



NEW JERSEY SMALL BUSINESS
ENVIRONMENTAL ASSISTANCE PROGRAM

*Helping New Jersey's small businesses
understand the complex world of environmental regulation*

Pollution Prevention Practical Solutions

Practical P2 Categories

- Environmental Accounting
- Inventory Management
- Good Housekeeping
- Alternative Materials
- Alternative Processes

Environmental Accounting

- Identify the financial costs of environmental liabilities
 - Collect accurate data on the generation of waste
 - Establish costs for waste disposal, regulatory burdens, worker safety and public health liability
- Provide data that demonstrates P2 improves a company's bottom-line, protects the environment and reduces health risks

Environmental Accounting Resources

<http://www.epa.gov/opptintr/acctg/earesources.htm>

Overviews, General Guidance and Software Tools

- Identify environmental costs
- Financial justification of P2 investments
- The monetary value of preventable environmental liability costs

Case Studies and Benchmarking Studies

- Profit in Pollution Prevention
- Environmental Accounting Databases
- Applying environmental accounting to specific industries

Environmental Accounting Project - Microsoft Internet Explorer

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Overviews, General Guidance and Software Tools

- **An Introduction to Environmental Accounting as a Business Management Tool: Key Concepts and Terms** (June 1995) This paper presents an overview of environmental accounting for those unfamiliar with environmental accounting. It describes what environmental accounting is, why it is important, outlines some application options, and presents key concepts, definitions, and issues. (EPA 742-R-95-001, pp. 39) ([PDF](#))
- **The Lean and Green Supply Chain: A Practical Guide for Material Managers and Supply Chain Managers to Reduce Costs and Improve Environmental Performance** (January 2000) This booklet illustrates the efficiency-enhancing opportunities that arise when companies incorporate environmental costs and benefits into mainstream materials and supply chain management decision-making. It provides introductory guidance on how to identify these costs and benefits and how to adjust existing information systems and analysis techniques to better account for this significant category of costs. (EPA 742-R-00-001, pp.58) ([PDF](#))
- **P2/FINANCE Version 3.0, Pollution Prevention Financial Analysis Cost Evaluation Spreadsheet Software Application** (December 1996) This is a spreadsheet system for conducting financial evaluations of current and potential investments. P2/FINANCE differs from conventional capital budgeting tools because it expressly addresses traditional obstacles to the financial justification of pollution prevention (P2) investments. Specifically, it expands the cost and savings inventory to include indirect and less tangible environmental costs, and uses profitability indicators and time horizons that capture the longer-term savings typical of pollution prevention investments. It runs with either Lotus 1-2-3 Version 3.4a for DOS or Microsoft Excel Version 5.0 for Windows. (EPA 742-C-96-001/002) ([Download P2/FINANCE](#))
- **Valuing Potential Environmental Liabilities for Managerial Decision-Making: A Review of Available Techniques** (December 1996) This report describes publicly available approaches and tools that have been developed specifically for estimating the monetary value of potential, preventable environmental liability costs. (EPA 742-R-96-003, 114 pages) ([PDF / HTML](#))
- **Incorporating Environmental Costs and Considerations into Decision-Making: Review of Available Tools and Software** (September 1995) This study documents commercially available "project management software systems" and evaluates the extent to which environmental information, including costs, is incorporated into each system. (EPA 742-R-002, pp. 300) ([HTML](#))
- **Stakeholders' Action Agenda: A Report of the Workshop on Accounting and Capital Budgeting for Environmental Costs** (May 1994)
The Action Agenda summarizes the workshop and presents the recommendations of the workshop attendees for the key stakeholder group can take to promote improved environmental

Internet

Inventory Management

- Order and manage material to reduce expiring products.
- Use the “first in, first out” reduce the possibility of expired material
- Material should be inspected when received.
- Expired material should be inspected and tested before disposal.
- Use a computerized inventory system to track inventory.

Good Housekeeping

- Do regular maintenance on equipment to ensure that all machinery and processes are working efficiently.
- Check for leaks and spills, and perform repairs immediately
- Maintain spill-kits and instruct all employees in the proper use and location of the spill-kits.
- Prohibit the mixing of hazardous waste and non-hazardous waste.
- To reduce spills use spigots, pumps, and funnels when dispensing or transferring liquids to and from storage containers.
- Keep chemicals in safety cans or covered containers between uses to reduce evaporation, spills and contamination.

Alternative Materials

- Target the following materials at a facility for with available alternatives:
 - Solvents that contain high VOC contents or Hazardous Air Pollutants (HAPS)
 - Heavy Metals such as: Chromium, Mercury, Lead, or Arsenic...
- Resources for available alternatives are easily found on the “Web”



Joint Service Pollution Prevention Opportunity Handbook



Maintained by the
Naval Facilities Engineering Service Center



Introduction

The Joint Service P2 Opportunity Handbook was designed to identify available "off-the-shelf" pollution prevention (P2) technologies, management practices, and process changes that will reduce the amount of hazardous waste and solid waste being generated at joint service industrial facilities. The handbook was prepared by the Naval Facilities Engineering Service Center (NFESC), under the direction of the Office of the Chief of Naval Operations (CNO-N45) and the Naval Facilities Engineering Command (NAVFAC), the Air Force Center for Environmental Excellence (AFCEE), the Army Environmental Center (AEC), Headquarters Marine Corps (HQMC), the Defense Logistics Agency (DLA), and the Coast Guard (USCG). Over 250 individual data sheets are represented in the following 14 sections.

Joint Service P2 Opportunity Handbook

[Introduction](#)

[Foreword](#)

[Section 1 - Electroplating and Metal Finishing Datasheets](#)

[Section 2 - Hazardous Material and Hazardous Waste Management](#)

[Section 3 - Ozone Depleting Substances](#)

[Section 4 - Painting](#)

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Section 8 - Solvent Alternatives

I. General Alternatives

- [8-I-1 Chemical Cleaning As A Solvent Alternative](#)
- [8-I-2 Immersion Cleaning](#)
- [8-I-3 EPA'S Solvents Alternatives Guide - SAGE](#)
- [8-I-4 Solvent Distillation](#)
- [8-I-5 The Clean-In-Place \(CIP\) Method To Minimize Hazardous Waste](#)
- [8-I-6 Steam Cleaning As A Solvent Alternative](#)
- [8-I-7 Mechanical Cleaning Processes As Solvent Alternatives](#)
- [8-I-8 Hand Wipe Cleaning Alternative](#)
- [8-I-9 Hand Pump Spray Bottle Applicators](#)
- [8-I-10 Ultrasonic Cleaning Processes As A Solvent Alternative](#)
- [8-I-11 Portable Steam Cleaning System \(Mini-Max\)](#)
- [8-I-12 Wire Rope Lubrication System](#)
- [8-I-13 Oxygen Component Ultrasonic Cleaning System](#)
- [8-I-14 Solvent Substitution](#)

II. Specific Alternatives

A. Cleaning and Degreasing

- [8-II/A-1 Parts Washer, Aqueous Jet](#)
- [8-II/A-2 - Cleaning and Degreasing](#)
- [8-II/A-3 - General Metal Cleaning](#)
- [8-II/A-4 - Emulsifier for Cleaning Bilges](#)
- [8-II/A-5 - Electronic and Electrical Equipment Cleaning](#)

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STEAM CLEANING AS A SOLVENT ALTERNATIVE



Revision Date:	12/00
Process Code:	Navy/Marines: ID-02-13; Air Force: CLD5; Army: CLD
Usage:	Navy: Medium; Marines: Medium; Army: High; Air Force: High
Compliance Impact:	High
Alternative for:	Solvent Cleaning
Applicable EPCRA Targeted Constituents:	Methyl Ethyl Ketone (CAS: 78-93-3), Toluene (CAS: 108-88-3), 1,1,1-Trichloroethane (CAS: 71-55-6), Xylene (CAS: 1330-20-7)

Overview:

Steam cleaning is a viable solvent alternative for removing oily or greasy residue. High risk factors are often associated with solvent use, and these risks are avoided through the use of this type of system. The use of heat in the steam cleaning process accelerates emulsification, break-down, and removal of dirt and grease. Steam's high temperature and low specific heat allow surfaces to be heated to relatively high temperatures. High temperature is maintained on the surface long enough for the steam to vaporize or liquefy the oil, grease, or dirt. The residue can then be effectively washed away with the condensate remaining from the condensed steam. Steam cleaning can also be used with a degreasing agent (often a surfactant) that enhances the solubility of grease in water. Steam cleaners are available to perform medium duty (e.g. auto parts, engines, etc.) to heavy duty (e.g. large machinery and oil drilling rigs) cleaning jobs. Steam cleaning units can be electric or fired with gasoline or diesel fuel.

The Mini-Max system, which is manufactured by PDQ Precision, Inc., has been used at many military installations with outstanding results. Unlike the typical steam cleaners, the Mini-Max operates efficiently at high temperature (550°F), while using a minimum amount of water. Waste disposal and chemical costs are almost completely eliminated using the Mini-Max system, which can be used for multiple applications and are available in various sizes.

The wastewater generated from the steam cleaning process may be treated at an industrial wastewater treatment plant, depending on the nature of the dirt and grease removed. Analysis of the wastewater is required prior to disposal.

Compliance Benefit:

Steam cleaning allows a facility to use steam in place of solvents. The decrease in toxic and/or ODSs may reduce the on site storage below any of the reporting thresholds of SARA Title III for those chemicals (**40 CFR 355, 370, and 372; and EO 12856**). In addition, the decrease in toxic chemicals may eliminate the need for a facility to obtain an air permit (**40 CFR 70 and 71**). Switching from a halogenated solvent (i.e., methyl chloroform, methylene chloride, and perchloroethylene) may also enhance the facility's compliance with the NESHAPs for halogenated solvent cleaning (**40 CFR 63**). Using a non-ODS will also help facilities meet the requirements under **40 CFR 82, Subpart D and Executive Order 12843** requiring federal agencies to maximize the use of safe alternatives to class I and class II ozone depleting substances, to the maximum extent practicable. Moreover, steam cleaning will decrease the amount of hazardous waste generated (i.e., no waste solvent generated). Waste reduction is required under **RCRA, 40 CFR 262, Appendix**. The reduction of hazardous waste may also help facilities reduce their generator status and lessen the number of regulatory requirements (i.e., recordkeeping, reporting, inspections, transportation, accumulation time, emergency prevention and preparedness, emergency response) with which they must comply under **RCRA, 40 CFR 262**.

The wastewater discharge from steam cleaning operations may require a local wastewater discharge permit. In addition, steam cleaning will increase electricity and water consumption. Under **EO 12902**, federal facilities are required to reduce energy consumption and implement water conservation programs.

Alternative Processes

- Target processes with discharges
 - Air releases
 - Solid waste generation
 - Liquid waste generation
 - Hazardous waste generation
- Target cleanup processes
 - Wet Cleaning
 - Degreasing

Alternative Processes

- Segregate metals and solvents in the waste stream to reduce hazardous waste disposal
 - Use hydrometallurgical processes to extract metals from sludge
 - Convert sludge to smelter feed
 - Remove and recover metals with electrolysis
 - Solvent waste streams should be kept segregated and free from water contamination
 - Solvent recovery units can be used to recycle spent solvents

Alternative Processes

Accomplish these tasks by examining others within the industry

- Apply in-process recycling to waste generating activities
- Regenerate wastes onsite or offsite and reuse as feed stock
- Use dry cleaning methods
- Use aqueous cleaning solutions
- Reformulate processes to eliminate waste

Virtual Plant Tour

<http://www.chemalliance.org/Handbook/plant/index.htm>

Regulations

- Environmental
- OSHA

Good Management Practices

- Pollution Prevention Options
- Operating Procedures

Case Studies

- Operation Specific
- Multiple Examples

Focus Areas

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ChemAlliance.org News & Events Articles Handbook WebLinks **Virtual Plant Tour**

Welcome to our "Virtual Plant" Tour of Regulations and P2 Information!



Walk through our "Virtual Plant" to see site-specific:

- Regulations
- P2 Options
- Case Studies

Click on each stop for details.

Stops:

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Implementing P2

- Get anybody to buy into the P2 solution!
 - Work with management & employees
- Do what is easy first!
 - Inventory Management
 - Good Housekeeping
- Phase in alternative materials and processes
- Incorporate the “Environment” into the company’s “Business Model”

IEMS

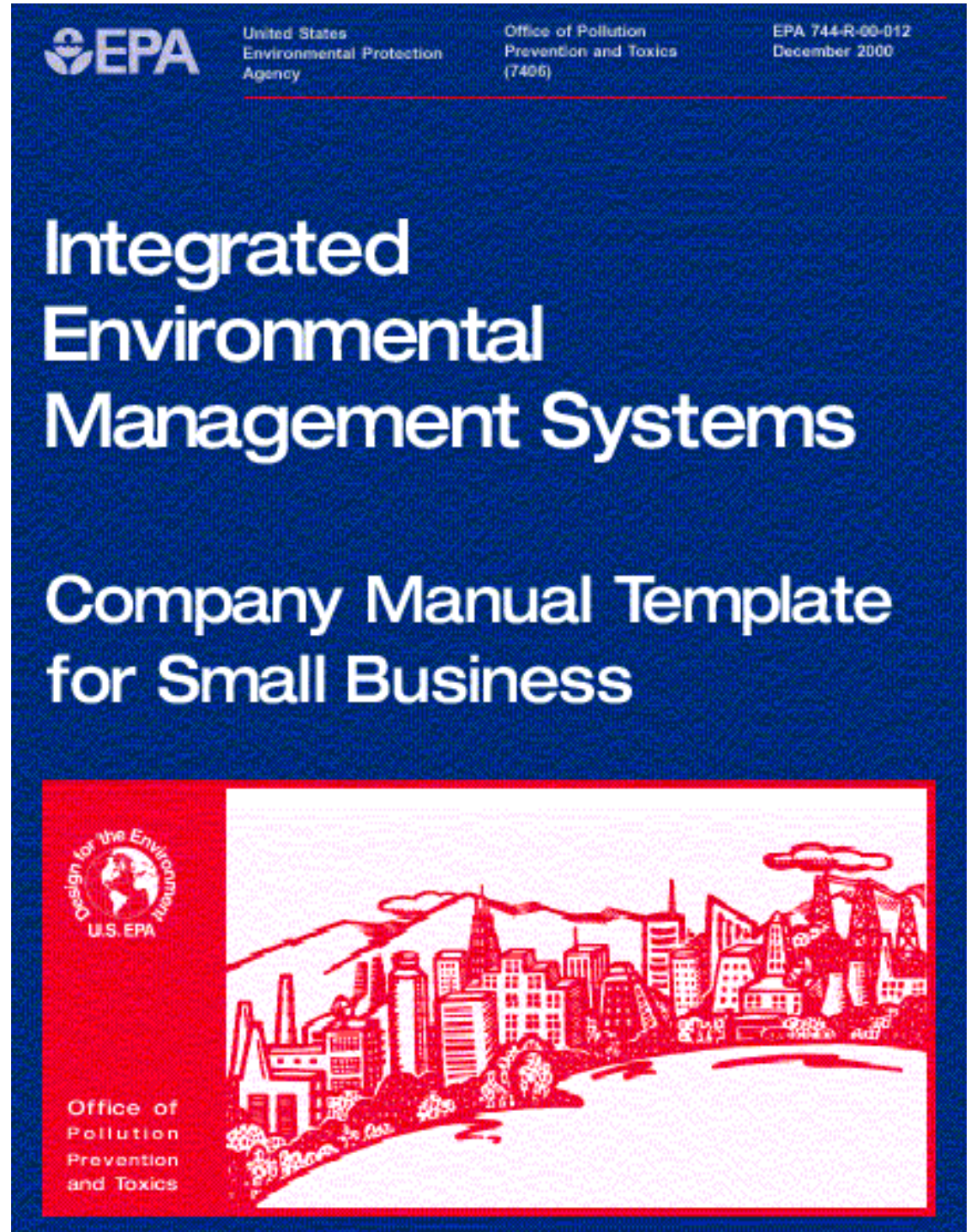
Company Manual Template for Small Business EPA 744-R-00-012

IEMS development by example

- Step-by-step instructions
- Fill in blank tables and forms

Identify IEMS components

- Develop objectives, targets and action plans
- Document control
- Alternatives evaluation
- Purchasing review
- Conducting assessments
- Stakeholder communication
- Management review

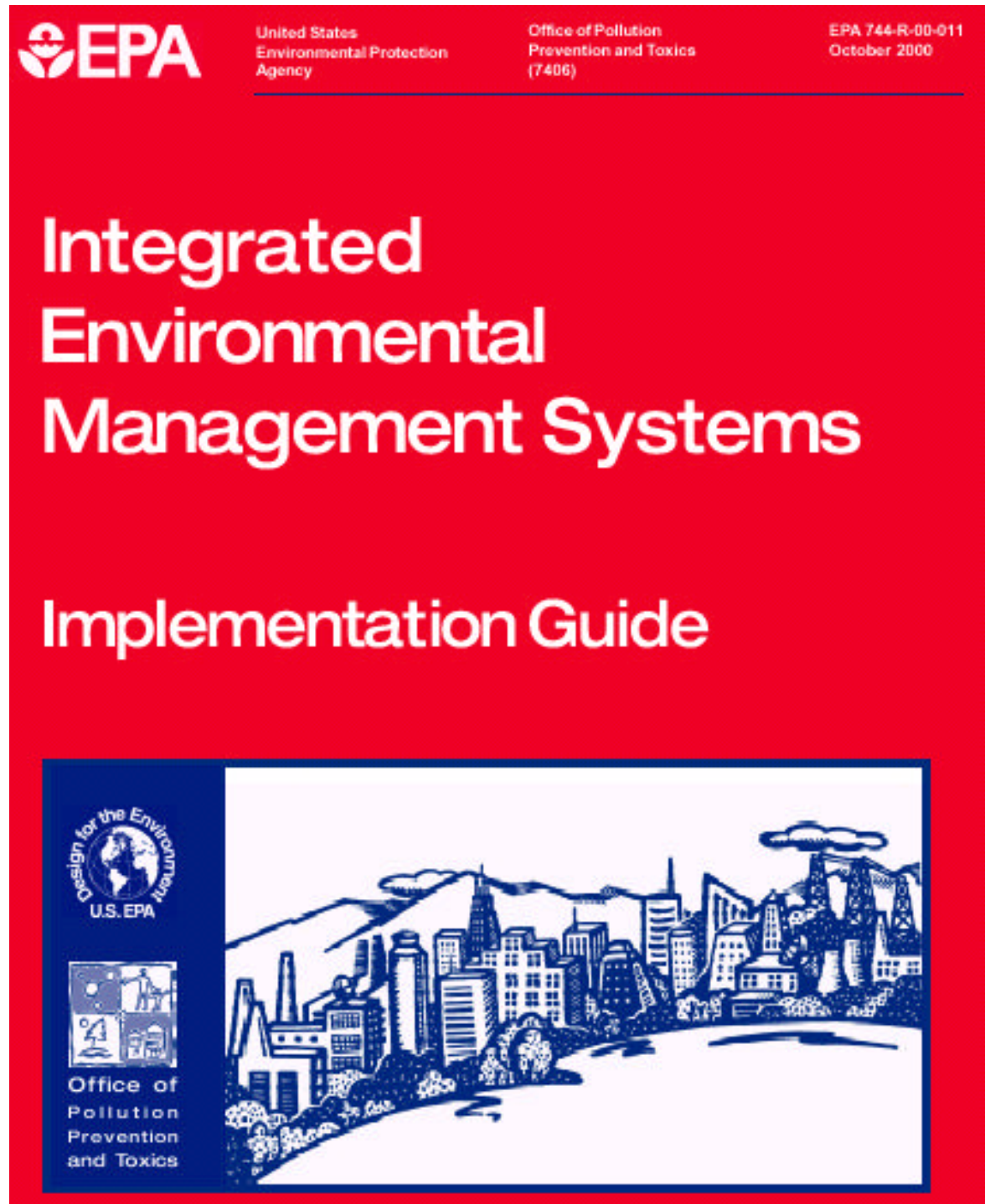


IEMS

Implementation Guide

EPA 744-R-00-011

- IEMS development & implementation for small businesses
- 10 modules designed to be completed through group discussion
- Stresses full company involvement
- Allows flexible phase-in approach



How to Get Copies of EPA Documents

- Visit the EPA Design for the Environment (DfE) Program website at <http://www.epa.gov/dfe>
- Contact the Pollution Prevention Information Clearinghouse (PPIC) by e-mail at ppic@epa.gov or call PPIC at 202-260-1023.

Being Practical

- Identify P2 opportunities
- Account for all environmental costs
- Research the alternatives
- Implement P2



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