Within approved agency budget totals, each agency head shall work to achieve the goals set forth in this order. To the extent that available resources fall short of requirements, agency heads shall rank energy efficiency investments in descending order of the savings-to-investment ratios, or their adjusted internal rate of return to establish priority.

**Sec. 13. *Annual Reports.*** The head of each agency shall report annually to the Secretary of Energy, in a format specified by the Secretary after consultation with the heads of affected agencies, on progress in achieving the goals of this Executive order with respect to Federal buildings, facilities, and vehicles subject to this order. The Secretary of Energy will prepare a consolidated report to the President annually on the implementation of this order.

**Sec. 14. *Definitions.*** For the purpose of this order—

(a) the term “energy use” means the energy that is used at a building or facility and measured in terms of energy delivered to the building or facility;

(b) the term “Federal building” means any building in the United States which is controlled by the Federal Government for its use.

[Signed] WILLIAM J. CLINTON

THE WHITE HOUSE,

*April 17, 1992.*

[FR Doc. 91-9473  
Filed 4-18-91; 10:33 am]  
Billing code 3195-01-M

**Editorial note:** For the President’s remarks on signing Executive Order 12759, see the *Weekly Compilation of Presidential Documents* (vol. 27, no. 16).

*(This Order was revoked by E.O. 12873, and is included here only for information)*

**EXECUTIVE ORDER 12780**

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**FEDERAL AGENCY RECYCLING AND THE COUNCIL  
ON FEDERAL RECYCLING AND PROCUREMENT POLICY**

WHEREAS, this Administration is determined to secure for future generations of Americans their rightful share of our Nation's natural resources, as well as a clean and healthful environment in which to enjoy them; and

WHEREAS, two goals of the Administration's environmental policy, cost-effective pollution prevention and the conservation of natural resources, can be significantly advanced by reducing waste and recycling the resources used by this generation of Americans' and

WHEREAS, the Federal Government, as one of the Nation's largest generators of solid waste, is able through cost effective waste reduction and recycling resources to conserve local government disposal capacity; and

WHEREAS, the Federal Government, as the Nation's largest single consumer is able through affirmative procurement practices to encourage the development of economically efficient markets for products manufactured with recycled materials;

NOW, THEREFORE, I, GEORGE BUSH, by the authority vested in me as President by the Constitution and the laws of the United States of America, including the Solid Waste Disposal Act, Public Law 89-272, 79 Stat. 997, as amended by the Resource Conservation and Recovery Act ("RCRA"), Public Law 94-580, 90 Stat. 2795 (1976), hereby order as follows:

**PART 1—PREAMBLE**

**Section 101.** The purpose of this Executive order is to:

(a) Require that Federal agencies promote cost-effective waste reduction and recycling of reusable materials from wastes generated by Federal Government activities.

(b) Encourage economically efficient market demand for designated items produced using recovered materials by directing the immediate implementation of cost-effective Federal procurement preference programs favoring the purchase of such items.

(c) Provide a forum for the development and study of policy options and procurement practices that will promote environmentally sound and economically efficient waste reduction and recycling of our Nation's resources.

## **Appendix D**

(d) Integrate cost-effective waste reduction and recycling programs into all Federal agency waste management programs in order to assist in addressing the Nation's solid waste disposal problems.

(e) Establish Federal Government leadership in addressing the need for efficient State and local solid waste management through implementation of environmentally sound and economically efficient recycling.

**Sec. 102.** Consistent with section 6002(c)(1) of RCRA (42 U.S.C. 6962(c)(1)), activities and operations of the executive branch shall be conducted in an environmentally responsible manner, and waste reduction and recycling opportunities shall be utilized to the maximum extent practicable, consistent with economic efficiency.

**Sec. 103.** Consistent with section 6002(c)(2) of RCRA (42 U.S.C. 6962(c)(2)), agencies that generate energy from fossil fuel in systems that have the technical capacity of using energy or fuels derived from solid waste as a primary or supplementary fuel shall use such capability to the maximum extent practicable.

## **PART 2—DEFINITIONS**

For purposes of this order:

**Sec. 201.** “Federal agency” means any department, agency, or other instrumentality of the executive branch.

**Sec. 202.** “Procurement” and “acquisition” are used interchangeably to refer to the processes through which Federal agencies purchase products.

**Sec. 203.** “Recovered materials” is used as defined in section 1004(19) and 6002(h) of the Resource Conservation and Recovery Act (42 U.S.C. 6903(19) and 6962(h)), as amended.

**Sec 204.** “Recycling” means the diversion of materials from the solid waste stream and the beneficial use of such materials. Recycling is further defined as the result of a series of activities by which materials that would become or otherwise remain waste, are diverted from the solid waste stream by collection, separation processing and are used as raw materials in the manufacture of goods sold or distributed in commerce or the reuse of such materials as substitutes for goods made of virgin materials.

**Sec. 205.** “Waste reduction” means any change in a process, operation, or activity that results in the economically efficient reduction in waste material per unit of production without reducing the value output of the process, operation, or activity, taking into account the health and environmental consequences of such change.

### **PART 3—SOLID WASTE RECYCLING PROGRAMS**

**Sec. 301. *Recycling Programs.*** Each Federal agency that has not already done so shall initiate a program to promote cost-effective waste reduction and recycling of reusable materials in all of its operations and facilities. These programs shall foster (a) practices that reduce waste generation, and (b) the recycling of recyclable materials such as paper, plastic, metals, glass, used oil, lead acid batteries, and tires and the composting of organic materials such as yard waste. The recycling programs implemented pursuant to this section must be compatible with applicable State and local recycling requirements.

**Sec. 302. *Contractor Operated Facilities.*** Every contract that provides for contractor operation of a Government-owned or leased facility, awarded more than 210 days after the effective date of this Executive order, shall include provisions that obligate the contractor to comply with the requirements of this Part as fully as though the contractor were a Federal agency.

### **PART 4—VOLUNTARY STANDARDS**

**Sec. 401. *Amendment of OMB Circular No. A-119.*** The Director of the Office of Management and Budget (“OMB”) shall amend, as appropriate, OMB Circular No. A-119, “Federal Participation in the Development and Use of Voluntary Standards,” to encourage Federal agencies to participate in the development of environmentally sound and economically efficient standards and to encourage Federal agency use of such standards.

### **PART 5—PROCUREMENT OF RECOVERED MATERIALS**

**Sec. 501. *Adoption of Affirmative Procurement Programs.*** Within 180 days after the effective date of this order, each Federal agency shall provide a report to the Administrator of the Environmental Protection Agency regarding the Agency’s adoption of an affirmative procurement program; such programs are required by section 6002(i) of RCRA (42 U.S.C. 6962(i)). Within 1 year of the issuance of this order, the Administrator of the Environmental Protection Agency shall report to the President regarding the compliance of each Federal agency with this requirement.

**Sec. 502. *Annual Review of Affirmative Procurement Programs.*** In accordance with section 6002(i) of RCRA (42 U.S.C. 6962(i)), each Federal agency shall review annually the effectiveness of its affirmative procurement program and shall provide a report regarding its findings to the Environmental Protection Agency and to the Office of Federal Procurement Policy, beginning with a report covering fiscal year 1992. Such report shall be transmitted by December 15 each year. Reports required by this section shall be made available to the public.

## ***Appendix D***

### **PART 6—RECYCLING COORDINATORS AND THE COUNCIL ON FEDERAL RECYCLING AND PROCUREMENT POLICY**

**Sec. 601. *Federal Recycling Coordinator.*** Within 90 days after the effective date of this order, the head of each Federal agency shall designate an agency employee to serve as Agency Recycling Coordinator. The Federal Recycling Coordinator shall review and report annually to OMB, at the time of agency budget submissions, the actions taken by the agencies to comply with the requirements of this order.

**Sec. 602. *Designation of Recycling Coordinators.*** Within 90 days after the effective date of this order, the head of each Federal agency shall designate an agency employee to serve as Agency Recycling Coordinator. The Agency Recycling Coordinator shall be responsible for:

- (a) coordinating the development of an effective agency waste reduction and recycling program that complies with the comprehensive implementation plan developed by the Council on Federal Recycling and Procurement Policy;

- (b) coordinating agency action to develop benefits, costs, and savings data measuring the effectiveness of the agency program; and

- (c) coordinating the development of agency reports required by this Executive order and providing copies of such reports to the Environmental Protection Agency.

**Sec. 603. *The Council on Federal Recycling and Procurement Policy.*** (a) A Council on Federal recycling and Procurement Policy is hereby established. It shall comprise the Federal Recycling coordinator, the Chairman of the Council on Environmental Quality, the Administrator of the Office of Federal Procurement Policy, and the Agency Recycling Coordinator and the Procurement Executive of each of the following agencies: the Environmental Protection Agency, the Department of Defense, the General Service Administration, the National Aeronautics and Space Administration, the Department of Energy, the Department of Commerce, and the Department of the Interior. The Federal Recycling coordinator shall serve as Chair of the Council.

- (b) Duties. The Council on Federal Recycling and Procurement Policy shall:

- (1) identify and recommend, to OMB, initiatives that will promote the purposes of this order, including:

- (A) the development of appropriate incentives to encourage the economically efficient acquisition by the Federal Government of products that reduce waste and of products produced with recycled materials;

- (B) the development of appropriate incentives to encourage active participation in economically efficient Federal waste reduction and recycling programs; and

## ***Executive Orders***

(C) the development of guidelines for cost-effective waste reduction and recycling activities by Federal agencies;

(2) review Federal agency specifications and standards and recommend changes that will enhance Federal procurement of products made from recycled and recyclable materials, taking into account the costs and the performance requirements of each agency;

(3) collect and disseminate Federal agencies' information concerning methods to reduce wastes, types of materials that can be recycled, the costs and savings associated with recycling, and the current market sources and prices of products that reduce waste and of products produced with recycled materials;

(4) assist the development of cost-effective waste reduction and recycling programs pursuant to this order by developing guidelines for agency waste reduction and recycling programs and by identifying long-range goals for Federal waste reduction and recycling programs;

(5) provide meaningful data to measure the effectiveness and progress of Federal waste reduction and recycling programs;

(6) provide guidance and assistance to the Agency Recycling Coordinators in setting up and reporting on agency programs; and

(7) review Federal agency compliance with section 103 of this order.

### **PART 7—LIMITATION**

**Sec. 701.** This order is intended only to improve the internal management of the executive branch and shall not be interpreted to create any right or benefit, substantive or procedural, enforceable at law by a party against the United States, its officers, or any other person.

**Sec. 702.** Section 502 and Part 6 of this order shall be effective for 5 years only, beginning on the effective date of this order.

**Sec. 703.** This order shall be effective immediately.

[Signed] *GEORGE BUSH*

THE WHITE HOUSE,

*October 31, 1991.*

[FR Doc. 91-26646  
Filed 10-31-91; 12:42 pm]  
Billing code 3195-01-M

April 21, 1993

**EXECUTIVE ORDER 12843**

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**PROCUREMENT REQUIREMENTS AND POLICIES FOR FEDERAL AGENCIES  
FOR OZONE-DEPLETING SUBSTANCES**

WHEREAS, the essential function of the stratospheric ozone layer is shielding the Earth from dangerous ultraviolet radiation; and

WHEREAS, the production and consumption of substances that cause the depletion of stratospheric ozone are being rapidly phased out on a worldwide basis with the support and encouragement of the United States; and

WHEREAS, the Montreal Protocol on Substances that Deplete the Ozone Layer, to which the United States is a signatory, calls for a phaseout of the production and consumption of these substances; and

WHEREAS, the Federal government, as one of the principal users of these substances, is able through affirmative procurement practices to reduce significantly the use of these substances and to provide leadership in their phaseout; and

WHEREAS, the use of alternative substances and new technologies to replace these ozone-depleting substances may contribute positively to the economic competitiveness on the world market of U.S. manufacturers of these innovative safe alternatives;

NOW, THEREFORE, I, WILLIAM JEFFERSON CLINTON, by the authority vested in me as President by the Constitution and the laws of the United States of America, including the 1990 amendments to the Clean Air Act ("Clean Air Act Amendments"), Public Law 101-549, and in order to reduce the Federal government's procurement and use of substances that cause stratospheric ozone depletion, do hereby order as follows:

**Section 1. *Federal Agencies.*** Federal agencies shall, to the extent practicable:

- (a) conform their procurement regulations and practices to the policies and requirements of Title VI of the Clean Air Act Amendments, which deal with stratospheric ozone protection;
- (b) maximize the use of safe alternatives to ozone-depleting substances;
- (c) evaluate the present and future uses of ozone-depleting substances, including making assessments of existing and future needs for such materials and evaluate their use of and plans for recycling;



## ***Executive Orders***

(d) revise their procurement practices and implement cost-effective programs both to modify specifications and contracts that require the use of ozone-depleting substances and to substitute non-ozone-depleting substances to the extent economically practicable; and

(e) exercise leadership, develop exemplary practices, and disseminate information on successful efforts in phasing out ozone-depleting substances.

**Sec. 2. Definitions.** (a) “Federal agency” means any executive department, military department, or independent agency within the meaning of 5 U.S.C. 101, 102, or 104(1), respectively.

(b) “Procurement” and “acquisition” are used interchangeably to refer to the processes through which Federal agencies purchase products and services.

(c) “Procurement regulations, policies and procedures” encompasses the complete acquisition process, including the generation of product descriptions by individuals responsible for determining which substances must be acquired by the agency to meet its mission.

(d) “Ozone-depleting substances” means the substances controlled internationally under the Montreal Protocol and nationally under Title VI of the Clean Air Act Amendments. This includes both Class I and Class II substances as follows:

(i) “Class I substance” means any substance designated as Class I in the **Federal Register** notice of July 30, 1992 (57 Fed. Reg. 33753), including chlorofluorocarbons, halons, carbon tetrachloride, and methyl chloroform and any other substance so designated by the Environmental Protection Agency (“EPA”) by regulation at a later date; and

(ii) “Class II substance” means any substance designated as Class II in the **Federal Register** notice of July 30, 1992 (57 Fed. Reg. 33753), including hydrochlorofluorocarbons and any other substances so designated by EPA by regulation at a later date.

(e) “Recycling” is used to encompass recovery and reclamation, as well as the reuse of controlled substances.

**Sec. 3. Policy.** It is the policy of the Federal Government that Federal agencies: (i) implement cost-effective programs to minimize the procurement of materials and substances that contribute to the depletion of stratospheric ozone; and (ii) give preference to the procurement of alternative chemicals, products, and manufacturing processes that reduce overall risks to human health and the environment by lessening the depletion of ozone in the upper atmosphere. In implementing this policy, prior to final promulgation of EPA regulations on Federal procurement, Federal agencies shall begin conforming their procurement policies to the general requirements of Title VI of the Clean Air Act Amendments by:

(a) minimizing, where economically practicable, the procurement of products containing or manufactured with Class I substances in anticipation of the phaseout schedule to be promulgated by EPA for Class I substances, and maximizing the use of safe alternatives. In developing

## ***Appendix D***

their procurement policies, agencies should be aware of the phaseout schedule for Class II substances;

(b) amending existing contracts, to the extent permitted by law and where practicable, to be consistent with the phaseout schedules for Class I substances. In awarding contracts, agencies should be aware of the phaseout schedule for Class II substances in awarding contracts;

(c) implementing policies and practices that recognize the increasingly limited availability of Class I substances as production levels capped by the Montreal Protocol decline until final phaseout. Such practices shall include, but are not limited to:

- (i) reducing emissions and recycling ozone-depleting substances;
- (ii) ceasing the purchase of nonessential products containing or manufactured with ozone-depleting substances; and
- (iii) requiring that new contracts provide that any acquired products containing or manufactured with Class I or Class II substances be labeled in accordance with section 611 of the Clean Air Act Amendments.

**Sec. 4. *Responsibilities.*** Not later than 6 months after the effective date of this Executive order, each Federal agency, where feasible, shall have in place practices that, where economically practicable, minimize the procurement of Class I substances. Agencies also shall be aware of the phaseout schedule for Class II substances. Agency practices may include, but are not limited to:

- (a) altering existing equipment and/or procedures to make use of safe alternatives;
- (b) specifying the use of safe alternatives and of goods and services, where available, that do not require the use of Class I substances in new procurements and that limit the use of Class II substances consistent with section 612 of the Clean Air Act Amendments; and
- (c) amending existing contracts, to the extent permitted by law and where practicable, to require the use of safe alternatives.

**Sec. 5. *Reporting Requirements.*** Not later than 6 months after the effective date of this Executive order, each Federal agency shall submit to the Office of Management and Budget a report regarding the implementation of this order. The report shall include a certification by each agency that its regulations and procurement practices are being amended to comply with this order.

**Sec. 6. *Exceptions.*** Exceptions to compliance with this Executive order may be made in accordance with section 604 of the Clean Air Act Amendments and with the provisions of the Montreal Protocol.

**Sec. 7. *Effective Date.*** This Executive order is effective 30 days after the date of issuance. Although full implementation of this order must await revisions to the Federal Acquisition Regu-

## ***Executive Orders***

lations (“FAR”), it is expected that Federal agencies will take all appropriate actions in the interim to implement those aspects of the order that are not dependent upon regulatory revision.

**Sec. 8. *Federal Acquisition Regulatory Councils.*** Pursuant to section 6(a) of the Office of Federal Procurement Policy Act, as amended, 41 U.S.C. 405(a), the Defense Acquisition Regulatory Council and the Civilian Agency Acquisition Council shall ensure that the policies established herein are incorporated in the FAR within 180 days from the date this order is issued.

**Sec. 9. *Judicial Review.*** This order does not create any right or benefit, substantive or procedural, enforceable by a non-Federal party against the United States, its officers or employees, or any other person.

[Signed] **WILLIAM J. CLINTON**

THE WHITE HOUSE,

*April 21, 1993.*

[FR Doc. 93-9757  
Filed 4-22-93; 10:48 am]  
Billing code 3195-01-M

**Editorial note:** For the President’s remarks on Earth Day, see issue 16 of the *Weekly Compilation of Presidential Documents*.

April 21, 1993

### **EXECUTIVE ORDER 12844**

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### **FEDERAL USE OF ALTERNATIVE FUELED VEHICLES**

By the authority vested in me as President by the Constitution and the laws of the United State of America, including the Energy Policy and Conservation Act, as amended (42 U.S.C. 6201 *et seq.*), the Motor Vehicle Information and Cost Savings Act, as amended (15 U.S.C. 1901 *et seq.*), the Energy Policy Act of 1992 (Public Law 102-486), and section 301 of title 3, United States Code, it is hereby ordered as follows:

## ***Appendix D***

**Section 1. *Federal Leadership and Goals.*** The use of alternative fueled motor vehicles can, in some applications, substantially reduce pollutants in the atmosphere, create significant domestic economic activity and stimulate jobs creation, utilize domestic fuel sources as defined by the Energy Policy Act of 1992, and reduce vehicle maintenance costs.

Moreover, Federal action can provide a significant market impetus for the development and manufacture of alternative fueled vehicles, and for the expansion of the fueling infrastructure necessary to support large numbers of privately owned alternative fueled vehicles.

The Federal Government can exercise leadership in the use of alternative fueled vehicles. To that end, each agency shall adopt aggressive plans to substantially exceed the alternative fueled vehicle purchase requirements established by the Energy Policy Act of 1992.

**Section 2. *Alternative Fueled Vehicle Requirements.*** The Federal Government shall acquire, subject to the availability of funds and considering life cycle costs, alternative fueled vehicles in numbers that exceed by 50 percent the requirements for 1993 through 1995 set forth in the Energy Policy Act of 1992. The Federal fleet vehicle acquisition program shall be structured with the objectives of: (a) continued reduction in the incremental cost associated with specific vehicle and fuel combinations; (b) long-term movement toward increasing availability of alternative fueled vehicles produced as standard manufacturers' models; and (c) minimizing life cycle costs in the acquisition of alternative fueled vehicles. In addition, there is established, for a period not to exceed 1 year, the Federal Fleet Conversion Task Force, a Federal interagency implementation committee to be constituted by the Secretary of Energy, in consultation with a Task Force Chairman to be named by the President. The Task Force will advise on the implementation of this Executive order. The Task Force will issue a public report within 90 days, setting forth a recommended plan and schedule of implementation and, no later than 1 year from the date of this order, in cooperation with the Secretary of Energy, file a report on the status of the conversion effort.

**Section 3. *Alternative Fueled Vehicle Acquisition Assistance.*** Within available appropriations, and as required by the Energy Policy Act of 1992, the Secretary of Energy shall provide assistance to other agencies that acquire alternative fueled vehicles. This assistance includes payment of incremental costs associated with acquisition and disposal. All vehicles, whether conversions or purchases as original equipment manufacturer models, shall comply with all applicable Federal and State emissions and safety standards, consistent with those requirements placed on original equipment manufacturers, including years and mileage.

**Section 4. *Alternative Fueled Vehicle Purchase and Use Incentives.*** The Administrator of the General Services Administration, to the extent allowed by law, may provide incentives to purchase alternative fueled vehicles, including priority processing of procurement requests, and, with the Secretary of energy, provide any other technical or administrative assistance aimed at accelerating the purchase and use of Federal alternative fueled vehicles.

## ***Executive Orders***

**Section 5. *Cooperation with Industry and State and Local Authorities on Alternative Fueled Vehicle Refueling Capabilities.*** The Secretary of Energy shall coordinate Federal planning and siting efforts with private industry fuel suppliers, and with State and local governments, to ensure that adequate private sector refueling capabilities exist or will exist wherever Federal fleet alternative fueled vehicles are sited. Each agency's fleet managers are expected to work with appropriate organizations at their respective locations on initiatives to promote alternative fueled vehicle use.

**Section 6. *Reporting.*** The head of each agency shall report annually to the Secretary of Energy on actions and progress under this order, consistent with guidance provided by the Secretary. The Secretary shall prepare a consolidated annual report to the President and to the Congress on the implementation of this order. As part of the report, the Secretary and the Director of the Office of Management and Budget shall complete a thorough, objective evaluation of alternative fueled vehicles. The evaluation shall consider operating and acquisition costs, fuel economy, maintenance, and other factors as appropriate.

**Section 7. *Definitions.*** For the purpose of this order, the terms "agency" and "alternative fueled vehicle" have the same meanings given such terms in sections 151 and 301 of the Energy Policy Act of their respective agencies.

**Section 8. *Exceptions.*** The Secretary of Defense, the Secretary of the Treasury, and the Attorney General, consistent with the national security and protective and law enforcement activities of their respective agencies, shall determine the extent to which the requirements of this order apply to the national security and protective and law enforcement activities of their respective agencies.

**Section 9. *Judicial Review.*** This order is not intended to create any right or benefit, substantive or procedural, enforceable by a non-Federal party against the United States, its officers or employees, or any other person.

[Signed] **WILLIAM J. CLINTON**

THE WHITE HOUSE,

*April 21, 1993.*

[FR Doc. 93-9751  
Filed 4-22-93; 10:33 am]  
Billing code 3195-01-M

**Editorial note:** For the President's remarks on Earth Day, see issue 16 of the *Weekly Compilation of Presidential Documents*.

April 21, 1993

**EXECUTIVE ORDER 12845**

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**REQUIRING AGENCIES TO PURCHASE  
ENERGY EFFICIENT COMPUTER EQUIPMENT**

WHEREAS, the Federal Government should set an example in the energy efficient operation of its facilities and the procurement of pollution preventing technologies;

WHEREAS, the Federal Government should minimize its operating costs, make better use of taxpayer-provided dollars, and reduce the Federal deficit; and

WHEREAS, the Federal Government is the largest purchaser of computer equipment in the world and therefore has the capacity to greatly accelerate the movement toward energy efficient computer equipment;

NOW, THEREFORE, by the authority vested in me as President by the Constitution and the laws of the United States of America, including section 381 of the Energy Policy and Conservation Act, as amended (42 U.S.C. 6361), section 205 of the Federal Property and Administrative Services Act, as amended (40 U.S.C. 486), section 152 of the Energy Policy Act of 1992 (Public Law 102-486), and section 301 of title 3, United States Code, and to ensure the energy efficient operation of the Federal Government's facilities and to encourage the procurement of pollution preventing technologies that will save taxpayer money, reduce the Federal deficit, and accelerate the movement to energy efficient designs in standard computer equipment, it is hereby ordered as follows:

**Section 1.** *Procurement of Computer Equipment that Meets EPA Energy Star Requirements for Energy Efficiency.* (a) The heads of Federal agencies shall ensure that, within 180 days from the date of this order, all acquisitions of microcomputers, including personal computers, monitors, and printers, meet "EPA Energy Star" requirements for energy efficiency. the heads of Federal agencies may grant, on a case-by-case basis, exemptions to this directive for acquisitions, based upon the commercial availability of qualifying equipment, significant cost differential of the equipment, the agency's performance requirements, and the agency's mission.

(b) Within 180 days from the date of this order, agencies shall specify that microcomputers, including personal computers, monitors, and printers, acquired by the agency shall be equipped with the energy efficient low-power standby feature as defined by the EPA Energy Star computers program. This feature shall be activated when the equipment is shipped and shall be capable of entering and recovering from the low-power state unless the equipment meets Energy Star

## ***Executive Orders***

efficiency levels at all times. To the extent permitted by law, agencies shall include this specification in all existing and future contracts, if both the Government and the contractor agree, and if any additional costs would be offset by the potential energy savings.

(c) Agencies shall ensure that Federal users are made aware of the significant economic and environmental benefits of the energy efficient low-power standby feature and its aggressive use by including this information in routine computer training classes.

(d) Each agency shall report annually to the General Services Administration on acquisitions exempted from the requirements of this Executive order, and the General Services Administration shall prepare a consolidated annual report for the President.

**Sec. 2. *Definition.*** For purposes of this order, the term “agency” has the same meaning given it in section 151 of the Energy Policy Act of 1992.

**Sec. 3. *Judicial Review.*** This order does not create any right or benefit, substantive or procedural, enforceable by a non-Federal party against the United States, its officers or employees, or any other person.

[Signed] ***WILLIAM J. CLINTON***

THE WHITE HOUSE,

*April 21, 1993.*

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Filed 4-22-93; 10:48 am]  
Billing code 3195-01-M

**Editorial note:** For the President’s remarks on Earth Day, see issue 16 of the *Weekly Compilation of Presidential Documents*.

August 4, 1993

**EXECUTIVE ORDER 12856**

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**FEDERAL COMPLIANCE WITH RIGHT-TO-KNOW LAWS AND  
POLLUTION PREVENTION REQUIREMENTS**

WHEREAS, the Emergency Planning and Community Right-to-Know Act of 1986 (42 U.S.C. 11001-11050) (EPCRA) established programs to provide the public with important information on the hazardous and toxic chemicals in their communities, and established emergency planning and notification requirements to protect the public in the event of a release of extremely hazardous substances;

WHEREAS, the Federal Government should be a good neighbor to local communities by becoming a leader in providing information to the public concerning toxic and hazardous chemicals and extremely hazardous substances at Federal facilities, and in planning for and preventing harm to the public through the planned or unplanned releases of chemicals;

WHEREAS, the Pollution Prevention Act of 1990 (42 U.S.C. 13101-13109) (PPA) established that it is the national policy of the United States that, whenever feasible, pollution should be prevented or reduced at the source; that pollution that cannot be prevented should be recycled in an environmentally safe manner; that pollution that cannot be prevented or recycled should be treated in an environmentally safe manner; and that disposal or other release into the environment should be employed only as a last resort and should be conducted in an environmentally safe manner;

WHEREAS, the PPA required the Administrator of the Environmental Protection Agency (EPA) to promote source reduction practices in other agencies;

WHEREAS, the Federal Government should become a leader in the field of pollution prevention through the management of its facilities, its acquisition practices, and in supporting the development of innovative pollution prevention programs and technologies;

WHEREAS, the environmental, energy, and economic benefits of energy and water use reductions are very significant; the scope of innovative pollution prevention programs must be broad to adequately address the highest-risk environmental problems and to take full advantage of technological opportunities in sectors other than industrial manufacturing; the Energy Policy Act of 1992 (Public Law 102-486 of October 24, 1992) requires the Secretary of Energy to work with other Federal agencies to significantly reduce the use of energy and reduce the related environmental impacts by promoting use of energy efficiency and renewable energy technologies; and



## ***Executive Orders***

WHEREAS, as the largest single consumer in the Nation, the Federal Government has the opportunity to realize significant economic as well as environmental benefits of pollution prevention;

### **AND IN ORDER TO:**

Ensure that all Federal agencies conduct their facility management and acquisition activities so that, to the maximum extent practicable, the quantity of toxic chemicals entering any wastestream, including any releases to the environment, is reduced as expeditiously as possible through source reduction; that waste that is generated is recycled to the maximum extent practicable; and that any wastes remaining are stored, treated or disposed of in a manner protective of public health and the environment;

Require Federal agencies to report in a public manner toxic chemicals entering any wastestream from their facilities, including any releases to the environment, and to improve local emergency planning, response, and accident notification; and

Help encourage markets for clean technologies and safe alternatives to extremely hazardous substances or toxic chemicals through revisions to specifications and standards, the acquisition and procurement process, and the testing of innovative pollution prevention technologies at Federal facilities or in acquisitions;

NOW THEREFORE, by the authority vested in me as President by the Constitution and the laws of the United States of America, including the EPCRA, the PPA, and section 301 of title 5, United States Code, it is hereby ordered as follows:

### **Section 1. Applicability**

1-101. As delineated below, the head of each Federal agency is responsible for ensuring that all necessary actions are taken for the prevention of pollution with respect to that agency's activities and facilities, and for ensuring that agency's compliance with pollution prevention and emergency planning and community right-to-know provisions established pursuant to all implementing regulations issued pursuant to EPCRA and PPA.

1-102. Except as otherwise noted, this order is applicable to all Federal agencies that either own or operate a "facility" as that term is defined in section 329(4) of EPCRA, if such facility meets the threshold requirements set forth in EPCRA for compliance as modified by section 3-304(b) of this order ("covered facilities"). Except as provided in section 1-103 and section 1-104 below, each Federal agency must apply all of the provisions of this order to each of its covered facilities, including those facilities which are subject, independent of this order, to the provisions of EPCRA and PPA (e.g., certain Government-owned/contractor-operated facilities (GOCO's), for chemicals meeting EPCRA thresholds). This order does not apply to Federal agency facilities outside the customs territory of the United-States, such as United States diplomatic and consular missions abroad.

## **Appendix D**

1-103. Nothing in this order alters the obligations which GOCO's and Government corporation facilities have under EPCRA and PPA independent of this order or subjects such facilities to EPCRA or PPA if they are otherwise excluded. However, consistent with section 1-104 below, each Federal agency shall include the releases and transfers from all such facilities when meeting all of the Federal agency's responsibilities under this order.

1-104. To facilitate compliance with this order, each Federal agency shall provide, in all future contracts between the agency and its relevant contractors, for the contractor to supply to the Federal agency all information the Federal agency deems necessary for it to comply with this order. In addition, to the extent that compliance with this order is made more difficult due to lack of information from existing contractors, Federal agencies shall take practical steps to obtain the information needed to comply with this order from such contractors.

### **Sec. 2-2 Definitions**

2-201. All definitions found in EPCRA and PPA and implementing regulations are incorporated in this order by reference, with the following exception: for the purposes of this order, the term "person", as defined in section 329(7) of EPCRA, also includes Federal agencies.

2-202. Federal agency means an Executive agency, as defined in 5 U.S.C. 105. For the purpose of this order, military departments, as defined in 5 U.S.C. 102, are covered under the auspices of the Department of Defense.

2-203. Pollution Prevention means "source reduction," as defined in the PPA, and other practices that reduce or eliminate the creation of pollutants through: (a) increased efficiency in the use of raw materials, energy, water, or other resources; or (b) protection of natural resources by conservation.

2-204. GOCO means a Government-owned/contractor-operated facility which is owned by the Federal Government but all or portions of which are operated by private contractors.

2-205. Administrator means the Administrator of the EPA.

2-206. Toxic Chemical means a substance on the list described in section 313(c) of EPCRA.

2-207. Toxic Pollutants. For the purposes of section 3-302(a) of this order, the term "toxic pollutants" shall include, but is not necessarily limited to, those chemicals at a Federal facility subject to the provisions of section 313 of EPCRA as of December 1, 1993. Federal agencies also may choose to include releases and transfers of other chemicals, such as "extremely hazardous chemicals" as defined in section 329(3) of EPCRA, hazardous wastes as defined under the Resource Conservation and Recovery Act of 1976 (42 U.S.C. 6901-6986) (RCRA), or hazardous air pollutants under the Clean Air Act Amendments (42 U.S.C. 7403-7626); however, for the purposes of establishing the agency's baseline under 3-302(c), such "other chemicals" are in

addition to (not instead of) the section 313 chemicals. The term “toxic pollutants” does not include hazardous waste subject to remedial action generated prior to the date of this order.

**Sec. 3-3. Implementation**

3-301. Federal Agency Strategy. Within 12 months of the date of this order, the head of each Federal agency must develop a written pollution prevention strategy to achieve the requirements specified in sections 3-302 through 3-305 of this order for that agency. A copy thereof shall be provided to the Administrator. Federal agencies are encouraged to involve the public in developing the required strategies under this order and in monitoring their subsequent progress in meeting the requirements of this order. The strategy shall include, but shall not be limited to, the following elements: (a) A pollution prevention policy statement, developed by each Federal agency, designating principal responsibilities for development, implementation, and evaluation of the strategy. The statement shall reflect the Federal agency’s commitment to incorporate pollution prevention through source reduction in facility management and acquisition, and it shall identify an individual responsible for coordinating the Federal agency’s efforts in this area.

(b) A commitment to utilize pollution prevention through source reduction, where practicable, as the primary means of achieving and maintaining compliance with all applicable Federal, State, and local environmental requirements.

3-302. Toxic Chemical Reduction Goals. (a) The head of each Federal agency subject to this order shall ensure that the agency develops voluntary goals to reduce the agency’s total releases of toxic chemicals to the environment and off-site transfers of such toxic chemicals for treatment and disposal from facilities covered by this order by 50 percent by December 31, 1999. To the maximum extent practicable, such reductions shall be achieved by implementation of source reduction practices.

(b) The baseline for measuring reductions for purposes of achieving the 50 percent reduction goal for each Federal agency shall be the first year in which releases of toxic chemicals to the environment and off-site transfers of such chemicals for treatment and disposal are publicly reported. The baseline amount as to which the 50 percent reduction goal applies shall be the aggregate amount of toxic chemicals reported in the baseline year for all of that Federal agency’s facilities meeting the threshold applicability requirements set forth in section 1-102 of this order. In no event shall the baseline be later than the 1994 reporting year.

(c) Alternatively, a Federal agency may choose to achieve a 50 percent reduction goal for toxic pollutants. In such event, the Federal agency shall delineate the scope of its reduction program in the written pollution prevention strategy that is required by section 3-301 of this order. The baseline for measuring reductions for purposes of achieving the 50 percent reduction requirement for each Federal agency shall be the first year in which releases of toxic pollutants to the environment and off-site transfers of such chemicals for treatment and disposal are publicly reported for each of that Federal agency’s facilities encompassed by section 3-301. In no event

## ***Appendix D***

shall the baseline year be later than the 1994 reporting year. The baseline amount as to which the 50 percent reduction goal applies shall be the aggregate amount of toxic pollutants reported by the agency in the baseline year. For any toxic pollutants included by the agency in determining its baseline under this section, in addition to toxic chemicals under EPCRA, the agency shall report on such toxic pollutants annually under the provisions of section 3-304 of this order, if practicable, or through an agency report that is made available to the public.

(d) The head of each Federal agency shall ensure that each of its covered facilities develops a written pollution prevention plan no later than the end of 1995, which sets forth the facility's contribution to the goal established in section 3-302(a) of this order. Federal agencies shall conduct assessments of their facilities as necessary to ensure development of such plans and of the facilities, pollution prevention programs.

3-303. Acquisition and Procurement Goals. (a) Each Federal agency shall establish a plan and goals for eliminating or reducing the unnecessary acquisition by that agency of products containing extremely hazardous substances or toxic chemicals. Similarly, each Federal agency shall establish a plan and goal for voluntarily reducing its own manufacturing, processing, and use of extremely hazardous substances and toxic chemicals. Priorities shall be developed by Federal agencies, in coordination with EPA, for implementing this section.

(b) Within 24 months of the date of this order, the Department of Defense (DoD) and the General Services Administration (GSA), and other agencies, as appropriate, shall review their agency's standardized documents, including specifications and standards, and identify opportunities to eliminate or reduce the use by their agency of extremely hazardous substances and toxic chemicals, consistent with the safety and reliability requirements of their agency mission. The EPA shall assist agencies in meeting the requirements of this section, including identifying substitutes and setting priorities for these reviews. By 1999, DoD, GSA and other affected agencies shall make all appropriate revisions to these specifications and standards.

(c) Any revisions to the Federal Acquisition Regulation (FAR) necessary to implement this order shall be made within 24 months of the date of this order.

(d) Federal agencies are encouraged to develop and test innovative pollution prevention technologies at their facilities in order to encourage the development of strong markets for such technologies. Partnerships should be encouraged between industry, Federal agencies, Government laboratories, academia, and others to assess and deploy innovative environmental technologies for domestic use and for markets abroad.

### 3-304. Toxics Release Inventory/Pollution Prevention Act Reporting.

(a) The head of each Federal agency shall comply with the provisions set forth in section 313 of EPCRA, section 6607 of PPA, all implementing regulations, and future amendments to these authorities, in light of applicable guidance as provided by EPA.

## ***Executive Orders***

(b) The head of each Federal agency shall comply with these provisions without regard to the Standard Industrial Classification (SIC) delineations that apply to the Federal agency's facilities, and such reports shall be for all releases, transfers, and wastes at such Federal agency's facility without regard to the SIC code of the activity leading to the release, transfer, or waste. All other existing statutory or regulatory limitations or exemptions on the application of EPCRA section 313 shall apply to the reporting requirements set forth in section 3-304(a) of this order.

(c) The first year of compliance shall be no later than for the 1994 calendar year, with reports due on or before July 1, 1995.

3-305. Emergency Planning and Community Right-to know Reporting Responsibilities. The head of each Federal agency shall comply with the provisions set forth in sections 301 through 312 of EPCRA, all implementing regulations, and future amendments to these authorities, in light of any applicable guidance as provided by EPA. Effective dates for compliance shall be:

(a) With respect to the provisions of section 302 of EPCRA, emergency planning notification shall be made no later than 7 months after the date of this order.

(b) With respect to the provisions of section 303 of EPCRA, all information necessary for the applicable Local Emergency Planning Committee (LEPC's) to prepare or revise local Emergency Response Plans shall be provided no later than 1 year after the date of this order.

(c) To the extent that a facility is required to maintain Material Safety Data Sheets under any provisions of law or Executive order, information required under section 311 of EPCRA shall be submitted no later than 1 year after the date of this order, and the first year of compliance with section 312 shall be no later than the 1994 calendar year, with reports due on or before March 1, 1995.

(d) The provisions of section 304 of EPCRA shall be effective beginning January 1, 1994.

(e) These compliance dates are not intended to delay implementation of earlier timetables already agreed to by Federal agencies and are inapplicable to the extent they interfere with those timetables.

### **Sec/ 4-4. Agency Coordination**

4-401. By February 1, 1994, the Administrator shall convene an Interagency Task Force composed of the Administrator, the Secretaries of Commerce, Defense, and Energy, the Administrator of General Services, the Administrator of the office of Procurement Policy in the Office of Management and Budget, and such other agency officials as deemed appropriate based upon lists of potential participants submitted to the Administrator pursuant to this section by, the agency head. Each agency head may designate other senior agency officials to act in his/her stead, where appropriate. The Task Force will assist the agency heads in the implementation of the activities required under this order.

## ***Appendix D***

4-402. Federal agencies subject to the requirements of this order shall submit annual progress reports to the Administrator beginning on October 1, 1995. These reports shall include a description of the progress that the agency has made in complying with all aspects of this order including the pollution reductions requirements. This reporting requirement shall expire after the report due on October 1, 2001.

4-403. Technical Advice. Upon request and to the extent practicable, the Administrator shall provide technical advice and assistance to Federal agencies in order to foster full compliance with this order. In addition, to the extent practicable, all Federal agencies subject to this order shall provide technical assistance, if requested, to LEPC's in their development of emergency response plans and in fulfillment of their community right-to-know and risk reduction responsibilities.

4-404. Federal agencies shall place high priority on obtaining funding and resources needed for implementing all aspects of this order, including the pollution prevention strategies, plans, and assessments required by this order, by identifying, requesting, and allocating funds through line-item or direct funding requests. Federal agencies shall make such requests as required in the Federal Agency Pollution Prevention and Abatement Planning Process and through agency budget requests as outlined in office of Management and Budget (OMB) Circulars A-106 and A-11, respectively. Federal agencies should apply, to the maximum extent practicable, a life cycle analysis and total cost accounting principles to all projects needed to meet the requirements of this order.

4-405. Federal Government Environmental Challenge Program. The Administrator shall establish a "Federal Government Environmental Challenge Program" to recognize outstanding environmental management performance in Federal agencies and facilities. The program shall consist of two components that challenge Federal agencies; (a) to agree to a code of environmental principles to be developed by EPA, in cooperation with other agencies, that emphasizes pollution prevention, sustainable development and state-of-the-art environmental management programs, and (b) to submit applications to EPA for individual Federal agency facilities for recognition as "Model Installations." The program shall also include a means for recognizing individual Federal employees who demonstrate outstanding leadership in pollution prevention.

### **Sec. 5-5 Compliance**

5-501. By December 31, 1993, the head of each Federal agency shall provide the Administrator with a preliminary list of facilities that potentially meet the requirements for reporting under the threshold provisions of EPCRA, PPA, and this order.

5-502. The head of each Federal agency is responsible for ensuring that such agency take all necessary actions to prevent pollution in accordance with this order, and for that agency's compliance with the provisions of EPCRA and PPA. Compliance with EPCRA and PPA means compliance with the same substantive, procedural, and other statutory and regulatory require-

## ***Executive Orders***

ments that would apply to a private person. Nothing in this order shall be construed as making the provisions of sections 325 and 326 of EPCRA applicable to any Federal agency or facility, except to the extent that such Federal agency or facility would independently be subject to such provisions. EPA shall consult with Federal agencies, if requested, to determine the applicability of this order to particular agency facilities.

5-503. Each Federal agency subject to this order shall conduct internal reviews and audits, and take such other steps, as may be necessary to monitor compliance with sections 3-304 and 3-305 of this order.

5-504. The Administrator, in consultation with the heads of Federal agencies, may conduct such reviews and inspections as may be necessary to monitor compliance with sections 3-304 and 3-305 of this order. Except as excluded under section 6-601 of this order, all Federal agencies are encouraged to cooperate fully with the efforts of the Administrator to ensure compliance with sections 3-304 and 3-305 of this order.

5-505. Federal agencies are further encouraged to comply with all state and local right-to-know and pollution prevention requirements to the extent that compliance with such laws and requirements is not otherwise already mandated.

5-506. Whenever the Administrator notifies a Federal agency that it is not in compliance with an applicable provision of this order, the Federal agency shall achieve compliance as promptly as is practicable.

5-507. The EPA shall report annually to the President on Federal agency compliance with the provisions of section 3-304 of this order.

5-508. To the extent permitted by law and unless such documentation is withheld pursuant to section 6-601 of this order, the public shall be afforded ready access to all strategies, plans, and reports required to be prepared by Federal agencies under this order by the agency preparing the strategy, plan, or report. When the reports are submitted to EPA, EPA shall compile the strategies, plans, and reports and make them publicly available as well. Federal agencies are encouraged to provide such strategies, plans, and reports to the State and local authorities where their facilities are located for an additional point of access to the public.

### **Sec. 6-6. Exemption**

6-601. In the interest of national security, the head of a Federal agency may request from the President an exemption from complying with the provisions of any or all aspects of this order for particular Federal agency facilities, provided that the procedures set forth in section 120(j),(l) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended (42 U.S.C. 9620(j)(1)), are followed. To the maximum extent practicable, and without compromising national security, all Federal agencies shall strive to comply with the purposes, goals, and implementation steps set forth in this order.

## ***Appendix D***

### **Sec. 7-7. General Provisions**

7-701. Nothing in this order shall create any right or benefit, substantive or procedural, enforceable by a party against the United States, its agencies or instrumentalities, its officers or employees, or any other person.

WILLIAM J. CLINTON

THE WHITE HOUSE,

August 3, 1993.

October 20, 1993

### **EXECUTIVE ORDER 12873**

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#### **FEDERAL ACQUISITION, RECYCLING, AND WASTE PREVENTION**

WHEREAS, the Nation's interest is served when the Federal Government can make more efficient use of natural resources by maximizing recycling and preventing waste wherever possible;

WHEREAS, this Administration is determined to strengthen the role of the Federal Government as an enlightened, environmentally conscious and concerned consumer;

WHEREAS, the Federal Government should—through cost-effective waste prevention and recycling activities—work to conserve disposal capacity, and serve as a model in this regard for private and other public institutions; and

WHEREAS, the use of recycled and environmentally preferable products and services by the Federal Government can spur private sector development of new technologies and use of such products, thereby creating business and employment opportunities and enhancing regional and local economies and the national economy;

NOW, THEREFORE, I, WILLIAM J. CLINTON, by the authority vested in me as President by the Constitution and the laws of the United States of America, including the Solid Waste Disposal Act, Public Law 89-272, 79 Stat. 997, as amended by the Resource Conservation



## ***Executive Orders***

and Recovery Act (“RCRA”), Public Law 94-580, 90 Stat. 2795 as amended (42 U.S.C. 6901-6907), and section 301 of title 3, United States Code, hereby order as follows:

### **PART 1—PREAMBLE**

**Section 101.** Consistent with the demands of efficiency and cost effectiveness, the head of each Executive agency shall incorporate waste prevention and recycling in the agency’s daily operations and work to increase and expand markets for recovered materials through greater Federal Government preference and demand for such products.

**Sec. 102.** Consistent with policies established by Office of Federal Procurement Policy (“OFPP”) Policy Letter 92-4, agencies shall comply with executive branch policies for the acquisition and use of environmentally preferable products and services and implement cost-effective procurement preference programs favoring the purchase of these products and services.

**Sec. 103.** This order creates a Federal Environmental Executive and establishes high-level Environmental Executive positions within each agency to be responsible for expediting the implementation of this order and statutes that pertain to this order.

### **PART 2—DEFINITIONS**

For the purposes of this order:

**Sec. 201.** “Environmentally preferable” means products or services that have a lesser or reduced effect on human health and the environment when compared with competing products or services that serve the same purpose. This comparison may consider raw materials acquisition, production, manufacturing, packaging, distribution, reuse, operation, maintenance, or disposal of the product or service.

**Sec. 202.** “Executive agency” or “agency” means an Executive agency as defined in 5 U.S.C. 105. For the purpose of this order, military departments, as defined in 5 U.S.C. 102, are covered under the auspices of the Department of Defense.

**Sec. 203.** “Postconsumer material” means a material or finished product that has served its intended use and has been discarded for disposal or recovery, having completed its life as a consumer item. “Postconsumer material” is a part of the broader category of “recovered material”.

**Sec. 204.** “Acquisition” means the acquiring by contract with appropriated funds for supplies or services (including construction) by and for the use of the Federal Government through purchase or lease, whether the supplies or services are already in existence or must be created, developed,

## ***Appendix D***

demonstrated and evaluated. Acquisition begins at the point when agency needs are established and includes the description of requirements to satisfy agency needs, solicitation and selection of sources, award of contracts, contract financing, contract performance, contract administration and those technical and management functions directly related to the process of fulfilling agency needs by contract.

**Sec. 205.** “Recovered materials” means waste materials and by-products which have been recovered or diverted from solid waste, but such term does not include those materials and by-products generated from, and commonly reused within, an original manufacturing process (42 U.S.C. 6903(19)).

**Sec. 206.** “Recyclability” means the ability of a product or material to be recovered from, or otherwise diverted from, the solid waste stream for the purpose of recycling.

**Sec. 207.** “Recycling” means the series of activities, including collection, separation, and processing, by which products or other materials are recovered from the solid waste stream for use in the form of raw materials in the manufacture of new products other than fuel for producing heat or power by combustion.

**Sec. 208.** “Waste prevention,” also known as “source reduction,” means any change in the design, manufacturing, purchase or use of materials or products (including packaging) to reduce their amount or toxicity before they become municipal solid waste. Waste prevention also refers to the reuse of products or materials.

**Sec. 209.** “Waste reduction” means preventing or decreasing the amount of waste being generated through waste prevention, recycling, or purchasing recycled and environmentally preferable products.

**Sec. 210.** “Life Cycle Cost” means the amortized annual cost of a product, including capital costs, installation costs, operating costs, maintenance costs and disposal costs discounted over the lifetime of the product.

**Sec. 211.** “Life Cycle Analysis” means the comprehensive examination of a product’s environmental and economic effects throughout its lifetime including new material extraction, transportation, manufacturing, use, and disposal.

### **PART 3—THE ROLE OF THE FEDERAL ENVIRONMENTAL EXECUTIVE AND AGENCY ENVIRONMENTAL EXECUTIVES**

**Sec. 301.** *Federal Environmental Executive.* (a) A Federal Environmental Executive shall be designated by the President and shall be located within the Environmental Protection Agency

## ***Executive Orders***

(“EPA”). The Federal Environmental Executive shall take all actions necessary to ensure that the agencies comply with the requirements of this order and shall generate an annual report to the Office of Management and Budget (“OMB”), at the time of agency budget submissions, on the actions taken by the agencies to comply with the requirements of this order. In carrying out his or her functions, the Federal Environmental Executive shall consult with the Director of the White House Office on Environmental Policy.

(b) *Staffing.* A minimum of four (4) full time staff persons are to be provided by the agencies listed below to assist the Federal Environmental Executive, one of whom shall have experience in specification review and program requirements, one of whom shall have experience in procurement practices, and one of whom shall have experience in solid waste prevention and recycling. These four staff persons shall be appointed and replaced as follows:

- (1) a representative from the Department of Defense shall be detailed for not less than one year and no more than two years;
- (2) a representative from the General Services Administration (“GSA”) shall be detailed for not less than one year and no more than two years;
- (3) a representative from EPA shall be detailed for not less than one year and no more than two years; and
- (4) a representative from one other agency determined by the Federal Environmental Executive shall be detailed on a rotational basis for not more than one year.

(c) *Administration.* Agencies are requested to make their services, personnel and facilities available to the Federal Environmental Executive to the maximum extent practicable for the performance of functions under this order.

(d) *Committees and Work Groups.* The Federal Environmental Executive shall establish committees and work groups to identify, assess, and recommend actions to be taken to fulfill the goals, responsibilities, and initiatives of the Federal Environmental Executive. As these committees and work groups are created, agencies are requested to designate appropriate personnel in the areas of procurement and acquisition, standards and specifications, electronic commerce, facilities management, waste prevention, and recycling, and others as needed to staff and work on the initiatives of the Executive.

(e) *Duties.* The Federal Environmental Executive, in consultation with the Agency Environmental Executives, shall:

- (1) identify and recommend initiatives for government-wide implementation that will promote the purposes of this order, including:

(A) the development of a federal plan for agency implementation of this order and appropriate incentives to encourage the acquisition of recycled and environmentally preferable products by the Federal Government;

## **Appendix D**

(B) the development of a federal implementation plan and guidance for instituting economically efficient federal waste prevention, energy and water efficiency programs, and recycling programs within each agency; and

(C) the development of a plan for making maximum use of available funding assistance programs;

- (2) collect and disseminate information electronically concerning methods to reduce waste, materials that can be recycled, costs and savings associated with waste prevention and recycling, and current market sources of products that are environmentally preferable or produced with recovered materials;
- (3) provide guidance and assistance to the agencies in setting up and reporting on agency programs and monitoring their effectiveness; and
- (4) coordinate appropriate government-wide education and training programs for agencies.

**Sec. 302. *Agency Environmental Executives.*** Within 90 days after the effective date of this order, the head of each Executive department and major procuring agency shall designate an Agency Environmental Executive from among his or her staff, who serves at a level no lower than at the Deputy Assistant Secretary level or equivalent. The Agency Environmental Executive will be responsible for:

(a) coordinating all environmental programs in the areas of procurement and acquisition, standards and specification review, facilities management, waste prevention and recycling, and logistics;

(b) participating in the interagency development of a Federal plan to:

- (1) create an awareness and outreach program for the private sector to facilitate markets for environmentally preferable and recycled products and services, promote new technologies, improve awareness about federal efforts in this area, and expedite agency efforts to procure new products identified under this order;
- (2) establish incentives, provide guidance and coordinate appropriate educational programs for agency employees; and
- (3) coordinate the development of standard agency reports required by this order;

(c) reviewing agency programs and acquisitions to ensure compliance with this order.

## **PART 4—ACQUISITION PLANNING AND AFFIRMATIVE PROCUREMENT PROGRAMS**

**Sec. 401. *Acquisition Planning.*** In developing plans, drawings, work statements, specifications, or other product descriptions, agencies shall consider the following factors: elimination of

## ***Executive Orders***

virgin material requirements; use of recovered materials; reuse of product; life cycle cost; recyclability; use of environmentally preferable products; waste prevention (including toxicity reduction or elimination); and ultimate disposal, as appropriate. These factors should be considered in acquisition planning for all procurements and in the evaluation and award of contracts, as appropriate. Program and acquisition managers should take an active role in these activities.

**Sec. 402. *Affirmative Procurement Programs.*** The head of each Executive agency shall develop and implement affirmative procurement programs in accordance with RCRA section 6002 (42 U.S.C. 6962) and this order. Agencies shall ensure that responsibilities for preparation, implementation and monitoring of affirmative procurement programs are shared between the program personnel and procurement personnel. For the purposes of all purchases made pursuant to this order, EPA, in consultation with such other Federal agencies as appropriate, shall endeavor to maximize environmental benefits, consistent with price, performance and availability considerations, and shall adjust bid solicitation guidelines as necessary in order to accomplish this goal.

(a) Agencies shall establish affirmative procurement programs for all designated EPA guideline items purchased by their agency. For newly designated items, agencies shall revise their internal programs within one year from the date EPA designated the new items.

(b) For the currently designated EPA guideline items, which are: (i) concrete and cement containing fly ash; (ii) recycled paper products; (iii) re-refined lubricating oil; (iv) re-tread tires; and (v) insulation containing recovered materials; and for all future guideline items, agencies shall ensure that their affirmative procurement programs require that 100 percent of their purchases of products meet or exceed the EPA guideline standards unless written justification is provided that a product is not available competitively within a reasonable time frame, does not meet appropriate performance standards, or is only available at an unreasonable price.

(c) The Agency Environmental Executives will track agencies' purchases of designated EPA guideline items and report agencies' purchases of such guideline items to the Federal Environmental Executive. Agency Environmental Executives will be required to justify to the Federal Environmental Executive as to why the item(s) have not been purchased or submit a plan for how the agencies intend to increase their purchases of the designated item(s).

(d) Agency affirmative procurement programs, to the maximum extent practicable, shall encourage that:

- (1) documents be transferred electronically,
- (2) all government documents printed internally be printed double-sided, and
- (3) contracts, grants, and cooperative agreements issued after the effective date of this order include provisions that require documents to be printed double-sided on recycled paper meeting or exceeding the standards established in this order or in future EPA guidelines.

## **Appendix D**

**Sec. 403. *Procurement of Existing Guideline Items.*** Within 90 days after the effective date of this order, the head of each Executive agency that has not implemented an affirmative procurement program shall ensure that the affirmative procurement program has been established and is being implemented to the maximum extent practicable.

**Sec. 404. *Electronic Acquisition System.*** To reduce waste by eliminating unnecessary paper transactions in the acquisition process and to foster accurate data collection and reporting of agencies' purchases of recycled content and environmentally preferred products, the executive branch will implement an electronic commerce system consistent with the recommendations adopted as a result of the National Performance Review.

### **PART 5—STANDARDS, SPECIFICATIONS AND DESIGNATION OF ITEMS**

**Sec. 501. *Specifications, Product Descriptions and Standards.*** Where applicable, Executive agencies shall review and revise federal and military specifications, product descriptions and standards to enhance Federal procurement of products made from recovered materials or that are environmentally preferable. When converting to a Commercial Item Description (CID), agencies shall ensure that environmental factors have been considered and that the CID meets or exceeds the environmentally preferable criteria of the government specification or product description. Agencies shall report annually on their compliance with this section to the Federal Environmental Executive for incorporation into the annual report to OMB referred to in section 301 of this order.

(a) If an inconsistency with RCRA Section 6002 or this order is identified in a specification, standard, or product description, the Federal Environmental Executive shall request that the Environmental Executive of the pertinent agency advise the Federal Environmental Executive as to why the specification cannot be revised or submit a plan for revising it within 60 days.

(b) If an agency is able to revise an inconsistent specification but cannot do so within 60 days, it is the responsibility of that agency's Environmental Executive to monitor and implement the plan for revising it.

**Sec. 502. *Designation of Items that Contain Recovered Materials.*** In order to expedite the process of designating items that are or can be made with recovered materials, EPA shall institute a new process for designating these items in accordance with RCRA section 6002(e) as follows.

(a) EPA shall issue a Comprehensive Procurement Guideline containing designated items that are or can be made with recovered materials.

(1) The proposed guideline shall be published for public comment in the **Federal Register** within 180 days after the effective date of this order and shall be updated annually after publication for comment to include additional items.

## ***Executive Orders***

(2) Once items containing recovered materials have been designated by EPA through the new process established pursuant to this section and in compliance with RCRA section 6002, agencies shall modify their affirmative procurement programs to require that, to the maximum extent practicable, their purchases of products meet or exceed the EPA guideline standards unless written justification is provided that a product is not available competitively, not available within a reasonable time frame, does not meet appropriate performance standards, or is only available at an unreasonable price.

(b) Concurrent with the issuance of the Comprehensive Procurement Guideline required by section 502(a) of this order, EPA shall publish for public comment in the Federal Register Recovered Material Advisory Notice(s) that present the range of recovered material content levels within which the designated recycled items are currently available. These levels shall be undated periodically after publication for comment to reflect changes in market conditions.

**Sec. 503.** *Guidance for Environmentally Preferable Products.* In accordance with this order, EPA shall issue guidance that recommends principles that Executive agencies should use in making determinations for the preference and purchase of environmentally preferable products.

(a) Proposed guidance shall be published for public comment in the Federal Register within 180 days after the effective date of this order, and may be updated after public comment, as necessary, thereafter. To the extent necessary, EPA may issue additional guidance for public comment on how the principles can be applied to specific product categories.

(b) Once final guidance for environmentally preferable products has been issued by EPA, executive agencies shall use these principles, to the maximum extent practicable, in identifying and purchasing environmentally preferable products and shall modify their procurement programs by reviewing and revising specifications, solicitation procedures, and policies as appropriate.

**Sec. 504.** *Minimum Content Standard for Printing and Writing Paper.* Executive agency heads shall ensure that agencies shall meet or exceed the following minimum materials content standards when purchasing or causing the purchase of printing and writing paper.

(a) For high speed copier paper, offset paper, forms bond, computer printout paper, carbonless paper, file folders, and white woven envelopes, the minimum content standard shall be no less than 20 percent postconsumer materials beginning December 31, 1994. This minimum content standard shall be increased to 30 percent beginning on December 31, 1998.

(b) For other uncoated printing and writing paper, such as writing and office paper, book paper, cotton fiber paper, and cover stock, the minimum content standard shall be 50 percent recovered materials, including 20 percent postconsumer materials beginning on December 31, 1994. This standard shall be increased to 30 percent beginning on December 31, 1998.

## **Appendix D**

(c) As an alternative to meeting the standards in sections 504(a) and (b), for all printing and writing papers, the minimum content standard shall be no less than 50 percent recovered materials that are a waste materials by-product of a finished product other than a paper or textile product which would otherwise be disposed of in a landfill, as determined by the State in which the facility is located.

- (1) The decision not to procure recycled content printing and writing paper meeting the standards specified in this section shall be based solely on a determination by the contracting officer that a satisfactory level of competition does not exist, that the items are not available within a reasonable time period, or that the available items fail to meet reasonable performance standards established by the agency or are only available at an unreasonable price.
- (2) Each agency should implement waste prevention techniques, as specified in section 402(d) of this order, so that total annual expenditures for recycled content printing and writing paper do not exceed current annual budgets for paper products as measured by average annual expenditures, adjusted for inflation based on the Consumer Price Index or other suitable indices. In determining a target budget for printing and writing paper, agencies may take into account such factors as employee increases or decreases, new agency or statutory initiatives, and episodic or unique requirements (e.g., census).
- (3) Effective immediately, all agencies making solicitations for the purchase of printing and writing paper shall seek bids for paper with postconsumer material or recovered waste material as described in section 504(c).

**Sec. 505. *Revision of Brightness Specifications and Standards.*** The General Services Administration and other Federal agencies are directed to identify, evaluate and revise or eliminate any standards or specifications unrelated to performance that present barriers to the purchase of paper or paper products made by production processes that minimize emissions of harmful by-products. This evaluation shall include a review of unnecessary brightness and stock clause provisions, such as lignin content and chemical pulp requirements. The GSA shall complete the review and revision of such specifications within six months after the effective date of this order, and shall consult closely with the Joint Committee on Printing during such process. The GSA shall also compile any information or market studies that may be necessary to accomplish the objectives of this provision.

**Sec. 506. *Procurement of Re-refined Lubricating Oil and Retread Tires.*** Within 180 days after the effective date of this order, agencies shall implement the EPA procurement guidelines for re-refined lubricating oil and retread tires.

(a) Commodity managers shall finalize revisions to specifications for re-refined oil and retread tires, and develop and issue specifications for tire retreading services, as commodity managers shall take affirmative steps to procure these items in accordance with RCRA section 6002.



## ***Executive Orders***

(b) Once these items become available, fleet managers shall take affirmative steps to procure these items in accordance with RCRA section 6002.

**Sec. 507. *Product Testing.*** The Secretary of Commerce, through the National Institute of Standards and Technology (“NIST”), shall establish a program for testing the performance of products containing recovered materials or deemed to be environmentally preferable. NIST shall work with EPA, GSA and other public and private sector organizations that conduct appropriate life cycle analyses to gather information that will assist agencies in making selections of products and services that are environmentally preferable.

(a) NIST shall publish appropriate reports describing testing programs, their results, and recommendations for testing methods and related specifications for use by Executive agencies and other interested parties.

(b) NIST shall coordinate with other Executive and State agencies to avoid duplication with existing testing programs.

## **PART 6—AGENCY GOALS AND REPORTING REQUIREMENTS**

**Sec. 601. *Goals for Waste Reduction.*** Each agency shall establish a goal for solid waste prevention and a goal for recycling to be achieved by the year 1995. These goals shall be submitted to the Federal Environmental Executive within 180 days after the effective date of this order. Progress on attaining these goals be reported by the agencies to the Federal Environmental Executive for the annual report specified in section 301 of this order.

**Sec 602. *Goal for Increasing the Procurement of Recycled and Other Environmentally Preferable Products.*** Agencies shall strive to increase the procurement of products that are environmentally preferable or that are made with recovered materials and set annual goals to maximize the number of recycled products purchased, relative to non-recycled alternatives.

**Sec. 603. *Review of Implementation.*** The President’s Council on Integrity and Efficiency (“PCIE”) will request that the Inspectors General periodically review agencies’ affirmative procurement programs and reporting procedures to ensure their compliance with this order.

## **PART 7—APPLICABILITY AND OTHER REQUIREMENTS**

**Sec. 701. *Contractor Operated Facilities.*** Contracts that provide for contractor operation of a government-owned or leased facility, awarded after the effective date of this order, shall include provisions that obligate the contractor to comply with the requirements of this order within the scope of its operations. In addition, to the extent permitted by law and where economically feasible, existing contracts should be modified.

## ***Appendix D***

**Sec. 702. *Real Property Acquisition and Management.*** Within 90 days after the effective date of this order, and to the extent permitted by law and where economically feasible, Executive agencies shall ensure compliance with the provisions of this order in the acquisition and management of federally owned and leased space. GSA and other Executive agencies shall also include environmental and recycling provisions in the acquisition of all leased space and in the construction of new federal buildings.

**Sec. 703. *Retention of Funds.*** Within 90 days after the effective date of this order, the Administrator of GSA shall develop a legislative proposal providing authority for Executive agencies to retain a share of the proceeds from the sale of materials recovered through recycling or waste prevention programs and specifying the eligibility requirements for the materials being recycled.

**Sec. 704. *Model Facility Programs.*** Each Executive department and major procuring agency shall establish model facility demonstration programs that include comprehensive waste prevention and recycling programs and emphasize the procurement of recycled and environmentally preferable products and services using an electronic data interchange (EDI) system.

**Sec. 705. *Recycling Programs.*** Each Executive agency that has not already done so shall initiate a program to promote cost effective waste prevention and recycling of reusable materials in all of its facilities. The recycling programs implemented pursuant to this section must be compatible with applicable State and local recycling requirements. Federal agencies shall also consider cooperative ventures with State and local governments to promote recycling and waste reduction in the community.

## **PART 8—AWARENESS**

**Sec. 801. *Agency Awards Program.*** A government-wide award will be presented annually by the White House to the best, most innovative program implementing the objectives of this order to give greater visibility to these efforts so that they can be incorporated government-wide.

**Sec. 802. *Internal Agency Awards Programs.*** Each agency shall develop an internal agency-wide awards program, as appropriate, to reward its most innovative environmental programs. Winners of agency-wide awards will be eligible for the White House award program.

## **PART 9—REVOCATION, LIMITATION AND IMPLEMENTATION**

**Sec. 901.** Executive Order No. 12780, dated October 31, 1991, is hereby revoked.

**Sec. 902.** This order is intended only to improve the internal management of the executive branch and is not intended to create any right or benefit, substantive or procedural, enforceable at law by a party against the United States, its agencies, its officers, or any other person.

***Executive Orders***

**Sec. 903.** The policies expressed in this order, including the requirements and elements for effective agency affirmative procurement programs, shall be implemented and incorporated in the Federal Acquisition Regulation (FAR) within 180 days after the effective date of this order. The implementation language shall consist of providing specific direction and guidance on agency programs for preference, promotion, estimation, certification, reviewing and monitoring.

**Sec. 904.** This order shall be effective immediately.

[Signed] *WILLIAM J. CLINTON*

THE WHITE HOUSE

*October 20, 1993.*



**APPENDIX E**  
**STATE POLLUTION PREVENTION PROGRAMS**

# Appendix E

State	State Program Name <sup>1</sup>	Program Element					
		Pollution Prevention	Source Reduction/ Hazardous Waste Minimization <sup>2</sup>	MSW Recycling <sup>3</sup>	Toxic Use Reduction <sup>4</sup>	Procurement/ Recycled Product Purchasing <sup>5</sup>	Energy Conservation <sup>6</sup>
Alabama	Waste Reduction and Technology Transfer Programs		✓				✓
Alaska	Pollution Prevention Office	✓				✓	✓
Arizona	Waste Minimization Program		✓	✓		✓	✓
Arkansas	Pollution Prevention		✓	✓		✓	✓
California	Toxic Substances Control, Department of Health Services		✓	✓		✓	✓
Colorado	Pollution Prevention and Waste Reduction Program					✓	✓
Connecticut	Connecticut Technical Assistance Program		✓	✓		✓	✓
Delaware	Pollution Prevention Program			✓		✓	✓
Florida	Waste Reduction Assistance Program		✓	✓		✓	✓
Georgia	Multimedia Source Reduction and Recycling Program	✓		✓		✓	✓
Hawaii	Hazardous Waste Minimization Program		✓	✓			✓
Idaho	Division of Environmental Quality		✓				✓
Illinois	Office of Pollution Prevention	✓		✓		✓	✓
Indiana	Office of Pollution Prevention and Technical Assistance	✓		✓		✓	✓
Iowa	Department of Natural Resources		✓	✓			✓
Kansas	State Technical Action Plan		✓	✓		✓	✓
Kentucky	Kentucky PARTNERS <sup>8</sup>		✓	✓		✓	✓
Louisiana	Department of Environmental Quality		✓			✓	✓
Maine	Department of Environmental Protection		✓	✓	✓	✓	✓
Maryland	Maryland Department of the Environment		✓	✓		✓	✓
Massachusetts	Massachusetts Department of Environmental Protection	✓		✓	✓	✓	✓
Michigan	Hazardous Waste Reduction Section	✓		✓		✓	✓

## State Pollution Prevention Programs

State	State Program Name <sup>1</sup>	Program Element					
		Pollution Prevention	Source Reduction/ Hazardous Waste Minimization <sup>2</sup>	MSW Recycling <sup>3</sup>	Toxic Use Reduction <sup>4</sup>	Procurement/ Recycled Product Purchasing <sup>5</sup>	Energy Conservation <sup>6</sup>
Minnesota	Minnesota Office of Waste Management	✓		✓		✓	✓
Mississippi	Waste Reduction/Waste Minimization Program	✓				✓	✓
Missouri	Department of Natural Resources Waste Management Program		✓	✓		✓	✓
Montana	Department of Health and Environmental Services		✓				✓
Nebraska	Department of Environmental Control		✓				✓
Nevada	Division of Environmental Protection		✓	✓		✓	✓
New Hampshire	Department of Environmental Services		✓	✓		✓	✓
New Jersey	Office of Pollution Prevention	✓		✓		✓	✓
New Mexico	Municipal Water Pollution Prevention Program			✓		✓	✓
New York	Bureau of Pollution Prevention	✓		✓		✓	✓
North Carolina	Office of Waste Reduction	✓		✓			✓
North Dakota							✓
Ohio	Pollution Prevention Section, Ohio EPA	✓		✓			✓
Oklahoma	Pollution Prevention Technical Assistance Program	✓		✓		✓	✓
Oregon	Waste Reduction and Technical Assistance Program	✓		✓	✓	✓	✓
Pennsylvania	Department of Environmental Resources	✓		✓		✓	✓
Rhode Island	Hazardous Waste Reduction Section		✓	✓		✓	✓
South Carolina	Center for Waste Minimization		✓	✓		✓	✓
South Dakota	Department of Environmental and Natural Resources		✓	✓		✓	✓
Tennessee	Department of Health and Environment	✓		✓	✓	✓	✓
Texas	Office of Pollution Prevention and Conservation	✓		✓		✓	✓

## Appendix E

State	State Program Name <sup>1</sup>	Program Element					
		Pollution Prevention	Source Reduction/ Hazardous Waste Minimization <sup>2</sup>	MSW Recycling <sup>3</sup>	Toxic Use Reduction <sup>4</sup>	Procurement/ Recycled Product Purchasing <sup>5</sup>	Energy Conservation <sup>6</sup>
Utah	Department of Environmental Quality	✓				✓	✓
Vermont	Pollution Prevention Division	✓				✓	✓
Virginia	Waste Minimization Program		✓	✓		✓	✓
Washington	Waste Reduction, Recycling, and Litter Control		✓	✓	✓	✓	✓
West Virginia	Generator Assistance Program		✓	✓		✓	✓
Wisconsin	Hazardous Waste Minimization Program	✓	✓	✓		✓	✓
Wyoming	Department of Environmental Quality		✓				✓

<sup>1</sup> Unless otherwise indicated, the program name listed in this table is the state regulatory agency's pollution prevention program. Many states have university-based programs in addition to the regulatory programs. Information on the university-based programs are presented in the U.S. EPA's Pollution Prevention 1991: Progress on Reducing Industrial Pollutants. EPA 21P-3003, October 1991. If a state does not have a specific pollution prevention office, the regulatory agency's name is listed. Since North Dakota does not have a formal pollution prevention program, it is omitted from the table. The program elements reported for the state may include activities from several organizations within the state (e.g., university programs, other state government agencies) rather than reflecting just the state environmental programs.

<sup>2</sup> Some states use the term "pollution prevention" while others use "source reduction", this table uses whichever term the state uses to describe its program. The term "source reduction" includes states that describe their programs as "hazardous waste minimization" without mentioning "pollution prevention".

<sup>3</sup> MSW recycling Source = Miller, Chaz. Recycling in the States 1992 Update. Waste Age. March 1993.

<sup>4</sup> Source: U.S. EPA Pollution Prevention 1991: Progress on reducing Industrial Pollutants. EPA 21P-3003, October 1991.

<sup>5</sup> Procurement/Recycled Product Purchasing Source: Raymond Communications. State Recycled Product Purchasing Laws. 1992. Includes states that place a purchasing price preference or set-aside on recycled products. All 50 states have passed legislation that "mention" recycled product preference.

<sup>6</sup> Energy conservation.

<sup>7</sup> Biomass Recovery Program.

<sup>8</sup> Kentucky PARTNERS is a university-based program, the state regulatory agency does not have a pollution prevention program.



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**APPENDIX F**  
**PROVISIONS OF TWELVE STATE LAWS**

## Appendix F

### Facility Pollution Prevention Planning: A Matrix of the Provisions of Twelve State Laws

State	Statutory Authorization	Date	Implementing Agency
California	S.B. 14 Hazardous Waste Source Reduction Management and Review Act	1989	Department of Health Services (DHS)
Georgia	S.B. 519 Amendment to the Hazardous Waste Management Act	1990	Department of Natural Resources
Maine	Chapter 929 An Act to Clean the Environment by the Reduction of Toxics Use, Waste and Release	1990	Department of Environmental Protection (DEP)
Massachusetts	H. 6161 Toxics Use Reduction Act	1989	Department of Environmental Protection (DEP)
Minnesota	Toxic Pollution Prevention Act	1990	Pollution Control Agency (PCA) Office of Waste Management
Mississippi	S.B. 2568 Comprehensive Multimedia Waste Minimization Act	1990	Department of Environmental Quality (DEQ)
New York	S. 5276-B An Act to Amend the Environmental Conservation Law, in Relation to the Management of Hazardous Waste	1990	Department of Environmental Conservation (DEC)
North Carolina	S.B. 324 Hazardous Waste Management Commission Act	1989	Department of Natural Resources and Community Development (DNRCD)
Oregon	H.B. 3515 Toxics Use Reduction and Hazardous Waste Reduction Act	1989	Department of Environmental Quality
Tennessee	H.B. 2217 Hazardous Waste Reduction Act	1990	Department of Health and Environment (DHE)
Vermont	H. 733 An Act Relating to the Management of Hazardous Waste	1990	Agency of Natural Resources (ANR)
Washington	H.B. 2390 Hazardous Waste and Substance Reduction Act	1990	Department of Ecology (DE)

Source: The following state matrix was adapted from material prepared by the Ohio Environmental Protection Agency as reprinted in the U.S. Environmental Protection Agency's *Pollution Prevention 1991*. EPA/21P-3003. October 1991.



**Provisions of Twelve State Laws**

<b>CALIFORNIA: Hazardous Waste Source Reduction Management and Review Act</b>		
<b>Persons Required to Prepare Plan</b> Generators who, by site, routinely generate, through ongoing processes and operations, more than 26,460 lbs of hazardous waste per year or more than 26.46 lbs of extremely hazardous waste per year.	<b>Performance Goals of Facility Plans</b> Specific numeric performance goals are not required, however, plan must include a timetable for making reasonable and measurable progress toward implementing selected source reduction methods	<b>Agency Review of Facility Plans</b> Generators must retain a copy of the current source reduction evaluation review plan and plan summary at each site (or central location) and upon request shall make it available during any DHS inspection
<b>Statutory Objectives</b> To reduce the generation of hazardous waste; to reduce chemical contaminant releases	<b>Exceptions</b> Selected measure is not technically feasible or economically practicable; attempts to implement the measure reveal that it would result in: (1) increased hazardous waste generation; (2) increased hazardous chemical releases to other environmental media; (3) adverse impacts on product quality; (4) significant increase in risks of an adverse impact to human health or environment	<b>Frequency of Facility Progress Report Submission</b> Every 4 years beginning 1991, generators must prepare a hazardous waste management report and summary
<b>Waste Management Hierarchy</b> 1) source reduction 2) recycling 3) treatment		<b>Administrative Penalties</b> Civil penalties in an amount not greater than \$1,000 may be imposed if a generator fails to submit a revised source reduction evaluation review and plan, plan summary, hazardous waste management performance report, or report summary
<b>Guidelines for Facility Plans</b> Identification of hazardous waste streams which result from ongoing processes or operations that have an annual volume > 5% total annual volume Estimate of quantity of hazardous waste generated Evaluation of viable source reduction options Specification of, and rationale for, source reduction measures which will be taken for each waste stream; rationale for rejecting any available source reduction approach Evaluation and quantification of effects of chosen source reduction measures on emissions and discharges to air, water, or land Timetable for making reasonable and measurable progress towards implementing source reduction measures Certification by professional engineer; process or operations personnel on-site; or an environmental assessor with expertise in hazardous waste management	<b>Exemptions from Completing Plan</b> DHS shall adopt regulations to establish procedures for exempting generators where the department determines no source reduction opportunities exist	<b>Public Access to Facility Plans</b> Any person may request DHS to certify that a generator is in compliance with statutory requirements
	<b>Requirements of Facility Progress Report</b> Estimate of quantity of hazardous waste generated and managed onsite and offsite during the current reporting year and baseline reporting year Assessment of the effect, during the current year, of each hazardous waste management measure implemented since the baseline year upon onsite and offsite hazardous waste generation, including source reduction, recycling, and treatment measures Description of factors during the current year that have affected onsite and offsite hazardous waste generation since the baseline year Certification by a professional engineer; process or operations personnel onsite; environmental assessor with expertise in hazardous waste management	<b>Plan Approval Criteria</b> DHS shall not judge the appropriateness of any decision or proposed measures contained in a review and plan, plan summary, report or report summary, but shall only determine whether the document is complete, prepared and implemented in accordance with the statute.

## Appendix F

<b>GEORGIA: Amendment to the Hazardous Waste Management Act</b>		
<b>Persons Required to Prepare Plan</b> Large quantity hazardous waste generators Out-of-state large quantity hazardous waste generators who use Georgia's hazardous waste treatment, storage and disposal	<b>Performance Goals of Facility Plans</b> Specific performance goals for hazardous waste reduction must be expressed in numeric terms wherever technically and economically practicable. If numeric terms are not practical, plan must include a statement of objectives designed to lead to the establishment of numeric goals as soon as practicable. Rationale for each performance goal must be explained, including any impediment to hazardous waste reduction	<b>Agency Review of Facility Plans</b> All plans must be completed and submitted to DNR on or before 3/1/92. Plans shall be updated and submitted to DNR on a biennial basis
<b>Statutory Objectives</b> To provide for the preparation of hazardous waste reduction plans and biennial progress reports	<b>Exceptions</b> For valid reasons of priority, a company chooses to address other more serious hazardous waste reduction concerns. Necessary steps to reduce hazardous waste will likely have significant adverse impacts on product quality. Legal or existing contractual obligations interfere with the necessary steps that would lead to hazardous waste reduction	<b>Frequency of Facility Progress Report Submission</b> Generators must biennially complete a hazardous waste reduction progress report
<b>Waste Management Hierarchy</b> Specified in the original act: 1) source reduction 2) recycling 3) treatment 4) disposal		<b>Administrative Penalties</b> Criminal penalties will be imposed for false statements made by a company in certifying that it is unable to meet the requirements because of the nature of its business operation or process, or by out-of-state generators in certifying that they are in compliance with the law
<b>Guidelines for Facility Plans</b> Policy statement of upper management and corporate support for the plan and commitment to implement plan goals Plan scope and objectives, including the evaluation of technologies, procedures and personnel training programs to ensure unnecessary hazardous waste is not generated; specific goals for hazardous waste reduction, based on what is economically practical Analysis of hazardous waste streams; identification of opportunities for hazardous waste reduction; evaluation of where and why waste was generated; potential reduction and recycled techniques Accounting systems which identify waste management costs and factor in liability, compliance and oversight costs Employee awareness and training programs to involve employees in hazardous waste reduction planning and implementation Incorporation of plan into management practice and procedure to institutionalize plan Plan for implementing reduction options	<b>Exemptions from Completing Plan</b> Waste resulting from remediation or cleanup programs. Commercial hazardous waste treatment, storage and disposal facilities upon certification to DNR that because of the nature of its business operation or process, the facility cannot meet the waste reduction requirements	<b>Public Access to Facility Plans</b> DNR shall maintain a copy of each hazardous waste reduction plan and biennial progress report received. This information shall be available to the public at the director's office
	<b>Requirements of Facility Progress Report</b> Analyze and quantify progress made, if any, in hazardous waste reduction, relative to each performance goal established in the plan. Set forth amendments to the plan and explain the need for the amendments	<b>Plan Approval Criteria</b> Not specified

**Provisions of Twelve State Laws**

<b>MAINE: An Act to Clean the Environment by the Reduction of Toxics Use, Waste and Release</b>		
<b>Persons Required to Prepare Plan</b> Generators of > than 220.5 lbs of hazardous waste per month for more than 3 months per year. Facility owners or operators required to report under SARA, Title III, Section 313 (toxics releasers). Persons required to report the presence of extremely hazardous substances under SARA, Title III, Section 312 (toxics users).	<b>Performance Goals of Facility Plans</b> Facilities must achieve toxics release and hazardous waste reduction goals of 10% by 1993; 20% by 1995; 30% by 1997. DEP will track generator progress by manifest data.	<b>Agency Review of Facility Plans</b> After 1/1/93, DEP may require a toxics releaser/hazardous waste generator to submit a summary of the toxics releaser/hazardous waste reduction plan when: - A facility fails to meet reduction goals - An exempted facility fails to meet alternative reduction goals established by DEP - Toxic release rates or hazardous waste generation in a new facility is significantly greater per production unit than in similar facility of the same SIC code Owners and operators of facilities shall keep a complete copy of the plan and any back-up data on the premises of that facility for at least 5 years and make the copy and data available to DEP upon request.
<b>Statutory Objectives</b> To reduce the volume of toxic substances used, toxics released and hazardous waste generated: 10% by 1993, 20% by 1995, 30% by 1997.	<b>Exceptions</b> Practicable hazardous waste or toxic release reduction methods do not exist. All practicable reductions or actions have been previously implemented or are currently being implemented. Practicable steps necessary to reduce hazardous waste or toxic releases would be an unreasonable adverse impact on product quality or quantity. Legal or contractual obligations prohibit steps necessary to reduce hazardous waste generation or toxic releases.	<b>Frequency of Facility Progress Report Submission</b> Toxics users and toxics releasers must annually report progress toward meeting reduction goals. Progress in hazardous waste reduction will be tracked through manifest data.
<b>Waste Management Hierarchy</b> 1) Toxics use reduction, toxics release reduction and hazardous waste reduction.		<b>Administrative Penalties</b> Toxic users are not subject to penalties under this statute, except for the requirement to pay an annual fee. Toxic releasers that fail to meet any statutory requirement, including, but not limited to, achievement of toxics release reduction goals and the preparation and submission of required plan summaries, are subject to enforcement action and fees of up to \$25,000/day. Hazardous waste generators that fail to meet any statutory requirement, including, but not limited to achievement of hazardous waste reduction goals and the preparation and submission of required plans, may be subject to enforcement action, civil or criminal penalties and fees as follows: - Hazardous waste transported offsite for disposal: \$0.18/lb. - Hazardous waste transported offsite for treatment, storage, or other handling, including beneficial reuse, reclamation or recycling: \$0.135/lb.

## Appendix F

<b>MAINE: An Act to Clean the Environment by the Reduction of Toxics Use, Waste and Release (con't.)</b>		
<b>Guidelines for Facility Plans</b> <p>Statement of facility-wide management policy for toxics use, toxics release and hazardous waste reduction.</p> <p>Identification and characterization of types and amounts of all toxics used, toxics released and hazardous waste generated.</p> <p>Evaluation of any appropriate technologies, procedures, processes, equipment or production changes that may be utilized to reduce the amount or toxicity of toxics used, toxics released or hazardous waste generated.</p> <p>Strategy and schedule for implementing reduction options for each production process.</p> <p>Identification of available markets or recycling opportunities for hazardous waste.</p> <p>Program for maintaining records or toxics use, toxics release and hazardous waste generation rates and management costs.</p> <p>Employee awareness and training program to involve employees in toxics use, toxics release and hazardous waste reduction planning and implementation.</p>	<b>Exemptions from Completing Plan:</b> <p>Hazardous waste reduction exemptions:</p> <ul style="list-style-type: none"> <li>- Commercial hazardous waste treatment or storage facilities</li> <li>- Pilot plants or pilot production units.</li> <li>- Hazardous waste transporters</li> <li>- Hazardous waste generated as a result of remedial or corrective actions or facility closures</li> </ul> <p>Toxics release reduction exemptions:</p> <ul style="list-style-type: none"> <li>- Water supply treatment facilities</li> <li>- Municipal wastewater treatment facilities</li> <li>- Retail and wholesale motor fuel and heating oil distributors</li> <li>- Agricultural operations</li> </ul>	<b>Public Access to Facility Plans</b> <p>Public access is not explicitly stated in this statute, but policy was set in another law. Public has access to any plan summary submitted to DEP unless the facility has met provisions for confidentiality.</p>
	<b>Requirements of Facility Progress Report</b> <p>Toxics use and toxics release reports must state progress toward meeting toxics use and toxics release goals, respectively. Hazardous waste generators are not required to complete a progress report, but DEP will track progress through hazardous waste manifest data.</p>	<b>Plan Approval Criteria</b> <p>In reviewing the adequacy of any plan summary, the commissioner shall base a determination on whether the plan summary is complete and prepared in accordance with requirements established by statute, regulations or guidelines.</p>

## Provisions of Twelve State Laws

<b>MASSACHUSETTS: Toxics Use Reduction Act</b>		
<b>Persons Required to Prepare Plan</b> Initially facility owners or operators required to report under SARA, Title III, Section 313, then expanding by 1995 to include other SIC groups and facilities which use chemicals on the CERCLA list (large quantity toxics users).	<b>Performance Goals of Facility Plans</b> If a majority of toxics users in a priority user segment fall significantly below standard achievements of by-product generated per unit of product, DEP may require priority user segments to achieve a specified level of by-product generated per unit of product, within a specified time frame.	<b>Agency Review of Facility Plans</b> Plans are kept at the facility and must be made available to DEP upon request.
<b>Statutory Objectives</b> To reduce toxic waste generated by 50% by 1997 using toxics use reduction as the means for meeting this goal.  <b>Waste Management Hierarchy</b> 1) Toxics use reduction	<b>Exceptions</b> Not specified.	<b>Frequency of Facility Progress Report Submission</b> Toxic or hazardous substance reports must be submitted to DEP annually.
		<b>Administrative Penalties</b> Any individual or toxics user who violates the requirements of toxics use reduction planning or annual toxics and hazardous substance reporting shall be punished by a fine in an amount between \$2,500 and \$25,000, or by imprisonment for not more than one year, or by both.
<b>Guidelines for Facility Plans</b> Statement of facility-wide management policy for toxics use reduction.  Plan scope and objectives, including planned reductions in facility-wide use and by-product generation from the relevant base year for each toxic or hazardous substance during the next 2 years and 5 years.  Economic and technical evaluation of technologies, procedures and training programs for achieving toxics use reduction.  Analysis of current and projected toxics use, by-product generation and emissions.  Economic impacts of toxics use, including costs of raw material and by-product storage, potential liability and regulatory compliance.  Plan implementation schedule. 2 year and 5 year goals for the by-product reduction index for each toxic or hazardous substance.  Plan certification by a toxics use reduction planner.	<b>Exemptions from Completing Plan</b> Pilot plants and pilot production units. Start-up production units for a specified time period.	<b>Public Access to Facility Plans</b> Any 10 residents living within 10 miles of a facility required to prepare a toxics use reduction plan may petition DEP to examine the plan, plan summary and any required back up data and determine their adequacy.  DEP shall make available for resident review all toxics use reduction plan summaries, provided that trade secret information is protected.
	<b>Requirements of Facility Progress Report</b> Quantities of toxic or hazardous substances which are manufactured, processed, otherwise used, generated as by-product, or shipped in product.  Indication of whether the substance was used in the production unit in amounts: - less than or equal to 5,000 pounds; - greater than 5,000 pounds but less than or equal to 10,000 pounds; and - greater than 10,000 pounds.  Reporting base year. By-product reduction index. Emissions reduction index.  Matrix form of methods by which by-product reduction index was achieved for each production operation.	<b>Plan Approval Criteria</b> DEP shall specify criteria for acceptable plans according to statutory requirements. Plans must be certified by a toxics use reduction planner as meeting the department's criteria for acceptable plans.

## Appendix F

MINNESOTA: Toxic Pollution Prevention Act		
<b>Persons Required to Prepare Plan</b> Facility owners or operators required to report under SARA, Title III, Section 313.	<b>Performance Goals of Facility Plans</b> Wherever technically and practicable, objectives for eliminating or reducing the generation or release of each toxic pollutant must be expressed in numeric terms. Otherwise objectives must include a clearly stated list of actions designed to lead to the establishment of numeric goals as soon as practicable.	<b>Agency Review of Facility Plans</b> Plans must be kept at the facility. PCA shall be given access to a facility plan if the progress report does not meet statutory requirements relating to progress report content.
<b>Statutory Objectives</b> To protect public health, welfare and the environment; to encourage toxic pollution prevention.	<b>Exceptions</b> Not specified.	<b>Frequency of Facility Progress Report Submission</b> PCA shall review all progress reports to determine if they meet statutory requirements.
<b>Waste Management Hierarchy</b> 1) Source reduction and processes that minimize cross-media pollutant transfers		<b>Administrative Penalties</b> Annual progress reports must be submitted to PCA beginning in October 1992.
<b>Guidelines for Facility Plans</b> Policy statement of upper management support for toxics reduction. Description of current processes generating or releasing toxics, describing types, sources and quantities of toxics currently being generated or released. Description of current and past toxics reduction practices and evaluation of their effectiveness. Assessment of technically and economically practicable options available to eliminate or reduce the generation of toxics, which may include cost-benefit analysis. Plan objectives and schedule for achieving objectives. Explanation of the rationale for each objective. List of options considered to be economically or technically impracticable. Certification by facility manager and a company officer attesting the plan's accuracy.	<b>Exemptions from Completing Plan</b> Toxic pollutants resulting solely from research and development activities need not be included in the plan.	<b>Public Access to Facility Plans</b> Plans are nonpublic data. 25 or more persons living within 10 miles of the facility may submit a petition that identifies specific deficiencies in the progress report and requests PCA to review the facility plan. Within 30 days after receipt of the petition, PCA shall respond in writing. If the commissioner agrees that the progress report does not meet statutory requirements, PCA shall be given access to the facility plan.
	<b>Requirements of Facility Progress Report</b> Summary of each objective established in the plan, including schedule for meeting objectives. Summary of progress made during past year, if any, toward meeting each plan objective, including quantity of each toxic pollutant eliminated or reduced. Statement of methods through which elimination or reduction has been achieved. Explanation of reasons objectives were not achieved (if applicable), including identification of any technical, economic or other impediments. Certification by facility manager and a company officer attesting the report's accuracy.	<b>Plan Approval Criteria</b> After reviewing the plan and progress report with any modifications submitted, the commissioner shall state in writing whether the progress report meets statutory requirements.

**Provisions of Twelve State Laws**

<b>MISSISSIPPI: Comprehensive Multimedia Waste Minimization Act</b>		
<b>Persons Required to Prepare Plan</b> Large quantity hazardous waste generators. Small quantity hazardous waste generators. Facility owners or operators required to report under SARA, Title III, Section 313.	<b>Performance Goals of Facility Plans</b> Performance goals for waste minimization must be set in numeric terms to the extent practical.	<b>Agency Review of Facility Plans</b> A generator or facility operator shall permit any designee of DEQ to review the waste minimization plan.
<b>Statutory Objectives</b> To reduce or minimize the generation and toxicity of waste by a minimum of 25% by January 1, 1996.	<b>Exceptions</b> Not specified.	<b>Frequency of Facility Progress Report Submission</b> Annual plan updates must be prepared and must include quantification of progress in achieving performance goals.
<b>Waste Management Hierarchy</b> 1) Source reduction 2) Recycling 3) Treatment 4) Disposal		<b>Administrative Penalties</b> No penalties.
<b>Guidelines for Facility Plans</b> Policy statement of management support for waste minimization and plan implementation. Plan scope and objectives, including evaluation of technologies, procedures and personnel training programs to ensure waste minimization. Explanation and documentation of previous waste minimization efforts. Analysis of waste streams and identification of opportunities to eliminate waste generation, including review of waste generating processes, evaluation of data on types, amounts and hazardous constituents of waste generated and potential waste minimization techniques. Identification of waste management costs. Employee awareness and training programs to involve employees in waste management planning and implementation. .Performance goals which shall be expressed in numeric terms whenever practicable.	<b>Exemptions from Completing Plan</b> Commission of Environmental Quality is authorized to make exceptions to an grant exemptions and variances from rules and regulations implementing the statute.	<b>Public Access to Facility Plans</b> A waste minimization plan and any updates shall be retained at the facility and shall not be subject to inspection, examination, copying or reproduction.
	<b>Requirements of Facility Progress Report</b> Annual plan updates are required in lieu of progress reports, and must include: - Analysis and quantification of progress made, if any, in waste minimization, relative to each performance goal. - Amendments, if any, to the plan and explanation of the need for amendments.	<b>Plan Approval Criteria</b> Not specified.

## Appendix F

NEW YORK: An Act to Amend the Environmental Conservation Law, in Relation to the Management of Hazardous Waste		
<b>Persons Required to Prepare Plan</b> Generators of equal to or greater than 25 tons of hazardous waste per year. Generators required to hold a hazardous waste treatment, storage or disposal facility permit.	<b>Performance Goals of Facility Plans</b> Evaluation of the anticipated reduction, in tons or other appropriate measurement, in the amount of hazardous wastes produced as a result of the implementation of each of the technically feasible and economically practicable waste reduction options.	<b>Agency Review of Facility Plans</b> DEC must review each plan according to a schedule established by statute.
<b>Statutory Objectives</b> To reduce hazardous waste generation and release by 50% over the next 10 years.	<b>Exceptions</b> Not specified.	<b>Frequency of Facility Progress Report Submission</b> Annual status reports must be submitted to DEC.
<b>Waste Management Hierarchy</b> 1) Source reduction 2) Recycling 3) Treatment 4) Disposal		<b>Administrative Penalties</b> Any generator whose plan has been rejected by DEC is not allowed to make the hazardous waste manifest certification, and, per a condition of any permit issued for onsite treatment, storage or disposal of hazardous waste, is not allowed to make the annual report certification.
<b>Guidelines for Facility Plans</b> Identification of amounts and types of acute hazardous waste. Identification of amounts and types of hazardous wastes generated during previous year. Description of the process that resulted in such waste. Calculation of the amount of waste generated per unit of production output, raw material used or other appropriate index. Estimate of waste management costs, including storage, treatment, transportation, disposal and regulatory fees. Evaluation of feasibility of implementing waste reduction processes for each waste. Program to implement feasible waste reduction alternatives. Evaluation of anticipated reduction in amount of hazardous waste produced as a result of implementing each waste reduction option. Evaluation of cross-media transfers of waste reduction options.	<b>Exemptions from Completing Plan</b> Hazardous waste generated by: - Corrective action for a release from a hazardous waste treatment, storage or disposal facility - Remediation of inactive disposal sites - Cleanup of environmental releases - Demolition and construction debris.	<b>Public Access to Facility Plans</b> Not specified.
	<b>Requirements of Facility Progress Report</b> Progress in achieving time schedule for implementing waste reduction alternatives. Reasons for not implementing any waste reduction technology, process or operational change identified in the plan. Explanation of why any waste reduction method chosen and implemented did not achieve anticipated waste reduction.	<b>Plan Approval Criteria</b> Review of hazardous waste reduction plans shall be subject to the following standards. DEC may reject any plan or biennial update which: - fails to contain all components required by statute - fails to apply generally accepted engineering, scientific or economic principles and practices - accomplishes waste reduction by transfers to other environmental media without an environmental benefit from such transfers - is inconsistent with the preferred hazardous waste management practices hierarchy - involves conduct prohibited by any applicable law or regulation - fails to provide a basis for charting waste reduction trends over time - beginning with the 1st biennial update, fails to demonstrate reasonable progress in implementing chosen waste reduction alternatives according to the established time schedule; or fails to reevaluate alternatives.



**Provisions of Twelve State Laws**

<b>NORTH CAROLINA: Hazardous Waste Management Commission Act</b>		
<b>Persons Required to Prepare Plan</b> Hazardous waste generators and operators of hazardous waste treatment facilities which treat waste on-site who are required to pay an annual fee under North Carolina law. Persons required to hold a water quality permit. Persons required to hold an air quality permit.	<b>Performance Goals of Facility Plans</b> Not specified.	<b>Agency Review of Facility Plans</b> All written descriptions of current and projected plans to reduce hazardous wastes, waste water and pollutant discharges and air contaminant emissions shall be transmitted to the Solid Waste Management Division for review and analysis.
<b>Statutory Objectives</b> To encourage voluntary waste and pollution reduction efforts.	<b>Exceptions</b> Not specified.	<b>Frequency of Facility Progress Report Submission</b> Progress reports are not required, however, plans are required annually.
<b>Waste Management Hierarchy</b> Not mentioned in this statute, but specified in an earlier law: 1) Source reduction 2) Recycling 3) Treatment 4) Disposal		<b>Administrative Penalties</b> Penalty for failure to submit a hazardous waste minimization plan along with the annual fee is an administrative fine. Penalty for failure to submit a plan along with an air or water quality permit fee is an administrative fine or permit revocation.
<b>Guidelines for Facility Plans</b> For hazardous waste permits: - written description of any program to minimize or reduce the volume and quantity of toxicity of waste  For water quality permits: - written description of current and projected plans to reduce the discharge of waste and pollutants by source reduction or recycling  For air quality permits: - written description of current and projected plans to reduce the emission of air contaminants by source reduction or recycling	<b>Exemptions from Completing Plan</b> Not specified.	<b>Public Access to Facility Plans</b> Not specified in statute, however, pollution prevention plans become part of the facility permit and compliance files, and are available for public review.
	<b>Requirements of Facility Progress Report</b> Progress reports are not required.	<b>Plan Approval Criteria</b> Not specified.

## Appendix F

<b>OREGON: Toxics Use Reduction and Hazardous Waste Reduction Act</b>		
<b>Persons Required to Prepare Plan</b> Large quantity hazardous waste generators. Small quantity hazardous waste generators. Facility owners or operators required to report under the SARA, Title III, Section 313 (large users)	<b>Performance Goals of Facility Plans</b> Establish specific numeric performance goals for the following categories of toxic substances and hazardous wastes: - Any toxic substance used in quantities in excess of 10,000 pounds a year; - Any toxic substance used in quantities in excess of 1,000 pounds a year that constitutes 10% or more of the total toxics used; and - For large quantity generators, any waste representing 10% or more by weight of the cumulative waste stream generated per year.	<b>Agency Review of Facility Plans</b> Upon coming completing a plan, the user must notify DEQ in writing on a form supplied by DEQ. Plans shall be retained at the facility. Toxics users shall permit any DEQ employee to inspect the plan.
<b>Statutory Objectives</b> To encourage toxic substance use and hazardous waste generation reduction without shifting risks from one environmental medium to another.	<b>Exceptions</b> Impediments may include the availability of technically practicable toxics use reduction and hazardous waste reduction methods, and the economic practicability of available toxics use reduction and hazardous waste reduction methods, including any anticipated changes in the future. Examples of situations where reduction may not be economically practicable may include: - For valid reasons of priority, a company chooses to first other more serious toxics use reduction or hazardous waste reduction or hazardous waste reduction concerns - Necessary steps to reduce toxics use and hazardous waste will likely have significant adverse impacts on product quality - Legal or contractual obligations interfere with the necessary steps that would lead to toxics use reduction or hazardous waste reduction.	<b>Frequency of Facility Progress Report Submission</b> All toxics users shall annually complete a toxic use reduction and hazardous waste reduction progress report.
<b>Waste Management Hierarchy</b> 1) Toxics use reduction 2) Hazardous waste reduction		<b>Administrative Penalties</b> If a toxics user fails to develop an adequate plan or progress report according to DEQ's required modifications, DEQ may issue an administrative order requiring the user to submit a plan or progress report. If the user fails to submit an adequate plan or progress reports within the time specified, DEQ shall conduct a public hearing on the plan or progress report. In any hearing, the relevant plan or progress report shall be considered public record, except for trade secret information.
<b>Guidelines for Facility Plans</b> Policy statement of upper management and corporate support for the plan and commitment to implement plan goals. Plan scope and objectives, including evaluation of technologies, procedures and personnel training programs. Internal analysis of toxics usage and hazardous waste streams, including evaluation of types and amounts of toxics used and waste generated, where and why toxics were used and waste was generated, potential reduction and recycling techniques.	<b>Guidelines for Facility Plans</b> Policy statement of upper management and corporate support for the plan and commitment to implement plan goals. Plan scope and objectives, including evaluation of technologies, procedures and personnel training programs. Internal analysis of toxics usage and hazardous waste streams, including evaluation of types and amounts of toxics used and waste generated, where and why toxics were used and waste was generated, potential reduction and recycling techniques.	<b>Public Access to Facility Plans</b> DEQ shall maintain a log of each plan or progress report it reviews, a list of all plans or progress reports that have been found to be inadequate and descriptions of corrective actions taken. This information shall be available to the public at DEQ. If a public hearing is held on any plan or progress report, the relevant plan or progress report, excepting trade secret information, shall be considered a public record.

***Provisions of Twelve State Laws***

<b>OREGON: Toxics Use Reduction and Hazardous Waste Reduction Act (con't.)</b>		
<b>Guidelines for Facility Plans (con't.)</b>  Accounting systems that identify toxic use and waste management costs and factor in liability, compliance and oversight costs.  Employee awareness and training programs.  Institutionalization of plan by incorporation of plan into management practice and procedure.  Plan for implementing technically and economically practicable toxics use and hazardous waste reduction options.	<b>Requirements of Facility Progress Report</b>  Analyze progress made, if any, in toxics use reduction and hazardous waste reduction, relative to each performance goal established in the plan. Set forth amendments to the plan and explain the need for amendments.  Submit report to DEQ on quantities of toxics used and wastes generated that meet performance goal criteria, and a narrative explaining the data.	<b>Plan Approval Criteria</b>  In reviewing the adequacy of any plan or progress report, DEQ shall base its determination solely on whether the document is complete and prepared in accordance with planning guidelines.

## Appendix F

<b>TENNESSEE: Hazardous Waste Reduction Act</b>		
<b>Persons Required to Prepare Plan</b> Large quantity hazardous waste generators. Small quantity hazardous waste generators.	<b>Performance Goals of Facility Plans</b> Specific performance goals shall be quantitative goals, expressed in numeric terms, established for the source reduction of each waste stream. When possible, units of measurement should be in pounds (or tons) of waste generated per standard unit of production, as defined by the generator. If numeric performance goals are not practical, performance goals shall include a clearly stated list of actions designed to lead to the establishment of numeric goals as soon as practical.	<b>Agency Review of Facility Plans</b> Upon completing a plan, the generator shall maintain a current copy of the plan at the facility. Generators shall permit the commissioner's designee to inspect the plan. Generators shall permit any officer, employee or DHE representative to have access to the plan. Generators shall furnish a copy of the plan upon request to DHE.
<b>Statutory Objectives</b> To reduce the aggregate level of hazardous waste generated by 25% by June 30, 1995.	<b>Exceptions</b> For valid reasons of priority, a company chooses to first address other more serious hazardous waste reduction concerns. Necessary steps to reduce hazardous waste will likely have significant adverse impacts on product quality. Legal or contractual obligations interfere with the necessary steps that would lead to hazardous waste reduction.	<b>Frequency of Facility Progress Report Submission</b> Based on their annual progress report, generators shall annually submit to DHE summary information on waste reduction activities.
<b>Waste Management Hierarchy</b> 1) Reduce or prevent hazardous waste generation 2) Storage, treatment and disposal		<b>Administrative Penalties</b> Civil penalties of up to \$10,000 shall be imposed on any generator or person who: - fails to file any required reports, records or documents - fails, neglects or refuses to comply with any statutory provisions or orders issued pursuant to the statute - knowingly gives false information in any required report, record or document.
<b>Guidelines for Facility Plans</b> Policy statement of management support for the plan. Plan scope and objectives, including evaluation of technologies, procedures and personnel training programs to ensure that unnecessary waste is not generated. Description of hazardous waste reduction options and an implementation schedule. Options must be based on internal analysis of waste streams, including evaluation of types and amounts of waste generated, where and why waste was generated, potential reduction and recycling techniques. Accounting systems that identify waste management costs and factor in liability, compliance and oversight costs. Employee awareness and training programs. Description of how plan has been or will be incorporated into management practices and procedures to insure an ongoing effort.	<b>Exemptions from Completing Plan</b> Waste shall not include wastewater streams containing hazardous wastes that are collected and treated in onsite wastewater treatment systems, the discharge of which is the subject of a NPDES permit.	<b>Public Access to Facility Plans</b> Plans shall not be considered public record.
	<b>Requirements of Facility Progress Report</b> Analyze and quantify progress made, if any, in hazardous waste reduction, relative to each performance goal established in the plan. Set forth amendments, if needed, to the plan and explain the need for amendments. The following summary information must be submitted to DHE as an element of the annual generator report: - For each hazardous waste stream, one of the following as appropriate: a) a statement of specific performance goals and a report on progress made in achieving these goals. Results should be in numeric terms. b) a report on the actions taken toward establishing numeric goals.	<b>Plan Approval Criteria</b> DHS may review a plan or annual progress report to determine whether the document reasonably contains the elements specified by statute.

**Provisions of Twelve State Laws**

<b>VERMONT: An Act Relating to the Management of Hazardous Waste</b>		
<b>Persons Required to Prepare Plan</b> Persons who routinely generate, through ongoing process and operation, more than 26,460 lbs of hazardous waste per year or more than 26.46 lbs of acutely hazardous waste per year.	<b>Performance Goals of Facility Plans</b> Specific performance goals are not required, however, plan must include a timetable and measurable progress toward implementing selected source reduction methods.	<b>Agency Review of Facility Plans</b> Every 2 years, beginning 7/1/92, ANR shall select at least 2 categories of generators by SIC code with potential for source reduction and must examine their source reduction review and plans to determine whether generators have complied with statutory requirements.  On or after 7/1/92, ANR may request a copy of the source reduction review and plan from any generator and may evaluate any document to determine whether it satisfies statutory requirements
<b>Statutory Objectives</b> To safeguard public health, promote worker safety and protect the environment by establishing toxic use reduction as the top priority for hazardous waste and toxics management.	<b>Exceptions</b> Not specified.	<b>Frequency of Facility Progress Report Submission</b> Hazardous materials management performance reports must be submitted annually.
<b>Waste Management Hierarchy</b> 1) Source reduction 2) Recycling 3) Treatment		<b>Administrative Penalties</b> No penalties.
<b>Guidelines for Facility Plans</b> Name, location, SIC code of site. Identification of each routinely generated hazardous waste resulting from ongoing processes or operations that have a yearly weight > 5% of total yearly weight of hazardous waste or hazardous materials released into the environment; or acute hazardous waste > 5% of total yearly weight. Estimate of quantity of hazardous waste generated. Evaluation of feasible source reduction methods. Specification of, and rationale for, feasible source reduction methods which will be taken for each waste stream; rationale for rejecting any available source reduction method. Evaluation of effects of chosen source reduction methods so as not to adversely affect compliance with applicable laws and regulations on emissions and discharges to air, water or land. Timetable for making reasonable and measurable progress toward implementing selected source reduction methods.	<b>Exemptions from Completing Plan</b> ANR shall adopt rules for exempting from facility planning requirements generators for whom the secretary determines no source reduction opportunities exist.	<b>Public Access to Facility Plans</b> Not specified.
	<b>Requirements of Facility Progress Report</b> Name, location, SIC code of site. Quantity of hazardous waste generated and managed onsite and offsite, during the current reporting year and baseline reporting year. Assessment of the effect, during the current year, of each hazardous materials management measure implemented since the baseline year, upon onsite and offsite hazardous waste generation. Description of factors during the current year that have affected hazardous waste generation, hazardous materials releases and onsite and offsite hazardous waste management since the baseline year. Certification by a professional engineer; or a process or operations personnel onsite.	<b>Plan Approval Criteria</b> ANR may evaluate any of the documents submitted to determine whether they satisfy statutory requirements.

## Appendix F

<b>WASHINGTON: Hazardous Waste and Substance Reduction Act</b>		
<b>Persons Required to Prepare Plan</b> Persons who generate more than 2,640 pounds of hazardous waste per year. Facility owners or operators required to report under SARA, Title III, Section 313 except those facilities that are primarily permitted treatment, storage and disposal facilities or recycling facilities (hazardous substance users).	<b>Performance Goals of Facility Plans</b> Specific performance goals must be expressed in numeric terms for each of the following categories: - hazardous substance use reduction or elimination - waste elimination or reduction - recycled materials or wastes - treated wastes. If the establishment of numeric performance goals is not practical, goals shall include a clearly stated list of objectives designed to lead to numeric goals as soon as practical.	<b>Agency Review of Facility Plans</b> Upon completing a plan, executive summaries of the plan shall be submitted to DE. DE may review a plan or executive summary to determine whether the document is adequate pursuant to rules developed under statute and with statutory provisions. Plans shall be retained at the facility. Generators shall permit a DE representative to review the plan to determine its adequacy.
<b>Statutory Objectives</b> To reduce hazardous waste generation by 50% by 1995 through hazardous substance use reduction and waste reduction techniques.	<b>Exceptions</b> Not specified.	<b>Frequency of Facility Progress Report Submission</b> Annual progress reports must be submitted to DE.
<b>Waste Management Hierarchy</b> 1) Hazardous substance use reduction 2) Hazardous waste reduction 3) Recycling 4) Treatment		<b>Administrative Penalties</b> A penalty fee of either \$1,000 or 3 times of amount of the generator's previous year's fee or current year's fee, whichever is greater, shall be charged if a generator fails to complete plan, executive summary or progress report modifications required by DE.
<b>Guidelines for Facility Plans</b> Policy statement of corporate support for plan. Analysis of current hazardous substance use and waste generation and current reduction, recycling and treatment options. Analysis of impediments to implementing options. Policy stating that in implementing selected options risks will not be shifted from one process, environmental media or product to another. Hazardous waste accounting systems which factor in liability, compliance and oversight costs. Financial description of plan. Employee training and involvement programs. 5 year plan implementation schedule. Documentation of previous waste reduction efforts. Executive summary of plan.	<b>Exemptions from Completing Plan</b> Persons required to prepare a plan may petition the DE to be excused from planning requirements, because of the quantity of hazardous waste generated. Persons must demonstrate to the director's satisfaction that the quantity of hazardous waste generated was due to unique circumstances not likely to be repeated and that the person is unlikely to generate sufficient hazardous waste to require a plan in the next 5 years.	<b>Public Access to Facility Plans</b> DE shall make available for public inspection any submitted executive plan summary, protecting confidential information. Any 10 persons residing within 10 miles of a facility required to prepare a plan may file a petition requesting DE to examine a plan to determine its adequacy. DE shall maintain and make available to the public, a record of each plan, executive summary or progress report it reviews, determines to be inadequate, or for which corrective action is taken.
	<b>Requirements of Facility Progress Report</b> Description of progress made toward achieving the specific performance goals established in the plan.	<b>Plan Approval Criteria</b> In determining the adequacy of any plan, executive summary or annual progress report, DE shall base its determination solely on whether the document is complete and prepared in accordance with statutory provisions.

**APPENDIX G**  
**ESTABLISHING A RECYCLING PROGRAM**

## **Appendix G**

### **Establishing a Recycling Program**

*The following background information for establishing a recycling program has been adapted from the US Air Force Installation Pollution Prevention Program Manual because it applies to all Federal facilities.*

#### **Setting Up A Recycling Program**

Careful planning is required before beginning a recycling program. Operators of recycling programs must decide on the method of collection and identify equipment, site, and facility requirements. A business and financing plan should be developed. Program operators must decide what to collect and who to collect it from, and how much material can be collected. Ongoing public education, information, and promotion will increase the quantity and quality of materials collected.

#### **Materials Specifications**

Recyclable materials recovered from solid waste must meet certain quality and purity specifications if they are to be utilized in current manufacturing processes. The condition of the materials plays a key role in setting the buyer's price.

#### **Selling Recyclable Materials**

A necessary component of recycling program is finding buyers for recovered materials. Prices fluctuate so it is important to check prices prior to making an economic assessment of the feasibility of a source separation project. The cost of transporting recyclable materials to a market is often a major expense of the program.

Buyers may sell or loan equipment such as balers or crushers to recycling programs, but for some programs it may be more economical to receive a lower price for less prepared materials (e.g., whole bottles or aluminum cans) than to spend time and money to partially process materials (e.g., crush glass and compact cans).

#### **Market Demand**

A demand must exist for recyclable materials before they can be reused in other products. Demand for recyclable materials is influenced by the availability of substitute materials, industry's overall ability to use those materials, the state of the economy, and energy costs.



## ***Establishing a Recycling Program***

### **Purchasing Products Made From Recycled Materials**

The standard three-arrow recycling symbol represents not only collection of recyclable materials, but also manufacturing and use of recycled products. Recycling can succeed in diverting materials from landfills only if markets for products made from recycled materials expand.

### **Recyclable Materials**

#### **Paper**

Paper, in the form of newspaper, corrugated, and high grade office paper, represents the bulk of waste from households and businesses, and is a steady component of installation waste streams. Much of it can easily be recovered through source separation. The benefits of recycling paper include conservation of trees and valuable landfill space, and energy savings realized through use of recycled fiber rather than virgin fiber in manufacturing new paper products.

Newspaper is the easiest paper to recycle and is typically the largest portion of recyclable material in households. Most old newspapers can be collected and sold to de-inking newsprint mills and remade into newspaper. Newsprint can also be made into products such as packing materials, insulation, and roofing materials. An increasing percentage of recycled newsprint is exported for remanufactured into newspaper or other products.

Corrugated cardboard boxes also account for a major portion of recycled paper; typically, it is baled and shipped to mills where it is made into new corrugated boxes or paperboard for cardboard boxes.

High grade office paper may be one of several grades or types. To be recycled at a high grade, it must be free from contaminants such as tape, metal objects, gummed labels, plastic, string, and carbon paper. Computer paper, tab cards, stationery bond, and miscellaneous plan paper are among the types of recyclable high grade paper. Magazines and slick advertising from newspapers are difficult to recycle and market demand is low because of the high clay content which gives them their shiny appearance.

Many offices have recycling programs where employees collect white paper at their desks and take it to a central storage point in the office. From there it is taken to a storage area and is picked up by a waste paper dealer or recycling business when sufficient quantity accumulates.

The price paid by buyers of waste paper depends on the demand for products made out of recycled paper, the type or grade of paper (e.g., corrugated and newspaper are lower grades than white office paper), and the quality of paper (amount of contamination). Paper grades are established by the Paper Stock Institute of America, a division of the Institute of Scrap Recycling Industries. DRMO offices at most Air Force bases continue to be responsible for determining market process for base recyclables. Air Force bases can help increase the demand for recycled paper by specifying that their letterhead and other paper products are recyclables.

## ***Appendix G***

### **Glass**

Recyclable glass consists mainly of clear (flint), brown (amber), and green glass containers. About 2.5 billion pounds of glass containers are collected annually. The glass is crushed into cullet (crushed glass) and purchased by glass container manufacturers, who make it into new bottles and jars. Every pound of cullet used saves approximately the same amount of raw materials used to make glass, namely sand, soda ash, and limestone.

Cullet prices are generally highest for clear glass, and lowest for mixed colored glass. Prices paid by glass companies for large quantities of crushed cullet fluctuate depending on demand and freedom from contamination. Demand for cullet sometimes depends on what color glass a company produces (e.g., a company may only make brown beer bottles so it does not need to buy green glass).

### **Aluminum**

Aluminum is one of the most important materials collected in recycling programs because the demand and high prices paid by aluminum manufacturers make it profitable for groups and recycling businesses. Aluminum is easily remelted and remolded into new products. It requires 95 percent less energy to process aluminum metal from scrap than to produce it from raw resources. Recycling eliminates all of the energy required for major steps in aluminum production, from the mining of the bauxite ore through the reduction process.

Aluminum beer and soda cans have become the largest source of aluminum scrap used by the aluminum industry. Aluminum manufacturing plants purchase large quantities of aluminum cans from recycling businesses and programs.

Other all-aluminum items such as TV dinner and foil pie plates, foil food wrap, aluminum siding, storm doors, windows, and lawn furniture also can be recycled. These items are recycled separately from aluminum cans because of their different aluminum composition.

### **Tin and Bi-Metal Cans**

Cans made of tin-coated steel (food cans) and bi-metal cans (which are tin-coated steel with an aluminum end, usually a beverage can) are recyclable. Tin-coated and bi-metal cans can be used directly as steel scrap in steel manufacturing furnaces. The material must be baled and delivered in truckload quantities. Only a small percentage of bi-metal cans can be used in steel furnaces because of the aluminum content of the cans.

### **Scrap Metal**

Ferrous metal items (other than cans) which are made of cast iron and steel sheet metal, and nonferrous metal items made of nickel, bronze, copper, brass, and lead can be recycled. Most ferrous and nonferrous metal is collected by scrap metal dealers from industrial businesses. There are a number of small businesses, however, which collect much metal scrap from non-

## ***Establishing a Recycling Program***

industrial sources. The price paid by scrap dealers depends on the market price for the various types of metal and their priority of scrap.

### **Plastics**

Plastics recycling generally fits into three main categories:

Polyethylene - These plastics can consist of:

- HDPE (high-density polyethylene)
- PET (polyethylene terephthalate)
- LDPE (low-density polyethylene)

Polyethylene plastics are obtained from many sources including milk jugs, plastic oil bottles, laundry detergent containers, soft drink bottles, and plastic bags.

Mixed plastics - Consists of items made from various combinations of HDPE, PET, LDPE, PVC, polystyrene, and polypropylene. They may be recycled to produce a variety of products such as cable reels, paving blocks, flower pots, drain pipe, and fencing.

Polyvinyl chloride (PVC)- Used primarily for piping and is not a major component of plastic recycling.

Collected PET and HDPE are generally sold in baled form, but can also be chopped into small flakes or granules, or pelletized (most closely approximating the component resins). The primary consumers of old plastic beverage containers are plastic fiber manufacturers. PET scrap is successfully being employed in the manufacture of fiber fill for jackets, pillows, and sleeping bags, as an interliner in upholstery, as a fiber in carpet construction, and as filler media. Additional end uses include the manufacture of industrial strapping, wall tile, flooring, and tail light lenses, HDPE plastic can be used to make lumber boards for boat piers and garden furniture, flower pots, toys, trash cans, and plastic containers for sorting recyclable materials at home.

The use of these types of plastics at Air Force installations is quite common. Learning to identify when this material is ready for replacement, how it can be segregated as waste, and what to do with it involves dealing with scheduling, procurement, contractors, and base administration.

### **Used Oil**

The recycling and reuse of used oil is a waste minimization effort widely used throughout Air Force installations. Recycling of used oil from the crankcases of cars, motorcycles, boats, and lawnmowers, keeps the oil out of waterways and saves energy over the use of virgin oil. Oil can be turned in at all auto-hobby shops and base service stations for recycling. Most collected used oil is cleaned and recycled into industrial fuel oil.

## ***Appendix G***

Waste oil is not considered a hazardous waste under federal regulations if it is recycled. Waste oil contaminated by other hazardous wastes (such as solvents) cannot be recycled, and disposing of such oil is very expensive. Precautions should be taken to properly segregate waste oil from other materials to prevent it from becoming contaminated.

Under some states' regulations, used oil is regulated as a hazardous waste. Air Force installations that are located in these states are required to comply with state guidelines concerning the management of hazardous waste (i.e., hazard determination, manifesting, labeling, recordkeeping) when handling waste oil.

### **Household Yard Wastes**

Leaves, grass, clippings, prunings, wood waste, and other vegetative debris can exceed 20 percent of municipal solid waste in many urban areas, especially during the autumn leaf season. Volume at Air Force locations varies by geographic location, but the cumulative volume represents a significant single waste source.

Leaves and other yard clippings can best be recycled by composting. Compost provides excellent soil conditioner and mulch, and adds important nutrients to soil. Compost can be sold to landscape contractors and nurseries as a soil conditioner. A list of such establishments may exist or be developed for the communities around a base. This provides a good public relations opportunity.

### **White Goods**

The term "white goods" refers to bulky items such as large electrical appliances (e.g., refrigerators, stoves) and metal furnishings which are occasionally discarded by homes and businesses. These items are usually recyclable as low grade scrap metal. The collection of white goods for recycling typically occurs at waste disposal facilities, such as landfills, rather than at community recycling centers.

White goods contain increasing amounts of plastics and other non-metal parts which has lessened the demand for white goods as a source of metal scrap. Some scrap processors no longer accept white goods on a regular basis or have become more cautious about which items they will accept because of potential problems with hazardous materials in certain items. For example, some refrigerators made before 1979 might have polychlorinated biphenyls (PCBs) in their electrical components. Some scrap processors will only accept such appliances if the electrical components have been stripped out, or will accept them but will not pay for them.

### **Tires**

Tires can be recycled in many ways. They can be:

- Retread;

## ***Establishing a Recycling Program***

- Split and die punched to make assorted products such as gaskets, bumpers, and mats.
- Ground into a fine crumb rubber for use in tire manufacturing (limited use), molded products, paved sports surfaces, roofing materials, and asphalt road paving materials.
- Shredded or cut into small chips for use as a fuel, usually for co-burning with wood waste, coal, or solid waste;
- Thermal processed (pyrolysis) to recover oils, gas, carbon, and other products;
- Burned whole as a fuel to produce steam and electricity; and
- Used for miscellaneous projects such as flower pots and fishing reefs.

Several of these procedures occur on-base because of the abundance of tires used. Considerable sources and amounts of tires end up as bulk waste at Air Force bases every year.

### **Clothing, Furniture, and Other Reusable Items**

In addition to organizations involved in recycling materials for processing into new manufactured goods, there are organizations that specialize in collecting particular items for direct reuse, sometimes after repairing them. These include charitable organizations such as the Salvation Army, AmVets, and Goodwill, as well as commercial organizations such as used clothing and furniture stores, and local flea markets. Thrift and consignment shops and used book and furniture dealers are usually identified in telephone directory yellow pages. Used books and records can sometimes be donated to libraries, schools, day care centers, senior citizens centers, and other charitable organizations, depending on organization needs.

Some communities have developed special programs for using surplus (usually not used) materials. Lumber, plumbing fixtures, doors, windows, and other materials which have been donated are distributed to non-profit organizations. Instead of being discarded, these miscellaneous items may be reused by the base or may benefit local communities, hospitals, schools, and churches.

Create a list of recycle/re-use possibilities and conduct a public outreach campaign. It will serve as positive public relations for the base and provide additional information and potential business to your solid waste management program, and will also help focus other components of the PPP at the same time.

### **Guidelines for Preparation of Recyclable Materials**

Recycling centers and curbside collection systems generally require some minor preparation of materials before acceptance for recycling. This preparation is necessary to meet buyer specifications or the specifications of manufacturers who will make new products out of the recycled materials. Basic preparation may involve separation of different types of materials and

## ***Appendix G***

removal of contaminants such as food wastes. General guidelines for each material are listed below.

### **Paper Products**

#### ***Newspaper***

- Tie with twine in a bundle about 1 ft high or put in brown grocery bags (check with collection center to see if they accept bagged newspapers).

#### ***Corrugated Cardboard Boxes***

- Flatten, remove tape and bundle.
- Do not include plastic coated corrugated.
- Brown grocery bags and brown wrapping paper are sometimes accepted. If they are, keep separate from corrugated.

#### ***High Grade Office Paper***

- White typing, bond, and photography paper, tablet paper, computer printout, and tabulating cards can be recycled.
- Ask collection center about specific instructions and types of paper accepted.
- Do not include colored paper, carbon paper, tape, gummed labels, window envelopes, plastic coated paper, cardboard, or magazines.
- Remove large staples and paper clips.

#### ***Magazines, Telephone Books, Miscellaneous Paper***

- Bundle separately from newspapers or office paper
- Do not include carbon paper.
- Ask collection center for specific instructions and types of paper accepted.

### **Cans**

#### ***Aluminum Cans***

- These are usually cans without side seams, which often say 100 percent aluminum.
- Cans should be reasonably clean (no dirt or food residue).

## ***Establishing a Recycling Program***

### ***Bi-Metal Cans***

- These are usually beverage cans with steel seamed sides and one or two aluminum ends.
- Bi-metal cans must be kept separate from aluminum cans.
- Markets are limited, so check with the recycling center to see if they are accepted.
- To determine metal type, test with magnet. Magnets will not stick to aluminum.
- Remove the ends.
- Flatten.

### ***Tin (Steel) Cans***

- Rinse to remove food residue. This is very important, because excessive contamination interferes with the recycling process.
- Remove paper label if possible.
- Storage is easier if ends of can are removed and flattened.

### **Glass Bottles and Jars**

- Rinse to remove food residue.
- Paper labels may be left on.
- Remove metal caps and lids.
- Some collection centers require removal of metal neck rings on glass beverage containers. Check with your collection center to be sure what their requirements are.
- Leave glass containers intact and separate by color. Some collection centers will accept mixed brown and green glass.
- Do not include milk-white glass, plate glass, dinnerware, and light bulbs.

### **Scrap Metal**

- Rinse foil food wrap, TV dinner trays, and aluminum pie pans to remove food residue.
- Call collection center for specific preparation instructions for aluminum siding, storm doors, windows, and lawn furniture.

### **Other Metal Scraps**

- Ask collection center for specific preparation instructions.

## ***Appendix G***

- Do not mix ferrous (steel, cast-iron) and nonferrous (brass, copper, lead, aluminum) scrap.

### **Plastic Soft Drink and Milk Bottles**

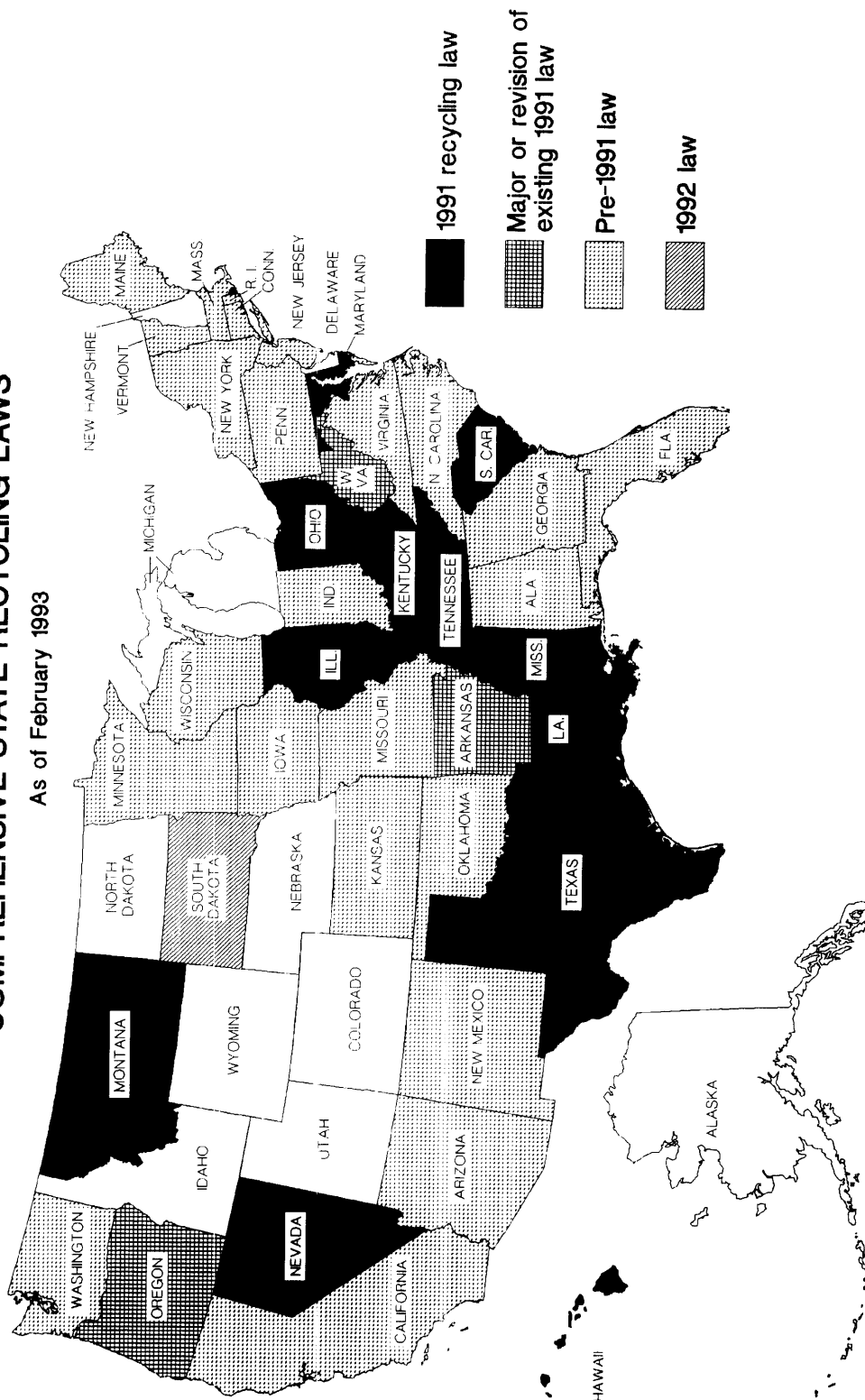
- Very few collection centers accept plastic. Find a collection center before saving plastic bottles.
- Remove metal rings and caps/rinse.
- Flatten to use less storage space.
- Separate PET (soft drink) and HDPE (milk) containers.

### **Used Oil**

- Drain oil into a non-breakable container with a tight-fitting cap, such as a sturdy plastic bottle.
- Do not mix with gasoline, antifreeze, solvents, brake fluid, or refrigerator oil.
- Do not put in garbage cans, pour down sewers or storm drains, or dump on the ground or in streams, rivers, or lakes.
- Take oil to a local collection center such as a participating service station.



**As of February 1993**



A total of seven continental states enacted or revised their comprehensive solid waste/recycling laws in 1991, bringing the national total to 37. Arkansas, West Virginia and Oregon completely overhauled their laws, enacting stronger curbside mandates/incentives, landfill bans and increases in landfill tip fees, as well as restrictions on shipments of out-of-state waste. Nevada, Texas, Mississippi and South Carolina passed major new legislation that frequently included fire fees. Hawaii enacted a major bill that will require local governments to submit plans, but the state has no funding mechanism for recycling programs yet. All states enacting such bills in 1991 included mandates for cities and counties to submit solid waste plans which include curbside recycling. The trend is to put mandates on local governments to recycle a certain number of items, rather than place direct mandates on residents to source separate.

STATE RECYCLING | AWS UPDATE: YEAR-END EDITION February 1993

**Appendix G****GOALS (RECYCLING/REDUCTION/DIVERSION)**

<b>State</b>	<b>Goal (%)</b>	<b>By Year</b>
Alabama	25	2000
Arkansas	40	2000
California	50	1991
Connecticut	25	1991
District of Columbia (DC)	45	1996
Florida	30	1994
Georgia	25	1996
Hawaii	50	2000
Illinois	25	2000
Indiana	50	2001
Iowa	50	2000
Kentucky	25	1997
Louisiana	25	1992
Maine	50	1994
Maryland	20	1994
Massachusetts	56	2000
Michigan	40 to 60	2005
Minnesota	25	1993
Mississippi	25	1996
Missouri	40	1998
Montana	25	1996
Nebraska	50	2002
Nevada	25	

*Establishing a Recycling Program*

**GOALS (RECYCLING/REDUCTION/DIVERSION)**

<b>State</b>	<b>Goal (%)</b>	<b>By Year</b>
New Hampshire	40	2000
New Jersey	60	1995
New Mexico	50	2000
New York	50	1997
North Carolina	25	1993
North Dakota	40	
Ohio	25	1994
Oregon	50	2000
Pennsylvania	25	1997
Rhode Island	70	
South Carolina	30	1997
South Dakota	50	2001
Tennessee	25	1995
Texas	40	1994
Vermont	40	2000
Virginia	25	1995
Washington	50	1995
West Virginia	50	2010



**APPENDIX H**  
**POLLUTION PREVENTION OPPORTUNITY**  
**ASSESSMENT WORKSHEETS**

## Appendix H

(Source: The following information is reproduced from the EPA's Facility Pollution Prevention Guide, EPA/600/R-92/088, May 1992)

The worksheets in this appendix were designed to be useful at various point is the development of a pollution prevention program. Table H-1 lists the worksheets and describes the purpose of each.

Since these worksheets are intentionally generic, you may decide to redesign some or all of them to be more specific to your facility once you have your program underway. The checklists in Appendix B, of the above referenced document, contains information that your may find helpful in deciding how to customize these worksheets to fit your situation. Appendix C (also of the above reference document) contains examples of worksheets as they might be customized for a pharmaceutical company.

**TABLE H-1. LIST OF POLLUTION PREVENTION ASSESSMENT WORKSHEETS**

Phase	Number and Title	Purpose/Remarks
<b>Assessment Phase</b>	1. Assessment Overview	Summarizes the overall program.
	2. Site Description	Lists background information about the facility, including location, products, and operations.
	3. Process Information	This is a checklist of process information that can be collected before the assessment effort begins.
	4. Input Materials Summary	Records input material information for a specific production or process area. This includes name, supplier, hazardous component or properties, cost, delivery and shelf-life information, and possible substitutes.
	5. Products Summary	Identifies hazardous components, production rate, revenues, and other information about products.
	6. Waste Stream Summary	Summarizes the information collected for several waste streams. This sheet can be used to prioritize waste streams to assess.
	7. Option Generation	Records options proposed during brainstorming or nominal group technique sessions. Includes the rationale for proposing each option.
	8. Option Description	Describes and summarizes information about a proposed options. Also notes approval of promising options.
<b>Feasibility Analysis Phase</b>	9. Profitability	This worksheet is used to identify capital and operating costs and to calculate the payback period.

## Pollution Prevention Opportunity Assessment Worksheets

Firm _____ Site _____ Date _____	<b>Pollution Prevention Assessment Worksheets</b>  Proj. No. _____	Prepared By _____ Checked By _____ Sheet ____ of ____ Page ____ of ____
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**WORKSHEET**  
**1**

**ASSESSMENT OVERVIEW**

```

graph TD
    A["Establish the Pollution Prevention Program  
• Executive Level Decision  
• Policy Statement  
• Consensus Building"] --> B["Organize Program  
• Name Task Force  
• State Goals"]
    B --> C["Do Preliminary Assessment  
• Collect Data  
• Review Sites  
• Establish Priorities"]
    C -.-> A
    C --> D["Write Program Plan  
• Consider External Groups  
• Define Objectives  
• Identify Potential Obstacles  
• Develop Schedule"]
    D --> E["Do Detailed Assessment  
• Name Assessment Team(s)  
• Review Data and Site(s)  
• Organize and Document Information"]
    E --> F["Define Pollution Prevention Options  
• Propose Options  
• Screen Options"]
    F --> G["Do Feasibility Analyses  
• Technical  
• Environmental  
• Economic"]
    G --> H["Write Assessment Report"]
    H --> I["Implement the Plan  
• Select Projects  
• Obtain Funding  
• Install"]
    I --> J["Measure Progress  
• Acquire Data  
• Analyze Results"]
    J --> K["Maintain Pollution Prevention Program"]
    J --> E
  
```

## Appendix H

Firm _____ Site _____ Date _____	<b>Pollution Prevention Assessment Worksheets</b>  Proj. No. _____	Prepared By _____ Checked By _____ Sheet ____ of ____ Page ____ of ____
<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"> <b>WORKSHEET</b>  <b>2</b> </div> <div style="border: 1px solid black; padding: 5px 20px;"> <b>SITE DESCRIPTION</b> </div> </div>		
<div style="margin-bottom: 5px;"><u>Firm:</u> _____</div> <div style="margin-bottom: 5px;"><u>Plant:</u> _____</div> <div style="margin-bottom: 5px;"><u>Department:</u> _____</div> <div style="margin-bottom: 5px;"><u>Area:</u> _____</div> <div style="margin-bottom: 5px;"><u>Street Address:</u> _____</div> <div style="margin-bottom: 5px;"><u>City:</u> _____</div> <div style="margin-bottom: 5px;"><u>State/Zip Code:</u> _____</div> <div style="margin-bottom: 5px;"><u>Telephone: (    )</u> _____</div> <div style="margin-bottom: 5px;"><u>Major Products:</u> _____ _____</div> <div style="margin-bottom: 5px;"><u>SIC Codes:</u> _____</div> <div style="margin-bottom: 5px;"><u>EPA Generator Number:</u> _____</div> <div style="margin-bottom: 5px;"><u>Major Unit:</u> _____</div> <div style="margin-bottom: 5px;"><u>Product or Service:</u> _____</div> <div style="margin-bottom: 5px;"><u>Operations:</u> _____ _____ _____ _____ _____ _____ _____</div> <div style="margin-bottom: 5px;"><u>Facilities/Equipment Age:</u> _____ _____ _____ _____</div>		



## Pollution Prevention Opportunity Assessment Worksheets

Firm _____ Site _____ Date _____	<b>Pollution Prevention Assessment Worksheets</b>	Prepared By _____ Checked By _____ Sheet ____ of ____ Page ____ of ____				
<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="border: 1px solid black; padding: 5px;"> <b>WORKSHEET 3</b> </div> <div style="border: 1px solid black; padding: 5px;"> <b>PROCESS INFORMATION</b> </div> </div>						
Process Unit/Operation: _____ Operation Type: <input type="checkbox"/> Continuous <input type="checkbox"/> Discrete <input type="checkbox"/> Batch or Semi-Batch <input type="checkbox"/> Other _____						
Document	Status					
	Complete? (Y/N)	Current? (Y/N)	Last Revision	Used in this Report (Y/N)	Document Number	Location
Process Flow Diagram						
Material/Energy Balance						
Design						
Operating						
Flow/Amount Measurements						
Stream						
Analyses/Assays						
Stream						
Process Description						
Operating Manuals						
Equipment List						
Equipment Specifications						
Piping and Instrument Diagrams						
Plot and Elevation Plan(s)						
Work Flow Diagrams						
Hazardous Waste Manifests						
Emission Inventories						
Annual/Biennial Reports						
Environmental Audit Reports						
Permit/Permit Applications						
Batch Sheet(s)						
Materials Application Diagrams						
Product Composition Sheets						
Material Safety Data Sheets						
Inventory Records						
Operator Logs						
Production Schedules						

## Appendix H

Firm _____ Site _____ Date _____	<b>Pollution Prevention Assessment Worksheets</b>  Proj. No. _____	Prepared By _____ Checked By _____ Sheet ____ of ____ Page ____ of ____
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<b>WORKSHEET 4</b>	<div style="border: 1px solid black; display: inline-block; padding: 2px 10px;"> <b>INPUT MATERIALS SUMMARY</b> </div>
------------------------	--

Attribute	Description		
	Stream No. ____	Stream No. ____	Stream No. ____
Name/ID			
Source/Supplier			
Component/Attribute of Concern			
Annual Consumption Rate			
Overall			
Component(s) of Concern			
Purchase Price, \$ per _____			
Overall Annual Cost			
Delivery Mode <sup>1</sup>			
Shipping Container Size & Type <sup>2</sup>			
Storage Mode <sup>3</sup>			
Transfer Mode <sup>4</sup>			
Empty Container Disposal Management <sup>5</sup>			
Shelf Life			
Supplier Would			
– accept expired material? (Y/N)			
– accept shipping containers? (Y/N)			
– revise expiration date? (Y/N)			
Acceptable Substitute(s), if any			
Alternate Supplier(s)			

Notes:

1. e.g., pipeline, tank car, 100 bbl tank truck, truck, etc.
2. e.g., 55 gal drum 100 lb paper bag, tank, etc.
3. e.g., outdoor, warehouse, underground, aboveground, etc.
4. e.g., pump, forklift, pneumatic transport, conveyor, etc.
5. e.g., crush and landfill, clean and recycle, return to supplier, etc.

## Pollution Prevention Opportunity Assessment Worksheets

Firm _____ Site _____ Date _____	<b>Pollution Prevention Assessment Worksheets</b>  Proj. No. _____	Prepared By _____ Checked By _____ Sheet ____ of ____ Page ____ of ____
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<b>WORKSHEET 5</b>	<div style="border: 1px solid black; padding: 5px; display: inline-block;"> <b>PRODUCTS SUMMARY</b> </div>
------------------------	--

Attribute	Description		
	Stream No. _____	Stream No. _____	Stream No. _____
Name/ID			
Component/Attribute of Concern			
Annual Production Rate			
Overall			
Component(s) of Concern			
Annual Revenues, \$ _____			
Shipping Mode			
Shipping Container Size & Type			
Onsite Storage Mode			
Containers Returnable (Y/N)			
Shelf Life			
Rework Possible (Y/N)			
Customer Would			
— relax specification (Y/N)			
— accept larger containers (Y/N)			

## Appendix H

Firm _____ Site _____ Date _____	<b>Pollution Prevention Assessment Worksheets</b>	Prepared By _____ Checked By _____ Sheet ____ of ____ Page ____ of ____
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<b>WORKSHEET 6</b>	<div style="border: 1px solid black; padding: 5px; display: inline-block;"> <b>WASTE STREAM SUMMARY</b> </div>
------------------------	--

Attribute	Description			
	Stream No. _____	Stream No. _____	Stream No. _____	Stream No. _____
Waste ID/Name:				
Source/Origin				
Component or Property of Concern				
Annual Generation Rate (units _____)				
Overall				
Component(s) of Concern				
Cost of Disposal				
Unit Cost (\$ per: _____)				
Overall (per year)				
Method of Management <sup>1</sup>				
Priority Rating Criteria <sup>2</sup>	Relative Wt. (W)	Rating (R)	R x W	Rating (R)
Regulatory Compliance				
Treatment/Disposal Cost				
Potential Liability				
Waste Quantity Generated				
Waste Hazard				
Safety Hazard				
Minimization Potential				
Potential to Remove Bottleneck				
Potential By-product Recovery				
Sum of Priority Rating Scores		Σ(RxW)		Σ(RxW)
Priority Rank				

Notes: 1. For example, sanitary landfill, hazardous waste landfill, on-site recycle, incineration, combustion with heat recovery, distillation, dewatering, etc.

2. Rate each stream in each category on a scale from 0 (none) to 10 (high).

[illegible]

## Appendix H

Firm _____ Site _____ Date _____	<b>Pollution Prevention Assessment Worksheets</b>  Proj. No. _____	Prepared By _____ Checked By _____ Sheet ____ of ____ Page ____ of ____
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<b>WORKSHEET 8</b>	<div style="border: 1px solid black; padding: 5px; display: inline-block;"> <b>OPTION DESCRIPTION</b> </div>
------------------------	--

Option Name: \_\_\_\_\_

Briefly describe the option: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Waste Stream(s) Affected: \_\_\_\_\_  
 \_\_\_\_\_

Input Material(s) Affected: \_\_\_\_\_  
 \_\_\_\_\_

Product(s) Affected: \_\_\_\_\_  
 \_\_\_\_\_

Indicate Type:

☐ **Source Reduction**  
     \_\_\_\_\_ Equipment-Related Change  
     \_\_\_\_\_ Personnel/Procedure-Related Change  
     \_\_\_\_\_ Materials-Related Change  
  
☐ **Recycling/Reuse**  
     \_\_\_\_\_ Onsite      \_\_\_\_\_ Material reused for original purpose  
     \_\_\_\_\_ Offsite     \_\_\_\_\_ Material used for a lower-quality purpose  
                              \_\_\_\_\_ Material sold

Originally proposed by: \_\_\_\_\_ Date: \_\_\_\_\_

Reviewed by: \_\_\_\_\_ Date: \_\_\_\_\_

Approved for study? \_\_\_\_\_ yes \_\_\_\_\_ no By: \_\_\_\_\_

Reason for Acceptance or Rejection \_\_\_\_\_

## Pollution Prevention Opportunity Assessment Worksheets

Firm _____ Site _____ Date _____	<b>Pollution Prevention Assessment Worksheets</b>  Proj. No. _____	Prepared By _____ Checked By _____ Sheet ____ of ____ Page ____ of ____
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**WORKSHEET**  
**9**

**PROFITABILITY**

**Capital Costs**

Purchased Equipment \_\_\_\_\_

Materials \_\_\_\_\_

Installation \_\_\_\_\_

Utility Connections \_\_\_\_\_

Engineering \_\_\_\_\_

Start-up and Training \_\_\_\_\_

Other Capital Costs \_\_\_\_\_

Total Capital Costs \_\_\_\_\_

**Incremental Annual Operating Costs**

Change in Disposal Costs \_\_\_\_\_

Change in Raw Material Costs \_\_\_\_\_

Change in Other Costs \_\_\_\_\_

Annual Net Operating Cost Savings \_\_\_\_\_

Payback Period (in years) =  $\frac{\text{Total Capital Costs}}{\text{Annual Net Operating Cost Savings}}$  = \_\_\_\_\_





**APPENDIX I**  
**ORDERING POLLUTION PREVENTION**  
**PUBLICATIONS**

## ***Appendix I***

This appendix provides a means to order Pollution Prevention Research Branch (PPRB) publications and information from the EPA. The documents listed here were generated through PPRB research, development and demonstration programs, which includes, but is not limited to, the WREAFS program.

In this appendix, each page is an individual ordering form for pollution prevention guides, research summaries and briefs. To obtain a copy of a publication(s), simply fill out the necessary form and send it to the CERI Publication Unit, as indicated. There is no charge for these publications.

Environmental management is a continuously evolving field and the WREAFS Program is committed to generating accurate, useful guidance and tools for federal managers in achieving the goal of environmental compliance with mission accomplishment. To that end, this guide will require regular updates and revision as events dictate. Therefore, this appendix includes a form for joining the WREAFS Mailing List and receiving future updates. The form also allows the reader to request further information about WREAFS and to provide commentary and corrections for the updates being planned for this guide.

To conserve on resources and limit publication waste, future updates will be developed on a section by section basis. That is, when one part of the guide is seen to have been overtaken by events, or contacts have changed (e.g., individual department pollution prevention policies as noted in Appendix J, or State program contacts in Appendix E), WREAFS will revise that section and send it to addressees on the WREAFS Mailing List. Revisions will be individually dated to assist the reader in maintaining current information.

The reader is encouraged to take advantage of the pollution prevention information available. In order to keep information current and to ensure the quality of content in future revisions, the reader is encouraged to offer comments - especially criticism - to improve the guide. The PPRB would also appreciate any case study examples for future publication.

***Ordering Pollution Prevention Publications***

**WREAFS PROGRAM MAILING LIST**

Should any holder of this guide require updates, please fill out this form to be entered on the WREAFS Mailing List. Note: if you did not receive this guide directly from the PPRB officer, you must submit this form to be placed on the WREAFS Mailing List.

**PLEASE RETURN THIS FORM TO:**

The WREAFS Program  
Pollution Prevention Research Branch  
U.S. EPA, Risk Reduction Engineering Laboratory  
26 West Martin Luther King  
Cincinnati, Ohio 45268

-----  
**TO THE POLLUTION PREVENTION RESEARCH BRANCH (PPRB):**

Please include my name and address on the WREAFS mailing list:

Name \_\_\_\_\_  
Address \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

\_\_\_\_\_ I would like to receive additional WREAFS Publications and Federal facility information as it becomes available.

\_\_\_\_\_ My review comments/critique is enclosed.

\_\_\_\_\_ A case study/example of a pollution prevention accomplishment at my facility is enclosed.

## ***Appendix I***

### **P2 PUBLICATIONS**

November 30, 1993

PLEASE PLACE A CHECK NEXT TO THE GUIDES YOU WISH TO ORDER AND MAIL TO:

CERI PUBLICATIONS UNIT, US EPA  
26 W. MARTIN LUTHER KING DRIVE  
CINCINNATI, OH 45268  
(513) 569-7562

#### **GUIDES TO POLLUTION PREVENTION:**

<input type="checkbox"/> THE PESTICIDE FORMULATING INDUSTRY	EPA/625/7-90/004
<input type="checkbox"/> THE PAINT MANUFACTURING INDUSTRY	EPA/625/7-90/005
<input type="checkbox"/> THE FABRICATED METAL PRODUCTS INDUSTRY	EPA/625/7-90/006
<input type="checkbox"/> THE PRINTED CIRCUIT BOARD MANUFACTURING INDUSTRY	EPA/625/7-90/007
<input type="checkbox"/> THE COMMERCIAL PRINTING INDUSTRY	EPA/625/7-90/008
<input type="checkbox"/> SELECTED HOSPITAL WASTE STREAMS	EPA/625/7-90/009
<input type="checkbox"/> RESEARCH AND EDUCATION INSTITUTIONS	EPA/625/7-90/010
<input type="checkbox"/> THE PHOTOPROCESSING INDUSTRY	EPA/625/7-91/012
<input type="checkbox"/> THE AUTO REPAIR INDUSTRY	EPA/625/7-91/013
<input type="checkbox"/> THE FIBERGLASS REINFORCED AND COMPOSITE PLASTICS INDUSTRIES	EPA/625/7-91/014
<input type="checkbox"/> MARINE MAINTENANCE AND REPAIR INDUSTRY	EPA/625/7-91/015
<input type="checkbox"/> THE AUTOMOTIVE REFINISHING INDUSTRY	EPA/625/7-91/016
<input type="checkbox"/> THE PHARMACEUTICAL INDUSTRY	EPA/625/7-91/017
<input type="checkbox"/> METAL CASTING AND HEAT TREATING INDUSTRY	EPA/625/R-92/009
<input type="checkbox"/> METAL FINISHING INDUSTRY	EPA/625/R-92/011
<input type="checkbox"/> MECHANICAL EQUIPMENT REPAIR	EPA/625/R-92/008
<input type="checkbox"/> NON-AGRICULTURAL PESTICIDE USERS	EPA/625/R-93/009

## ***Ordering Pollution Prevention Publications***

### **OTHER MANUALS:**

_____	<b>FACILITY POLLUTION PREVENTION GUIDE</b>	<b>EPA/600/R-92/088</b>
_____	<b>OPPORTUNITIES FOR POLLUTION PREVENTION RESEARCH TO SUPPORT THE 33/50 PROGRAM</b>	<b>EPA/600/R-92/175</b>
_____	<b>LIFE CYCLE DESIGN GUIDANCE MANUAL</b>	<b>EPA/600/R-92/226</b>
_____	<b>LIFE CYCLE ASSESSMENT: INVENTORY GUIDELINES AND PRINCIPLES</b>	<b>EPA/600/R-92/245</b>
_____	<b>POLLUTION PREVENTION CASE STUDIES COMPENDIUM</b>	<b>EPA/600/R-92/046</b>
_____	<b>INDUSTRIAL POLLUTION PREVENTION OPPORTUNITIES FOR THE 1990'S</b>	<b>EPA/600/8-91/052</b>
_____	<b>ACHIEVEMENTS IN SOURCE REDUCTION AND RECYCLING FOR TEN INDUSTRIES IN THE UNITED STATES</b>	<b>EPA/600/2-91/051</b>
_____	<b>BACKGROUND DOCUMENT ON CLEAN PRODUCTS RESEARCH AND IMPLEMENTATION</b>	<b>EPA/600/2-90/048</b>
_____	<b>OPPORTUNITIES FOR POLLUTION PREVENTION RESEARCH TO SUPPORT THE 33/50 PROGRAM</b>	<b>EPA/600/R-92/175</b>
_____	<b>WASTE MINIMIZATION PRACTICES AT TWO CCA WOOD-TREATMENT PLANTS</b>	<b>EPA/600/R-93/168</b>
_____	<b>MEASURING POLLUTION PREVENTION PROGRESS PROCEEDINGS</b>	<b>EPA/600/R-93/151</b>
_____	<b>A PRIMER FOR FINANCIAL ANALYSIS OF POLLUTION PREVENTION PROJECTS</b>	<b>EPA/600/R-93/059</b>
_____	<b>INNOVATIVE CLEAN TECHNOLOGIES CASE STUDIES</b>	<b>EPA/600/R-93/175</b>

### **TO CERL PUBLICATIONS UNIT:**

**PLEASE SEND THE ABOVE GUIDES TO ME AT THE FOLLOWING ADDRESS:**

**NAME**

\_\_\_\_\_

**ADDRESS**

\_\_\_\_\_

\_\_\_\_\_

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## ***Appendix I***

### **PROJECT SUMMARIES / PROJECT REPORTS**

**PLEASE PLACE A CHECK NEXT TO THE GUIDES YOU WISH TO ORDER AND MAIL TO:**

**CERI PUBLICATIONS UNIT, US EPA  
26 W. MARTIN LUTHER KING DRIVE  
CINCINNATI, OH 45268  
(513) 569-7562**

	<u>EPA Document #</u>
<input type="checkbox"/> WMOA Report and Project Summary - Fort Riley, Kansas	EPA/600/S2-90/031
<input type="checkbox"/> WMOA Report and Project Summary - Philadelphia Naval Shipyard	EPA/600/S2-90/046
<input type="checkbox"/> WMOA Report and Project Summary - Coast Guard/ Governor's Island	EPA/600/S2-90/062
<input type="checkbox"/> Management of Household and Small-Quantity-Generator Hazardous Waste in the United States	EPA/600/S2-89/064
<input type="checkbox"/> WMOA Report and Project Summary - Naval Undersea Warfare Engineering Station, Keyport, WA	EPA/600/S2-91/030
<input type="checkbox"/> WMOA Report and Project Summary - Optical Fabrication Laboratory, Fitzsimmons Army Medical Center, Denver, Colorado	EPA/600/S2-91/031
<input type="checkbox"/> WMOA Report and Project Summary - A Truck Assembly Plant	EPA/600/S2-91/038
<input type="checkbox"/> WMOA Report and Project Summary - A Photofinishing Facility	EPA/600/S2-91/039
<input type="checkbox"/> WMOA Report and Project Summary - Scott Air Force Base	EPA/600/S2-91/054
<input type="checkbox"/> Guidance Document for the WRITE Pilot Program with State and Local Governments	EPA/600/S8-89/070
<input type="checkbox"/> Machine Coolant Waste Reduction by Optimizing Coolant Life	EPA/600/S2-90/033
<input type="checkbox"/> Recovery of Metals Using Aluminum Displacement	EPA/600/S2-90/032
<input type="checkbox"/> Metal Recovery/Removal Using Non-Electrolytic Metal Recovery	EPA/600/S2-90/035
<input type="checkbox"/> Evaluation of Five Waste Minimization Technologies at the General Dynamics Pomona Division Plant	EPA/600/S2-91/067
<input type="checkbox"/> An Automated Aqueous Rotary Washer for the Metal Finishing Industry	EPA/600/SR-92/188
<input type="checkbox"/> Automotive and Heavy-Duty Engine Coolant Recycling by Filtration	EPA/600/S2-91/066
<input type="checkbox"/> Automotive and Heavy-Duty Engine Coolant Recycling by Distillation	EPA/600/SR-92/024
<input type="checkbox"/> Onsite Waste Ink Recycling	EPA/600/SR-92/251
<input type="checkbox"/> Diaper Industry Workshop Report	EPA/600/S2-91/018

CONTINUE ON BACK

## ***Ordering Pollution Prevention Publications***

_____	Industrial Pollution Prevention Opportunities for the 1990s	EPA/600/S8-91/052
_____	Hospital Pollution Prevention Case Study	EPA/600/S2-91/024
_____	Waste Minimization Audits at Generators of Corrosive and Heavy Metal Wastes	EPA/600/S2-87/055
_____	Waste Minimization Audit Report: Case Studies of Minimization of Cyanide Waste from Electroplating Operations	EPA/600/S2-87/056
_____	Waste Minimization Audit Report: Case Studies of Minimization of Solvent Waste from Parts Cleaning and From Electronic Capacitor Manufacturing Operations	EPA/600/S2-87/057
_____	Waste Minimization in the Printed Circuit Board Industry - Case Studies	EPA/600/S2-88/008
_____	Waste Minimization Audit Report: Case Studies of Minimization of Solvent Wastes and Electroplating Wastes at a DOD Installation	EPA/600/S2-88/010
_____	Waste Minimization Audit Report: Case Studies of Minimization of Mercury-Bearing Wastes at a Mercury Cell Chloralkali Plant	EPA/600/S2-88/011
_____	Waste Minimization in the Printed Circuit Board Industry - Case Study	EPA/600/S2-88/008
_____	Pollution Prevention Opportunity Assessment: USDA Beltsville Agricultural Research Center, Beltsville, Maryland	EPA/600/SR-93/008
_____	Pollution Prevention Opportunity Assessment for Two Laboratories at Sandia National Laboratories	EPA/600/SR-93/015
_____	Ink and Cleaner Waste Reduction Evaluation for Flexographic Printers	EPA/600/SR-93/086
_____	Mobile Onsite Recycling of Metalworking Fluids	EPA/600/SR-93/114
_____	Evaluation of Ultrafiltration to Recover Aqueous Iron Phosphating/Degreasing Bath	EPA/600/SR-93/144
_____	Recycling Nickel Electroplating Rinse Waters by Low Temperature Evaporation and Reverse Osmosis	EPA/600/SR-93/160
_____	A Fluid Sorbent Recycling Device for Industrial Fluid Users	EPA/600/SR-93/154

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## ***Appendix I***

### **ENVIRONMENTAL RESEARCH BRIEFS**

**PLEASE PLACE A CHECK NEXT TO THE GUIDES YOU WISH TO ORDER AND MAIL TO:**

**CERI PUBLICATIONS UNIT, US EPA  
26 W. MARTIN LUTHER KING DRIVE  
CINCINNATI, OH 45268  
(513) 569-7562**

**Waste Minimization Assessment for a:**

<input type="checkbox"/>	Manufacturer of Printed Plastic Bags	EPA/600/M-90/017
<input type="checkbox"/>	Metal Parts Coating Plant	EPA/600/M-91/015
<input type="checkbox"/>	Manufacturer of Outdoor Illuminated Signs	EPA/600/M-91/016
<input type="checkbox"/>	Manufacturer of Rebuilt Railway Cars and Components	EPA/600/M-91/017
<input type="checkbox"/>	Manufacturer of Brazed Aluminum Oil Coolers	EPA/600/M-91/018
<input type="checkbox"/>	Manufacturer of Heating, Ventilating, and Air Conditioning Equipment	EPA/600/M-91/019
<input type="checkbox"/>	Bumper Refinishing Plant	EPA/600/M-91/020
<input type="checkbox"/>	Multilayered Printed Circuit Board Manufacturing	EPA/600/M-91/021
<input type="checkbox"/>	Manufacturer of Printed Circuit Boards	EPA/600/M-91/022
<input type="checkbox"/>	Paint Manufacturing Plant	EPA/600/M-91/023
<input type="checkbox"/>	Manufacturer of Compressed Air Equipment Components	EPA/600/M-91/024
<input type="checkbox"/>	Manufacturer of Aluminum Cans	EPA/600/M-91/025
<input type="checkbox"/>	Manufacturer of Refurbished Railcar Bearing Assemblies	EPA/600/M-91/044
<input type="checkbox"/>	Manufacturer of Prototype Printed Circuit Boards	EPA/600/M-91/045
<input type="checkbox"/>	Manufacturer of Speed Reduction Equipment	EPA/600/M-91/046
<input type="checkbox"/>	Manufacturer of Printed Labels	EPA/600/M-91/047
<input type="checkbox"/>	Manufacturer of Chemicals	EPA/600/S-92/004
<input type="checkbox"/>	A Dairy	EPA/600/S-92/005
<input type="checkbox"/>	Manufacturer of Metal-Cutting Wheels and Components	EPA/600/S-92/006
<input type="checkbox"/>	Manufacturer of Automotive Air Conditioning Condensers and Evaporators	EPA/600/S-92/007
<input type="checkbox"/>	Printed Circuit Board Manufacturer	EPA/600/S-92/008
<input type="checkbox"/>	Manufacturer of Components for Automobile Air Conditioners	EPA/600/S-92/009
<input type="checkbox"/>	Manufacturer of Aluminum Extrusions	EPA/600/S-92/010
<input type="checkbox"/>	Manufacturer Producing Galvanized Steel Parts	EPA/600/S-92/011



## ***Ordering Pollution Prevention Publications***

_____	Manufacturer of Commercial Ice Machines and Ice Storage Bins	EPA/600/S-92/012
_____	Manufacturer of Water Analysis Instrumentation	EPA/600/S-92/013
_____	Manufacturer of Can-Manufacturing Equipment	EPA/600/S-92/014
_____	Manufacturer of Metal Bands, Clamps, Retainers, and Tooling	EPA/600/S-92/015
_____	Manufacturer of Permanent-Magnet DC Electric Motors	EPA/600/S-92/016
_____	Manufacturer of Military Furniture	EPA/600/S-92/017
_____	Aluminum Extrusions Manufacturer	EPA/600/S-92/018
_____	Manufacturer of Metal-Plated Display Racks	EPA/600/S-92/019
_____	Manufacturer of Motor Vehicle Exterior Mirrors	EPA/600/S-92/020
_____	Manufacturer of Sheet Metal Cabinets and Precision Metal Parts	EPA/600/S-92/021
_____	Manufacturer Producing Treated Wood Products	EPA/600/S-92/022
_____	Manufacturer of Industrial Coatings	EPA/600/S-92/028
_____	Manufacturer of Cutting and Welding Equipment	EPA/600/S-92/029
_____	Manufacturer of Finished Metal Components	EPA/600/S-92/030
_____	Manufacturer of Machined Parts	EPA/600/S-92/031
_____	Manufacturer of Injection-Molded Car and Truck Mirrors	EPA/600/S-92/032
_____	Manufacturer Producing Printed Circuit Boards	EPA/600/S-92/033
_____	Manufacturer of Custom Molded Plastic Products	EPA/600/S-92/034
_____	Manufacturer of Sheet Metal Components	EPA/600/S-92/035
_____	Manufacturer of Silicon-Controlled Rectifiers and Schottky Rectifiers	EPA/600/S-92/036
_____	Manufacturer of Penny Blanks and Zinc Products	EPA/600/S-92/037
_____	Manufacturer of Baseball Bats and Golf Clubs	EPA/600/S-93/007
_____	Manufacturer of Product Carriers and Printed Labels	EPA/600/S-93/008
_____	Manufacturer of Rotogravure Printing Cylinders	EPA/600/S-93/009

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## **Appendix I**

### **New Jersey Research Briefs**

**PLEASE PLACE A CHECK NEXT TO THE BRIEFS YOU WISH TO ORDER AND MAIL TO:**

**CERI PUBLICATIONS UNIT, US EPA  
26 W. MARTIN LUTHER KING DRIVE  
CINCINNATI, OH 45268  
(513) 569-7562**

#### **Waste Reduction Activities and Options for a:**

<input type="checkbox"/>	<b>Printer of Forms and Supplies for the Legal Profession</b>	<b>EPA/600/S-92/003</b>
<input type="checkbox"/>	<b>Nuclear Powered Electrical Generating Station</b>	<b>EPA/600/S-92/025</b>
<input type="checkbox"/>	<b>State DOT Maintenance Facility</b>	<b>EPA/600/S-92/026</b>
<input type="checkbox"/>	<b>Local Board of Education in New Jersey</b>	<b>EPA/600/S-92/027</b>
<input type="checkbox"/>	<b>Manufacturer of Finished Leather</b>	<b>EPA/600/S-92/039</b>
<input type="checkbox"/>	<b>Manufacturer of Paints Primarily for Metal Finishing</b>	<b>EPA/600/S-92/040</b>
<input type="checkbox"/>	<b>Manufacturer of Writing Instruments</b>	<b>EPA/600/S-92/041</b>
<input type="checkbox"/>	<b>Manufacturer of Room Air Conditioning Units and Humidifiers</b>	<b>EPA/600/S-92/042</b>
<input type="checkbox"/>	<b>Autobody Repair Facility</b>	<b>EPA/600/S-92/043</b>
<input type="checkbox"/>	<b>Fabricator and Finisher of Steel Computer Cabinets</b>	<b>EPA/600/S-92/044</b>
<input type="checkbox"/>	<b>Manufacturer of Artists' Supply Paints</b>	<b>EPA/600/S-92/045</b>
<input type="checkbox"/>	<b>Manufacturer of Wire Stock Used for Production of Metal Items</b>	<b>EPA/600/S-92/046</b>
<input type="checkbox"/>	<b>Manufacturer of Commercial Refrigeration Units</b>	<b>EPA/600/S-92/047</b>
<input type="checkbox"/>	<b>Transporter of Bulk Plastic Pellets</b>	<b>EPA/600/S-92/048</b>
<input type="checkbox"/>	<b>Manufacturer of Electroplated Wire</b>	<b>EPA/600/S-92/049</b>
<input type="checkbox"/>	<b>Manufacturer of Systems to Produce Semiconductors</b>	<b>EPA/600/S-92/050</b>
<input type="checkbox"/>	<b>Remanufacturer of Automobile Radiators</b>	<b>EPA/600/S-92/051</b>
<input type="checkbox"/>	<b>Manufacturer of Fire Retardant Plastic Pellets and Hot Melt Adhesives</b>	<b>EPA/600/S-92/052</b>
<input type="checkbox"/>	<b>Printing Plate Preparation Section of a Newspaper</b>	<b>EPA/600/S-92/053</b>
<input type="checkbox"/>	<b>Manufacturer of General Purpose Paints and Painting Supplies</b>	<b>EPA/600/S-92/054</b>

***Ordering Pollution Prevention Publications***

___	Manufacturer of Fine Chemicals Using Batch Processes	EPA/600/S-92/055
___	Laminator of Paper and Cardboard Packages	EPA/600/S-92/056
___	Manufacturer of Hardened Steel Gears	EPA/600/S-92/057
___	Scrap Metal Recovery Facility	EPA/600/S-92/058
___	Manufacturer of Electroplating Chemical Products	EPA/600/S-92/059
___	Manufacturer of Plastic Containers by Injection Molding	EPA/600/S-92/060
___	Fossil Fuel-Fired Electrical Generating Station	EPA/600/S-92/061
___	Manufacturer of Commercial Dry Cleaning Equipment	EPA/600/S-92/062
___	Electrical Utility Transmission System Monitoring and Maintenance Facility	EPA/600/S-92/063
___	Manufacturer of Orthopedic Implants	EPA/600/S-92/064

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**APPENDIX J**  
**FEDERAL AGENCY POLLUTION PREVENTION**  
**PROGRAMS**

## ***Appendix J***

### **Note on the Preparation of Appendix J**

The following agencies were contacted during preparation of this report under the assumption that they would be the most likely to have begun Pollution Prevention programs because of the nature of their operations.

#### **Agencies Described in Detail in Appendix J**

Department of Defense -- Air Force, Army, Navy

Department of Energy

Department of the Interior

Department of Justice

National Aeronautic Space Administration

Postal Service

Department of Transportation -- Coast Guard

#### **Agencies in the Process of Developing Programs**

Department of Agriculture

Department of Health and Human Services -- Food and Drug Administration

General Services Administration

National Security Agency

#### **Agencies With Limited Action as of September, 1993**

Central Intelligence Agency

Department of Commerce -- National Oceanic and Atmospheric Administration

Economic Development Administration

Tennessee Valley Authority

Department of Transportation -- Federal Aviation Administration, Federal Highway Administration, Maritime Administration

Department of the Treasury

Department of Veterans Affairs

## DEPARTMENT OF DEFENSE -- U.S. AIR FORCE

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**Mission:** To organize, train, and equip active duty and reserve forces for the preservation of peace, national security and defense. The Air Force's mission focuses on air operations.

**Statement of Commitment:** The Air Force Pollution Prevention Policy sets forth guidelines for the operation and management of a Pollution Prevention Program (PPP). The Program reduces hazardous and toxic materials and wastes by means of source reduction and environmentally sound recycling at Air Force installations. PPP also involves efforts to improve personnel awareness regarding installation operations that pollute so that actions to improve environmental compliance can be taken.

**Pollution Prevention Goals:** The Air Force has established quantitative goals for waste reduction and affirmative procurement. The goals include:

- By the end of 1993, reduce municipal solid waste disposal by 10% from 1992 baseline;
  - At least 10% of all nonpaper products and 50% of all paper products procured shall contain recycled material.
- By the end of 1996, reduce purchases of EPA 17 Industrial Toxics by 50% from 1992 baseline.
  - Reduce hazardous waste disposal by 25% from 1992 baseline;
  - Reduce municipal solid waste disposal by 30% from 1992 baseline.
- By the end of 1997, reduce municipal solid waste disposal by 50% from 1992 baseline;
- By the end of 1999, reduce hazardous waste disposal by 50% from 1992 baseline.
  - Reduce volatile air emissions by 50% from 1993 baseline.

**Program  
Planning  
Required?**

**YES!**

**"...pollution prevention provides every installation with the opportunity to achieve environmental compliance in a more efficient manner."**

♦ US Air Force Installation Pollution Prevention Program Manual, 1992

## **DEPARTMENT OF DEFENSE -- U.S. AIR FORCE**

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A partial list of the qualitative goals and sub-objectives follows.

### **Objectives:**

- ◆ **Reduce hazardous materials in new weapons and existing weapons systems, at installation and GOCOs.**
  - ◆ **Acquire and apply state of the art pollution prevention technologies.**
  - ◆ **Establish a pollution prevention investment strategy.**
- Reduce the use of hazardous materials in all phases of new weapons systems from concept through production, deployment, an ultimate disposal; find alternative materials and processes, and measure their life cycle costs.
    - By the end of 1994, institutionalize pollution prevention including hazardous materials minimization and management into the system acquisition process through the use of policies, procedures, training, contract provisions, and Federal Acquisition Regulation changes.
  - Reduce the use of hazardous materials in existing weapons systems by finding less hazardous materials and processes and integrating them into TOs, MILSPECS, and MILDSTDS.
    - By the end of 1993, implement proactive procurement policies and practices to integrate environmental performance into the current approach to purchase recycled materials to the maximum extent practical, and requiring purchasing activities to use environmental performance of vendors and products as selection criteria for awarding procurement contracts.
    - By the end of 1993, prioritize the hazardous material TOs, MILSPECS, and MILSTDS for existing weapon systems for review.
    - By the end of 1995, complete implementation of a hazardous material identification and tracking capability at the Air Logistics Centers, and by the end of 1996 export it to the rest of the Air Force.
  - Reduce hazardous materials use and waste generation at installations and GOCO facilities.
    - By the end of 1992, develop installation and GOCOs Pollution Prevention Plans.
    - By the end of 1993



*Federal Agency Pollution Prevention Programs*

**DEPARTMENT OF DEFENSE -- U.S. AIR FORCE**

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- Establish baseline for volatile and other air emissions.
- Characterize installation waste streams to all media.
- Reduce municipal solid waste disposal by 10% from 1992 baseline.
- Inventory all existing processes and systems which use hazardous materials/generate hazardous wastes.
- At least 10% of all non-paper products and 50% of all paper products procured shall contain recycled material.
- Acquire world class pollution prevention technologies and distribute them throughout the Air Force.
- Apply new technology to pollution prevention.
  - Develop an Environmental Strategic Research, Development, and Acquisition Plan to identify the technologies needed to achieve pollution prevention.
- Establish an investment strategy in the Air Force to fund the pollution prevention program.

**"Our goal is to prevent future pollution by reducing use of hazardous materials and releases of pollutants into the environment to as near zero as feasible."**

♦ Air Force Pollution Prevention Memorandum

**Agency-specific Requirements:** In accordance with the Pollution Prevention Act of 1990, the Air Force requires all units, installations, and facilities worldwide (including Air Force units in unified commands, the Air Force Reserve, the Air National Guard, Government Owned-Government Operated facilities, and Government Owned-Contractor operated facilities) to develop waste reduction plans and recycling programs.

**DEPARTMENT OF DEFENSE -- U.S. AIR FORCE**

**Pollution Prevention Management Plan Content:** Pollution Prevention Management Plans (PPMP) to be developed at each installation will provide overall strategy that addresses the following areas:

- The installation's pollution prevention goals, objectives, strategies, (technologies and status), program scope, and projects
- The selection criteria and prioritizing scheme for equipment upgrades and facility projects
- A summary of prevention opportunities
- Procedures to measure reductions
- Methods for tracking and reporting progress

PPMPs should address each of the following applicable sections:

- Industrial, maintenance, and cleanup operations:
  - Hazardous waste
  - Air emissions
  - Industrial wastewater, sanitary wastewater, stormwater
  - Other wastes
- Municipal solid waste
- Nonpoint source pollution
- Hazardous materials
- Integration with existing programs:
  - Comprehensive planning
  - Energy conservation
  - Natural resources
  - Water conservation
  - Spill prevention and response
  - Installation Restoration Program
  - Pest management
  - Noise abatement
- Education and incentives

## DEPARTMENT OF DEFENSE -- U.S. ARMY

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**Mission:** To organize, train, and equip active duty and reserve forces for the preservation of peace, national security and defense. The Army's mission focuses on land operations. In addition, the Army administers programs aimed at protecting the environment, improving waterway navigation, flood and beach erosion control, and water resources development.

**Statement of Commitment:** The Army's *Environmental Strategy into the 21st Century* defines the Army's environmental vision: to be a national leader in environmental and natural resource stewardship for present and future generations as an integral part of the Army's mission. Pollution prevention is one of the strategy's four major components (compliance, restoration, prevention, conservation).

**Pollution Prevention Goals:** The DoD has already reached its goal of reducing hazardous waste generation by 50% from 1985 disposal levels. DoD has not yet finalized new source reduction goals, in the interim, the Army's focus is on "continuous improvement". As outlined in the Strategy, qualitative pollution prevention goals include:

- Use a holistic approach to pollution prevention which looks at all environmental media collectively.
  - Establish an investment strategy to fund the Pollution Prevention Program.
  - Establish pollution prevention partnerships with industry, the public, and special interest groups
  - Acquire world class pollution prevention technology and capability, and distribute Armywide.
  - Reduce energy use, maximize energy efficiency, and reduce pollutants from energy and fuel sources.
- Systematically eliminate hazardous materials use and operations or processes that produce hazardous/solid waste and other emissions.
  - Meet DoD goals on HW and SW reduction at installations and GOCOs (CONUS and OCONUS).

**The philosophy is simple: you don't have a problem if you don't pollute."**

♦ Michael P.W. Stone,  
Secretary of the Army

**DEPARTMENT OF DEFENSE -- U.S. ARMY**

**"Programs and actions will be ...carried out in such a way as to prevent, minimize or mitigate degradation of the environment or endangerment of human health"**

- Reduce or eliminate hazardous or environmentally unacceptable materials in new weapon system acquisition programs.
- Reduce or eliminate hazardous or environmentally unacceptable materials in existing weapon systems management.
- Minimize environmental risks to operating personnel and visitors at Army civil works facilities.
  - Adopt operating procedures for all equipment which reduce or eliminate waste.
  - Communicate environmental values to visitors at all project sites.
  - Establish and apply rules which meet national environmental, health, and safety standards.
- Instill the pollution prevention ethic throughout the entire Army community and all mission areas.
  - Obtain command support and involvement.
  - Integrate environmental health and safety concerns into all Army operations and activities.
  - Develop multidirectional, open communications through comprehensive public affairs planning.

◆ AR 200-1

**Agency-Specific Requirements:** Although the Strategy strongly encourages installations to develop and implement pollution prevention plans and programs, it does not specifically require them to do so. DoD directive 4210.15, Hazardous Material Pollution Prevention, mandates that "a hazardous material shall be selected, used, and managed over its life-cycle so that the DoD incurs the lowest costs required to protect health and the environment." To implement DoD 4210.15, the Army has incorporated pollution prevention considerations in its environmental regulation, AR 200-1.

**Pollution Prevention Plan Content:** Although the Army has not required installations to prepare pollution prevention plans, the Army Environmental Policy Institute has prepared a guidance document explaining how to prepare a plan.

## U.S. DEPARTMENT OF ENERGY

**Mission:** To support the Federal government in implementing the National Energy Plan through coordination and administration of long term high risk development of energy technologies. Responsibilities include marketing federal energy power, energy conservation, nuclear weapons, and central energy data collection and analysis.

**Statement of Commitment:** The DOE waste minimization mission is:

"To develop, promote, and implement cost-effective waste minimization technologies, practices, and policies, in conjunction with partners in government and industry; to conduct the Department's operations in a legally and regulatorily compliant and environmentally sound manner through reducing pollution; and to improve the economic competitiveness, energy security, and environmental quality of the Nation."

**Pollution Prevention Goals:** In May, 1992, the Secretary of Energy released the DOE's Waste Minimization Crosscut Plan. The Plan sets forth a Department-wide planning structure for coordinating all DOE waste minimization activities. Furthermore, the plan reaffirms the DOE's commitment to expand use of waste minimization technologies, processes, and methods in DOE operations as well as to the mission of assisting U.S. business and industry with their waste minimization activities.

The DOE has not established quantitative goals at the time of this writing. Seven key objectives are outlined in the Waste Minimization Crosscut Plan. The objectives are:

- Culture Change - Create a DOE culture that fosters the philosophy of conserving resources and minimizing waste.
- Identify Waste Minimization Options - Foster environmental compliance and reduce waste management costs and environmental impacts for DOE operations by identifying, developing, implementing, and reporting on WMin options.
- Goal Setting - Develop and implement specific WMin goals for DOE's production, laboratory, and restoration operations. Each Program Senior Official organization will iden-

**Program  
Planning  
Required?**

**YES!**

**"Our course is clear. It is time for a fundamental shift in emphasis in the way the DOE generates and manages waste -- from pollution control to pollution prevention."**

♦ Secretary of Energy,  
James. D. Watkins, Waste  
Minimization and Pollution  
Prevention Policy  
Memorandum, August 20,  
1992

**U.S. DEPARTMENT OF ENERGY**

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**"High priority should be placed on waste minimization and pollution prevention within the DOE. This is one where a modest relative investment now, can significantly impact future cost to the Department for waste treatment, storage, and disposal...all DOE programs that are waste generators should have well-developed programs and request resources consistent with the desire to make near term investments for long-term savings..."**

Secretary O'Leary  
FY 95 IRB Guidance

**"All DOE Program Offices and Field Operations are required to institute a waste reduction policy to reduce the total amount of waste that is generated...through waste minimization."**

♦ DOE Waste Reduction  
Policy Statement

tify such goals and supporting operations within its area of responsibility.

- Identify and Develop Technologies and Exchange Information - Enhance the effectiveness of WMin by developing and exchanging applicable technologies and information.
- Waste Minimization in Design, Development, and Production - Ensure that WMin principles are applied to and included in the design, development, and production of all products.
- Increase Competitiveness of US Industry - Increase competitiveness of US industry through implementation of WMin to meet National Energy Strategy Goals.
- Positive Credible Image - Establish a positive, credible DOE public image with respect to WMin matters.

**Agency-specific Requirements:** The Waste Minimization and Pollution Prevention Policy Memorandum released August 20, 1992 makes DOE and DOE-contractor managers accountable for implementing policies, plans, and programs to promote pollution prevention. Specifically, managers are required to:

- Emphasize WMin practices, wherever possible;
- Separately identify and provide for sufficient resources, both funding and personnel, to carry out the assessment, development, and implementation of programs to meet the Department's WMin and pollution prevention goals; and
- Ensure that WMin and pollution prevention accomplishments and awareness are incorporated into training and incentive programs.

The Waste Minimization and Pollution Prevention Executive Board established by SEC-37-92 shall implement the DOE Waste Minimization Crosscut Plan and:

- Oversee development of consistent, Department-wide programs and objectives for WMin and pollution prevention;

**U.S. DEPARTMENT OF ENERGY**

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- Oversee setting of WMin and pollution prevention goals;
- Establish reporting and tracking systems for WMin and pollution prevention milestones;
- Formulate a strategy for inclusion of WMin and pollution prevention requirements in Departmental contract and procurement activities;
- Assure Department-wide compliance with applicable Executive Orders and environmental laws and regulations pertaining to WMin and pollution prevention; and
- Report annually to the Secretary of Departmental progress in WMin and pollution prevention.

**Other Requirements:** A Secretarial Memorandum issued in September, 1992 formalized DOE's participation in the EPA's 33/50 Program and initiated TRI Reporting under Section 313 of the Emergency Planning and Community Right to Know Act.

DOE 5820.2A Radioactive Waste Management establishes policies, guidelines and radioactive, mixed waste and contaminated facilities requirements. It requires Waste Management Plans with indication of actions to minimize hazardous waste generation and establishes an Annual Waste Reduction Report.

DOE 5400.1 General Environmental Protection Program establishes environmental protection program requirements and responsibilities and instituted Process Waste Assessments. This order requires Waste Minimization Program Plans, an Annual Waste Reduction/Minimization Report, and a Pollution Prevention Awareness Program.

**U.S. DEPARTMENT OF ENERGY**

DOE 5400.1, General Environmental Protection Program, requires each Head of Field Organization to prepare a waste minimization program plan. The program plan includes:

- Goals for minimizing the volume and toxicity of all wastes that are generated, with annual reductions if programmatic requirements allow.
- A summary of waste reduction achieved in comparison to the previous year.
- A description of the proposed treatment, storage, and disposal options that will accomplish waste minimization that are technically and economically practicable.

The Plan shall be reviewed annually and updated every 3 years.

In addition, Heads of Field Organizations are required to prepare Pollution Prevention Awareness Programs. All pollution prevention mission statements and project plans shall include program description including employee awareness training, special awareness campaigns, and incentives and award programs. The plan shall be reviewed annually and updated every 3 years.



**U.S. DEPARTMENT OF INTERIOR -- NATIONAL PARK SERVICE**

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**Mission:** To conserve the scenery, natural and historic objects and wildlife of the National Park System to ensure their enjoyment by future generations.

**Statement of Commitment:** Signed on December 14, 1992, the Department of Interior's (DOI) Order No. 3158 establishes a comprehensive approach to waste management. The Order commits the Department to adopting a waste management strategy founded on prevention and source reduction. The Interim Acquisition Policy Release issued in March 1992, establishes an affirmative procurement program for all bureaus and offices within DOI.

**Pollution Prevention Goals:** The (National Park Service) NPS has not established quantitative goals, instead, each park is responsible for determining goals and measures of program success.

**Agency-Specific Requirements:** The NPS initiated an Integrated Solid Waste Alternative Program (ISWAP) in March 1991 (Special Directive 91-1). Under ISWAP each park must develop an Integrated Solid Waste Alternative Plan to meet its needs. ISWAP's program elements include source reduction, recycling, and outreach.

Yosemite National Park prepared a Waste Reduction Action Plan as part of the President's Commission on Environmental Quality, Solid Waste Task Force. The Plan identifies 32 waste reduction initiatives which various organizations within the Park have agreed to implement. The initiatives fall under three broad areas:

- Education - educate the public, frequently used suppliers, and employees about the benefits of source reduction and recycling to increase recycling rates and identify further source reduction ideas.
- Procurement - increase purchase and use of recycled content products (e.g., modifying contract language to promote the use of recycled content products).
- Oversight - reinforce management commitment to pollution prevention.

**"...if visitation levels continue to increase at the current rate, the amount of solid waste generated in Yosemite National Park will grow to more than 5,000 tons per year by early in the next century"**

♦ Waste Reduction in Yosemite National Park: An Action Plan 1993

## Appendix J

# U.S. DEPARTMENT OF INTERIOR -- NATIONAL PARK SERVICE

Integrated Solid Waste Alternative Plan: The ISWAP encourages park managers to custom design their Plans to be consistent with the park's demographic and waste stream characteristics and federal, state, and local requirements. As such, rather than specifying the content of the Plan, the *ISWAP Manager's Guide* explains general source reduction and recycling principles for park managers to consider. The ISWAP recommends that parks carry out the following activities in developing the Plan (partial list):

- Identify ways to accomplish source reduction and to minimize waste including reuse of existing materials.
- Survey the solid waste stream and determine which materials are recyclable.
- Identify markets for recyclables.
- Compost leaves, grass clippings, and saw dust where possible.
- Establish recycling programs in employee housing areas and park campgrounds/picnic areas.
- Use and promote the use of recycled products.
- Share successes through the Maintenance Newsletter.

***Federal Agency Pollution Prevention Programs***

**U.S. DEPARTMENT OF JUSTICE -- FEDERAL BUREAU OF PRISONS**

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**Mission:** To protect society by confining offenders in the controlled environments of prisons and community based facilities.

**Statement of Commitment:** The Department of Justice (DOJ) has not finalized its Pollution Prevention Policy; however, the Federal Bureau of Prisons Operations Memorandum No. 034-92 (1640), dated February 2, 1992, establishes a comprehensive environmental awareness/pollution prevention strategy focused primarily on source reduction, recycling, and an affirmative procurement program. The Memorandum was issued in response to Executive Order 12780, Federal Recycling and the Council on Federal Recycling and Procurement Policy.

**Pollution Prevention Goal:** The Bureau of Prisons has not established quantitative goals.

**Agency-specific Requirements:** The Bureau of Prisons requires all facilities, departments, and offices to establish comprehensive Environmental Awareness/Pollution Prevention programs to institute source reduction techniques and sound recycling practices. In addition, each facility and administrative office must develop a cost effective Affirmative Procurement Program.

The Environmental Awareness/Pollution Prevention program should include four elements:

- During procurement procedures, efforts will be made to purchase items which promote recycling and/or source reduction.
- Examine areas where conservation initiatives can be implemented and waste reduction measures employed.
- Initiate a viable cost effective recycling program incorporating specific core recycling items.
- Establish an institution environmental committee as described to address the environmental concerns and recycling activities.

**"...these initiatives are intended to promote the sustainable use of our nation's resources, protect human health and preserve the environment."**

◆ Operations Memorandum  
No. 034-92

## **NATIONAL AERONAUTICS AND SPACE ADMINISTRATION**

### **Achievements**

- **Pollution Prevention Program Plan**
- **Towpreg Study**
- **Material Tracking System**

**Mission:** To increase the knowledge and capability of the United States in a full range of aeronautics disciplines and in selected space disciplines.

**Statement of Commitment:** Although NASA has not developed an agency-wide pollution prevention policy, several facilities have undertaken pollution prevention projects. The NASA-Langley Research Center (LaRC) in Hampton, Virginia is a participant in the Tidewater Interagency Pollution Prevention Program (TIPPP). LaRC has prepared a pollution prevention program plan and is expanding its program.

**Pollution Prevention Goal:** LaRC has not established quantitative goals.

**Agency-specific Activities:** The LaRC pollution prevention program plan:

- Illustrated how to develop a pollution prevention program plan so that the program can be updated periodically to identify new opportunities and assess the performance of existing pollution prevention techniques
- Developed a baseline of LaRC's most significant chemical uses, activities, waste streams and environmental issues
- Established criteria for ranking pollution prevention opportunities
- Identified more than 50 pollution prevention opportunities, ranging from a chemical materials management system to cardboard recycling
- Developed an implementation plan for the Center
- Created a Recycling Program and an Affirmative Procurement Program for the Center.

**Projects:** Projects underway include developing a material tracking system to allow the center to track materials from delivery through waste removal; follow-up research in devising less hazardous ways to impregnate carbon fibers with dry powder resin by using powdered polymers to coat fibers in composite materials for use in subsonic and supersonic aircraft applications (Towpreg Study).

## *Federal Agency Pollution Prevention Programs*

### **U.S. POSTAL SERVICE**

**Mission:** To provide prompt, reliable, and efficient postal services to all communities.

**Statement of Commitment:** The Postal Service is committed to a nationwide pollution prevention program designed to improve environmental quality and set a positive example for residents and private businesses in every community we serve. Waste reduction, a major component of that program, involves implementing practices that will reduce or eliminate hazardous and nonhazardous wastes before these wastes are generated. Reducing waste requires managers to reexamine how they order products and how they use those products and component materials.

**Pollution Prevention Goal:** The Postal Service has an overall goal to reduce waste 25% from 1992 levels by December 1993, and an additional 25% by December 1995.

**Agency-specific Requirements:** In accordance with Executive Order 12780 of October 31, 1991, Federal Agency Recycling and the Council on Federal Recycling and Procurement Policy, Section 6002 of RCRA, and the Pollution Prevention Act of 1990, the USPS requires all administrative and operational activities to develop waste reduction plans and recycling programs.

**Program  
Planning  
Required?**

**YES!**

**"By implementing a strong waste reduction program, the Postal Service can reduce costs, paperwork, liability, and pollution, as well as create a cleaner, safer, and more efficient work environment."**

◆ USPS Waste Reduction Guide 1992

**Waste Reduction Plans:** Waste reduction plans should include the following elements:

- Wastestream assessment
- Opportunities and priorities
- Identification of waste reduction approaches
- Feasibility analyses
- Facility-specific annual goals
- An annual review of achievements resulting from program tracking and measurement

**Recycling Program Development:** Each facility should:

- Build a recycling team
- Conduct a waste stream assessment
- Select the best recycling methods
- Understand principles of collection, storage, and transfer

**Appendix J**

**DEPARTMENT OF TRANSPORTATION -- U.S. COAST GUARD**

**Program  
Planning  
Required?**

**NO!**

**"The key to the success of this program is thorough integration and effective implementation of pollution prevention practices Coast Guard-wide."**

◆ USCG Memorandum 11019

**Mission:** To patrol the waters of the United States and conduct activities related to the enforcement of maritime law, public safety, waterway management, and ports safety.

**Statement of Commitment:** Coast Guard is in the process of finalizing a Pollution Prevention Policy statement. A Memorandum issued September 21, 1992 establishes a Pollution Prevention Steering Committee and gives the Committee a Charter to develop a comprehensive pollution prevention program.

**Pollution Prevention Goal:** The Coast Guard has not set quantitative goals.

**Agency-specific Requirements:** The Charter gives the Committee the responsibility for developing a comprehensive pollution prevention program for the Coast Guard. The Committee has four working groups. A summary of the working groups and their missions follows.

*Hazardous Material Management and Control* - minimize use of hazardous material in Coast Guard procurement, operations, and maintenance evolutions; control required hazardous material use throughout the life cycle to protect personnel and eliminate releases to the environment.

Actions include: reviewing hazardous material inventory and identifying substitutes.

*Solid Waste Management Working Group* - minimize solid waste disposal in the Coast Guard through source reduction and recycling; ensure procurement of recycled materials where practical; oversee transfer of recycling funds to Coast Guard Morale, Recreation, and Welfare Activities.

Actions include: developing actions based on Executive Order 12780 and DLA/Navy policy.

*Hazardous Waste Management* - where hazardous material must be used, find ways to recover, recycle, treat, or destroy hazardous material to minimize hazardous waste disposal; determine and track progress of hazardous waste generation; ensure proper management.

***Federal Agency Pollution Prevention Programs***

**DEPARTMENT OF TRANSPORTATION -- U.S. COAST GUARD**

Actions include: draft procedures to inventory existing hazardous waste generation and establish a baseline; develop a HAZMIN awareness videotape for work force; identify training needs

*Air Pollution Minimization* - minimize releases of airborne pollutants throughout the Coast Guard and ensure compliance with amended Clean Air Act.

Actions include: develop procedure to comply with CFC/Halon ban.





**APPENDIX K**  
**POLLUTION PREVENTION**  
**INFORMATION CLEARINGHOUSE**



## POLLUTION PREVENTION INFORMATION CLEARINGHOUSE

### ☎ CALL FOR INFORMATION ☎

#### Federal Facilities Pollution Prevention Programs and Projects

The Pollution Prevention Information Clearinghouse (PPIC) is establishing a Federal Facilities Mini-Exchange database on its Pollution Prevention Information Exchange System (PIES). The U.S. Environmental Protection Agency (EPA) is collecting information concerning Federal facilities' pollution prevention/recycling efforts. EPA is requesting a variety of information from Federal facilities' environmental managers on their pollution prevention/waste minimization programs and projects. EPA is soliciting Federal facilities to provide the following types of information:

- **Policy Statements** - current Agency and facility pollution prevention goals, objectives, and policy statements.
- **Program Descriptions** - formal and informal facility and Agency pollution prevention programs that encourage or enhance the implementation of waste minimization opportunities.
- **Manuals and Guidance Documents** - facility or Agency pollution prevention reports, articles, directives, guidance documents, and document ordering information.
- **Conferences, Seminars, and Training Courses** - any upcoming pollution prevention conferences, seminars, workshops, or training courses that are scheduled or conducted by your facility or Agency. Calendar submittals should provide date, location, description, and contact.
- **Case Studies** - case studies on successful pollution prevention projects as well as information gathered from waste minimization assessments, procurement activities, audits, process changes, National Environmental Policy Act (NEPA) reviews, and other "lessons learned." Contact the PPIC for a copy of the case study format.

**PPIC** is a clearinghouse dedicated to reducing industrial pollutants through technology transfer, education, and public awareness. PPIC helps you to establish a pollution prevention program, identify process options, locate and order documents, and save money by reducing your waste and liability.

**PIES** is an easy-to-use, interactive PC-based system designed to provide instant access to database information. With PIES, you can access technical and programmatic information, order documents, locate expert assistance, and solve technical and policy questions all at your PC.

This information will be collected, placed on PIES, and shared by Federal facilities and Industries that are facing similar waste management/waste minimization problems. If your Federal facility has developed a pollution prevention program or initiated waste minimization projects and would like to participate in exchanging information on PIES, please send copies to PPIC, Federal Facilities Mini-Exchange, 7600-A Leesburg Pike, Falls Church, VA 22043. If you have any questions concerning the requested information or accessing the Clearinghouse, call PPIC Technical Assistance at (703) 821-4800.

**APPENDIX L**  
**POLLUTION PREVENTION**  
**REFERENCES**

## **Appendix L**

### **General Pollution Prevention Guide**

EPA has published a general pollution prevention guide. The *Facility Pollution Prevention Guide* (EPA/600/R-92/088) describes how to develop a facility-wide pollution prevention program. This manual is available through the Pollution Prevention Branch of EPA's Risk Reduction Engineering Laboratory, Cincinnati, Ohio, 45268.

### **Industry-Specific Pollution Prevention Guidance**

The Pollution Prevention Research Branch of EPA's Office of Research and Development is publishing a series of industry-specific pollution prevention guidance manuals. These guides list source reduction and recycling techniques for specific industries. The first 13 manuals in the series have been published for the industrial categories designated in the titles provided below. Four more manuals are still forthcoming. Industrial categories that will be addressed and the publication schedule are listed below.

<i>Guides to Pollution Prevention: Automotive Refinishing Industry</i>	<i>EPA/625/7-91/016</i>
<i>Guides to Pollution Prevention: Auto Repair Industry</i>	<i>EPA/625/7-19/013</i>
<i>Guides to Pollution Prevention: The Commercial Printing Industry</i>	<i>EPA/625/7-90/008</i>
<i>Guides to Pollution Prevention: The Fabricated Metal Industry</i>	<i>EPA/625/7-90/006</i>
<i>Guides to Pollution Prevention: Fiberglass Reinforced and Composite Plastics</i>	<i>EPA/625/7-91/014</i>
<i>Guides to Pollution Prevention: Marine Maintenance and Repair</i>	<i>EPA/625/7-91/015</i>
<i>Guides to Pollution Prevention: The Paint Manufacturing Industry</i>	<i>EPA/625/7-90/005</i>
<i>Guides to Pollution Prevention: The Pesticide Formulating Industry</i>	<i>EPA/625/7-90/004</i>
<i>Guides to Pollution Prevention: Pharmaceutical Preparation</i>	<i>EPA/625/7-91/017</i>
<i>Guides to Pollution Prevention: Photoprocessing Industry</i>	<i>EPA/625/7-91/012</i>
<i>Guides to Pollution Prevention: The Printed Circuit Board Manufacturing Industry</i>	<i>EPA/625/7-90/00</i>
<i>Guides to Pollution Prevention: Research and Educational Institutions</i>	<i>EPA/625/7-90/010</i>
<i>Guides to Pollution Prevention: Selected Hospital Waste Streams</i>	<i>EPA/625/7-90/009</i>
<i>Guides to Pollution Prevention: Mechanical Equipment Repair</i>	<i>EPA/625/R-92/008</i>
<i>Guides to Pollution Prevention: Metal Finishing</i>	<i>EPA/625/R-92/011</i>

### **Fact Sheets**

The fact sheets listed in Exhibit M-1 contain overviews, tips, and/or guidelines for pollution prevention. Some provide only general information or advice on how to set up programs, while others identify pollution prevention opportunities for specific industries, process, or materials. EPA, State agencies, and local governments produced the fact sheets. In many cases, multiple sources have published fact sheets on particular topic. Fact sheets on the topic areas below are available from the EPA Library, 401 M Street, SW, Washington, DC 20460 (202-260-1963).

**Exhibit M-1. Fact Sheets**

<b>General/Introductory Information</b>	
<ul style="list-style-type: none"> <li>• Conservation Tips for Business</li> <li>• General Guidelines</li> <li>• Getting More Use Out of What We Have</li> <li>• Glossary of Waste Reduction Terms</li> <li>• Guides to Pollution Prevention</li> <li>• Hazardous Waste Fact Sheet for Minnesota Generators</li> <li>• Hazardous Waste Minimization</li> <li>• How Business Organizations Can Help</li> <li>• Increase Your Corporate and Product Image</li> <li>• Industrial Hazardous Wastes in Minnesota</li> <li>• Local Governments and Pollution Prevention</li> <li>• Pollution Prevention (General)</li> <li>• Pollution Prevention Fees</li> <li>• Pollution Prevention Training and Education</li> <li>• Pollution Prevention Through Waste Reduction</li> <li>• Recent Publications</li> <li>• Reduce Hazardous Waste</li> </ul>	<ul style="list-style-type: none"> <li>• Reuse Strategies for Local Government</li> <li>• Source Reduction Techniques for Local Government</li> <li>• U.S. EPA's Pollution Prevention Program</li> <li>• Video Tapes Available from the Virginia Waste Minimization Program</li> <li>• Waste Exchange: Everybody Wins!</li> <li>• Waste Exchange Services</li> <li>• Waste Minimization Fact Sheet</li> <li>• Waste Minimization in the Workplace</li> <li>• Waste Reduction Can Work For You</li> <li>• Waste Reduction Overview</li> <li>• Waste Reduction/Pollution Prevention: Getting Started</li> <li>• Waste Reduction Tips for All Businesses</li> <li>• Waste Source Reduction</li> <li>• Waste Source Reduction Checklist</li> <li>• What is Pollution Prevention</li> <li>• Why Reduce Waste?</li> </ul>
<b>Legislative Information/EPA and State Initiatives</b>	
<ul style="list-style-type: none"> <li>• About Minnesota's "But Recycled Campaign"</li> <li>• Alaska State Agency Waste Reduction and Recycling</li> <li>• EPA's 2% Set Aside Pollution Prevention Projects</li> <li>• EPA's "List of Lists" Projects</li> <li>• EPA's Pollution Prevention Enforcement Settlement Policy</li> <li>• EPA's Pollution Prevention Incentives for States</li> <li>• EPA's Pollution Prevention Strategy</li> </ul>	<ul style="list-style-type: none"> <li>• Introducing the Colorado Pollution Prevention Program</li> <li>• Michigan's Solid Waste Reduction Strategy</li> <li>• Minnesota's Toxic Pollution Prevention Act</li> <li>• New Form R Reporting Requirements</li> <li>• Oregon's Toxic Use Reduction Act</li> <li>• Pollution Prevention Act of 1990</li> <li>• Promoting Pollution Prevention in Minnesota State Government</li> </ul>

**Exhibit M-1. Fact Sheets (continued)**

<b>Process/Material Specific (continued)</b>	
<ul style="list-style-type: none"> <li>• Office Paper Waste Reduction</li> <li>• Plastics:               <ul style="list-style-type: none"> <li>- The Facts About Production, Use and Disposal</li> <li>- The Facts on Degradable Plastics</li> <li>- The Facts on Recycling Plastics</li> <li>- The Facts on Source Reduction</li> </ul> </li> <li>• Printing Equipment</li> <li>• Refrigerant Reclamation Equipment/ Services</li> <li>• Reverse Osmosis</li> <li>• Safety Kleen, Inc. Users</li> <li>• Shop Rags from Printers</li> <li>• Small solvent Recovery Units</li> <li>• Solvents:               <ul style="list-style-type: none"> <li>- Alternatives to CFC-113 Used in the Cleaning of Electronic Circuit Boards</li> <li>- Onsite Solvent Reclamation</li> <li>- Reducing Shingle Waste at a Manufacturing Facility</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>- Reducing solvent Emissions from Vapor Degreasers</li> <li>- Small Solvent Recovery Systems</li> <li>- Solvent Loss Control</li> <li>- Solvent Management: Fiber Production Plant</li> <li>- Solvent Reuse: Technical Institute</li> <li>- Trichloroethylene and Stoddard Solvent Reduction Alternatives</li> <li>- Solvent Recovery: Fiber Production Plant</li> <li>- Solvent Reduction in Metal Parts Cleaning</li> <li>• Ultrafiltration</li> <li>• Used Containers: Management</li> <li>• Used Oil Recycling</li> <li>• Waste Management Guidance for Oil Cleanup</li> <li>• Water and Chemical Reduction for Cooling Towers</li> <li>• Waste Water Treatment Opportunities</li> </ul>
<b>Industry Specific</b>	
<ul style="list-style-type: none"> <li>• Aerospace Industry</li> <li>• Auto Body Shops</li> <li>• Automotive Painting</li> <li>• Automotive/Vehicle Repair Shops</li> <li>• Auto Salvage Yards</li> <li>• Asbestos Handling, Transport and Disposal</li> <li>• Chemical Production</li> <li>• Coal Mining</li> <li>• Concrete Panel Manufacturers</li> <li>• Dairy Industry:               <ul style="list-style-type: none"> <li>- Cut Waste and Reduce Surcharges for You Dairy Plant</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>- Dairy CEO's: Do You Have a \$500 Million Opportunity?</li> <li>- Liquid Assets for Your Dairy Plant</li> <li>- Water and Wastewater Management in a Dairy Processing Plant</li> <li>• Dry Cleaners</li> <li>• Electrical Power Generators</li> <li>• Electroplating Industry:               <ul style="list-style-type: none"> <li>- Dragout Management for Electroplater</li> <li>- Plating with Trivalent Chrome Instead of Cr+6</li> <li>- Water Conservation Using Counter Current Rinsing</li> </ul> </li> </ul>

## Appendix L

### Exhibit M-1. Fact Sheets (continued)

Setting Up A Program	
<ul style="list-style-type: none"> <li>• 1991 Small Business Pollution Prevention Grants</li> <li>• An Organization Strategy for Pollution Prevention</li> <li>• Considerations in Selecting a Still for Onsite Recycling</li> <li>• Colorado Technical Information Center</li> <li>• Onsite Assistance (Colorado only)</li> <li>• Pollution Prevention Grant Program Summaries and Reports</li> <li>• Procuring Recycled Products</li> <li>• Recycling Market Development Program</li> <li>• Selecting a Supplier, Hauler and Materials Broker</li> <li>• Solid Waste Management Financial Assistance Program</li> <li>• Source Reduction at Your Facility</li> </ul>	<ul style="list-style-type: none"> <li>• Starting Your Own Waste Reduction Program</li> <li>• The Alexander Motor's Success Story</li> <li>• The Eastside Plating Success Story</li> <li>• The Wacker Payoff</li> <li>• Waste Reduction Checklists: <ul style="list-style-type: none"> <li>- General</li> <li>- Cleaning</li> <li>- Coating/Painting</li> <li>- Formulating</li> <li>- Machining</li> <li>- Operating Procedures</li> <li>- Plating/Metal Finishing</li> </ul> </li> <li>• Waste Source Reduction: Implementing a Program</li> </ul>
Process/Material Specific	
<ul style="list-style-type: none"> <li>• Aerosol Containers</li> <li>• Aircraft Rinsewater Disposal</li> <li>• Acids/Bases</li> <li>• Chemigation Practices to Prevent Ground Water Contamination</li> <li>• Corrugated Cardboard Waste Reduction</li> <li>• Demolition</li> <li>• Empty Containers</li> <li>• Gunwasher Maintenance</li> <li>• Lead Acid Batteries</li> <li>• Machine Coolants: <ul style="list-style-type: none"> <li>- Prolonging Coolant Life</li> <li>- Waste Reduction</li> </ul> </li> <li>• Metal Recovery: <ul style="list-style-type: none"> <li>- Dragout Reduction</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>- Ion Exchange/Electrolytic Recovery</li> <li>- Etchant Substitution</li> <li>• Old Paints, Inks, Residuals and Related Materials</li> <li>• Pesticides: <ul style="list-style-type: none"> <li>- Disposal of Unused Pesticides, Tank Mixes and Rinsewater</li> <li>- In-Filled Sprayer Rinse System to Reduce Pesticide Wastes</li> <li>- Pesticide Container Disposal</li> <li>- Preventing Pesticide Pollution of Surface and Ground Water</li> <li>- Preventing Well Contamination by Pesticides</li> <li>- Protecting Mountain Springs from Pesticide Contamination</li> <li>- Reducing and Saving Money Using Integrated Pest Management</li> </ul> </li> <li>• Metals Recycling</li> </ul>

## Appendix L

### Exhibit M-1. Fact Sheets (continued)

Industry Specific (continued)	
<ul style="list-style-type: none"> <li>- Water Conservation: Tank Design</li> <li>- Water Conservation: Rinsewater Reuse</li> <li>- What Should I Do With My Electroplating Sludge?</li> <li>• Fabricated Metal Manufacturers</li> <li>• Fiberglass Fabricators: Volatile Emissions Reduction</li> <li>• Machine Toolers</li> <li>• Metal Finishers:               <ul style="list-style-type: none"> <li>- General</li> <li>- Effluent Minimization</li> <li>- Rinsewater Reduction</li> </ul> </li> <li>• Oil Refiners</li> <li>• Paint Formulators</li> <li>• Paper Manufacturers</li> <li>• Pesticide Formulating Industry</li> <li>• Photofinishers/Photographic Processors</li> </ul>	<ul style="list-style-type: none"> <li>• Poultry Industry:               <ul style="list-style-type: none"> <li>- Poultry CEO's: You May Have a \$60 Million Opportunity?</li> <li>- Poultry Processor: You Can Reduce Waste Load and Cut Sewer Surcharges</li> <li>- Survey Shows That Poultry Processors Can Save Money By Conserving Water</li> <li>- Systems for Recycling Water in Poultry Processing</li> </ul> </li> <li>• Printed Circuit board Manufacturers</li> <li>• Printing Industry</li> <li>• Radiator Service Firms</li> <li>• Shrimp Processors</li> <li>• Steel Manufacturers</li> <li>• Textile Industry:               <ul style="list-style-type: none"> <li>- Dye Bath and Bleach Bath Reconstitution</li> <li>- Water Conservation</li> </ul> </li> <li>• Wire Milling Operations: Process Water Reduction</li> </ul>

Source: U.S. EPA, Office of Pollution Prevention and Toxics and Office of Environmental Engineering and Technology Demonstration, EPA/5650/8-92-002, January 1992, Pollution Prevention Resources and Training Opportunities in 1992.

### Energy Conservation and Efficiency

- *The NIRS Energy Audit Manual: How to Audit Campus, City and Other Buildings.* 1992. \$24.95.

Andrea Carlson  
 Nuclear Information Resource Service  
 Introduction - Harvey Wasserman  
 1424 16th Street W, Suite 601  
 Washington, D.C. 20036  
 (202) 328-0002



## ***Pollution Prevention References***

This manual describes, in detail, how to do a full-scale energy audit. It includes dozens of worksheets with calculations to figure out potential energy and cost savings. The manual walks the potential auditor through the initial site visit and then provides recommendations for installing money-saving efficiency measures.

- *Forty Ways to Make Government Purchasing Green*. 1992, \$10.00.

Eleanor J. Lewis and Eric Weltman  
Center for Study of Responsive Law  
Introduction - Ralph Nader  
P.O. Box 19367  
Washington, D.C. 20036

This book proposes 40 green initiatives, of which 16 deal with energy efficiency, that could potentially be implemented by government agencies. Each of the individual initiatives is followed by a list of strategies and examples which government agencies initiated, along with contact names, addresses and phone numbers, and a list of additional resources.

- *Energy Ideas* \$25.00 a year.

Center for Study of Responsive Law

A monthly newsletter discussing how government can be an environmentally responsible consumer using energy-efficient and renewable energy technologies. Each issue examines a different technology. It describes successful projects in federal, state and local agencies nationwide, and provides contact persons, financing options, information sources and other resources.

