



## **Annotated Bibliography of Environmental Studies-Related Pollution Prevention Sources**

Prepared by Andrew Duncan, NPPC Research Assistant. For information on obtaining many of the sources listed here, see the Resource List, which is arranged by topic. [Bracketed information indicates corresponding section in the Resource List and in the Bibliographic Teaching Outline.]

*Agenda 21: The Earth Summit Strategy to Save Our Planet.* Boulder: EarthPress, 1993. [I.A]

Contains an abridged version of Agenda 21, a document resulting from the 1992 United Nations Conference on the Environment and Development in Rio de Janeiro. Calls for a fundamental change in human-environment interactions, as well as a re-thinking of the development process. Represents the views of the less developed South to a greater extent than the North. Includes chapters on the quality of life on earth, the efficient use of the earth's natural resources, the protection of global commons, management of human settlements, chemicals and the management of waste, sustainable economic growth, and implementing Agenda 21. Sections on hazardous and municipal wastes emphasize prevention.

Allen, David T., Nandkumar Bakshani, and Kirsten S. Rosselot. *Pollution Prevention: Homework & Design Problems for Engineering Curricula.* New York: American Institute of Chemical Engineers, American Institute for Pollution Prevention, Center for Waste Reduction Technologies, 1992. [V.A]

A set of 22 engineering problems divided into six categories: life cycle analysis, identifying and prioritizing pollutants from industrial sites, selecting environmentally compatible materials, designing unit operations for minimizing waste, understanding the economics of pollution prevention, and flowsheeting processes to minimize waste. The introduction also divides the problems according to other topical areas. Each problem includes background material, a problem statement, questions for discussion, suggestions for further reading, and solutions. All the problems have useful background information about industrial processes and common pollution prevention decision-making issues.

Amato, Ivan. "The Slow Birth of Green Chemistry." *Science* 259 (12 March 1993): 1538–1541. [V.B]

Describes the increasing interest in academe for environmental chemistry. Part of the resurgence is the ongoing shift in focus from pollution control—not particularly interesting to most academic chemists—to pollution prevention, which has greater possibilities for academic discovery.

Andrews, Richard. "Heading Off Potential Problems." *EPA Journal* 18, no. 2 (May 1992): 40–45. [I.C]

Subtitle: "It's not as easy as it sounds." Holistic perspective about P2 written by a social scientist. Describes P2 in general terms, and outlines five steps for moving towards more effective progress in P2. Concludes that P2 is the only sensible strategy, even though it cannot be implemented by traditional environmental regulatory policies.

"Are You A Green Consumer?" *Consumer Reports* 57, no. 11 (November 1992): 704–707. [III.C]

Article about environmental consumer awareness based on the results of a challenging 16-item "Green Quiz." The sample of *Consumer Reports* subscribers answered correctly, on average, only five out of the 16 questions. The quiz and an explanation of the correct and incorrect answers form the bulk of the article. Also includes two sidebar articles about results from other questions asked on the survey, and the Federal Trade Commission's environmental marketing and labeling guidelines.

Arthur D. Little, consultants. *Disposable Vs. Reusable Diapers: Health, Environmental and Economic Comparisons*. Cambridge, MA: Arthur D. Little, 1990. [IV]

Disposable diaper company-sponsored life cycle assessment report. Indicates that disposable diapers are less environmentally harmful than cotton diapers in a number of categories. Although it is generally considered to be an objective analysis, some of the assumptions used have provoked controversy.

*Automotive Repair, Maintenance, Salvage Yards, Painting, Radiators* (fact sheets). Compiled by U.S. EPA, Pollution Prevention Information Clearinghouse. Washington: EPA, 1993. [IV]

A compendium of fact sheets written by state and regional organizations. Includes 14 fact sheets covering various waste reduction aspects of maintaining an automobile. Topics include antifreeze recycling, used motor oil, paint waste, etc. Also includes several case study descriptions.

Ayers, Ed. "Breaking Away." *World Watch* 6, no. 1 (January 1993): 10–18. [IV]

Article describing the benefits of using bicycles in place of automobiles for personal transit. Covers many aspects of the benefits from increasing bicycle use: decreased roadway and parking space, safer transportation, less air pollution, less water pollution from runoff, lower material intensiveness, affordability, less congestion, and greater potential for urban community. The author points out the benefits of bicycle use in less affluent areas around the world. Regarding the United States, the author mentions the "myth" of the open road, and how bicycles have been largely relegated to recreational use.

Bakshani, Nandkumar, and David T. Allen. "In the States: Pollution Prevention Education at Universities in the United States." *Pollution Prevention Review* 3, no. 1 (December 1992): 97–105. [V.B]

Describes P2 higher education programs in the U.S., based on the 1992 directory published by the NPPC. The authors note that most of the respondents were associated with science and engineering departments, with lesser representation in the social sciences and liberal arts. Within engineering, control technologies continue to receive more attention than P2. Most engineering P2 courses are offered at the higher level undergraduate or graduate level. In the social

sciences and liberal arts, there have been a few courses from a variety of different perspectives. In business schools, there has been a great deal of interest and activity in incorporating environmental issues in business curricula.

Baldwin, J. "Green Cars." *Garbage* 5, no. 3 (June/July 1993): 24–29. [IV]

Subtitle: "You can't drive your way to a pristine planet, but 'incremental improvements' continue." Article describes some of the new developments that are making automobiles more environmentally friendly. These include: electric powered vehicles, alternative fuels (compressed natural gas, hydrogen), photovoltaic cars, and high mileage cars.

Baucus, Max. "Environmental Technology and the Economy." *EPA Journal* 19, no. 3 (July 1993): 36–37. [I.C]

Subtitle: "A national strategy is needed." The author, then-chair of the U.S. Senate Committee on Environment and Public Works, describes the current situation with the development of environmental protection technologies and proposes mechanisms for the U.S. government to encourage further development.

Bernards, Neal, ed. *The Environmental Crisis—Opposing Viewpoints*. San Diego: Greenhaven Press, 1991. [IV]

Includes, among other issues, pro and con statements about the effects of low-input farming, cloth diapers, alternative fuels, and government intervention vs. radical activism to protect the environment. Also includes stand-alone pieces on citizen action, international cooperation, source reduction, and ending production of toxic wastes.

Betts, Kellyn S. "The Coming Green Computers." *E Magazine* 5, no. 2 (March 1994): 28–35. [IV]

Article describes the U.S. EPA's Energy Star program, a voluntary federal program that encourages computer manufacturers to make monitors and system units that "sleep" if not used for a period of time, and laser printers that are relatively energy efficient. The article continues with a discussion of the computer industry, including the radiation emissions from monitors, packaging, toxic manufacturing processes, and recycling old computer parts.

Browner, Carol M. "Pollution Prevention Takes Center Stage." *EPA Journal* 19, no. 3 (July 1993): 6–8. [III.B]

Subtitle: "No longer confined to special projects, the new approach will be integrated into all programs." Brief article describing the steps U.S. EPA is taking to incorporate P2 across its entire mission. (Author is Administrator of U.S. EPA).

Byers, R. Lee. "Regulatory Barriers to Pollution Prevention." *Air & Waste* (Journal of the Air and Waste Management Association) 41, no. 4 (1991): 418–422. [I.C]

Describes the steps EPA could take to make a pollution prevention/waste minimization policy more amenable to industry. In particular, the author argues that EPA does not give adequate recognition of the environmental benefits from reuse, recycling, and waste-to-energy strategies. Other related regulatory barriers are also described. Gives examples in the aluminum, woodtreating, chemical, and petroleum industries, describing wastes and specific barriers.

Caplan, Ruth, and the staff of Environmental Action. *Our Earth, Our Selves: The Action Oriented Guide to Help You Protect and Preserve Our Planet*. New York: Bantam Books, 1990. [III.C]

Gives background on environmental problems and suggests individual and political action strategies. Topics include global warming, the ozone layer, air pollution, toxics, solid waste, radioactive waste, and global environmental issues. Grassroots-oriented.

Carpi, John. "Green Batteries: Powering Innovation." *E Magazine* 5, no. 2 (March 1994): 46–47, 67. [IV]

Briefly describes the environmental impacts of battery landfilling or incineration. Discusses programs to handle old batteries and new battery technologies, including Ray-O-Vac's "Renewal" rechargeable alkaline battery and rechargeable lithium batteries. Mentions both household and automobile batteries.

Carson, Patrick, and Julia Moulden. *Green is Gold: Business Talking to Business About the Environmental Revolution*. Toronto: HarperBusiness, HarperCollins, 1991. [III.A]

Engaging book describing the greening of the business sector and citizens. Besides an introduction about "why be green," the book provides advice on green strategies, green products (particularly the Canadian grocer Loblaw's G.R.E.E.N. line), environmental audits, green manufacturing, etc. Published in Canada but relevant throughout North America.

Casler, Stephen D. "Budget Reallocation and the Peace Dividend: Energy and Pollution Tradeoffs." *Energy Policy* 19 (September 1991): 666–669. [I.C]

Abstract: "This paper deals with measurement of the energy and pollution costs associated with various budgetary categories, including defense, education and other nondefense components of expenditure . . . Empirical estimates show that budgetary reallocation away from defense can result in important reductions in energy-use and pollution emissions."

Cebon, Peter. "Corporate Obstacles to Pollution Prevention." *EPA Journal* 19, no. 3 (July 1993): 20–22. [III.A]

Subtitle: "The sociology of the workplace is just as important as technical solutions." Uses organizational culture perspective to explain why implementing business P2 programs can be difficult. Identifies three "realities of organizational life": (1) The cultures of organizations can effectively limit their perspectives; (2) in many organizations, it is very difficult to get information to the right people at the right time; and (3) many aspects of organizational life are very political.

Cohen, Mark A. *Management 5596: Management of Environmental Issues* (syllabus). Vanderbilt University, Nashville, March 1993. [V.A]

Detailed course description for what could be called "environmental studies for business students." Gives an introduction to environmental issues; business and environmental institutions in the U.S.; public policy analysis of environmental issues (including cost/benefit analysis, risk, economic efficiency, enforcement of environmental laws); case studies; green marketing; green finance & accounting; and global issues. Has a lengthy description of goals and grading procedures.

Commoner, Barry. *Making Peace With the Planet*. New York: The New Press, 1992. [I.C]

Influential and controversial book, with the perspective of the producer as the root of all the environmental problems. Author focuses on changing or abolishing polluting production processes and radically reforming political and economic systems. Criticizes EPA's approach to P2 as not forceful enough. Gives background and perspective to the current situation. Alarmist in general tone.

Conn, David W., ed. *Energy and Material Resources: Attitudes, Values, and Public Policy*. AAAS Selected Symposium 75. Boulder: Westview Press, 1983. [III.C]

A collection of papers examining social and political science implications of energy use and conservation. The lingering effects of the energy crisis are quite evident in the content of the papers. Despite the title, the focus is primarily on energy resources. Topics relevant to P2 include: risk assessment and energy conservation, environmental attitudes and values, and pro-environmental behaviors. The collection also covers a number of methodological issues, such as the usefulness of surveys.

Conn, David W. "Waste Reduction—Issues and Policies." *Resources Policy* 3 (March 1977): 23+. [I.B]

Older article illustrating that source reduction and related issues were intensely examined back in the 1970s. Mentions the creation of the California Source Reduction and Packaging Policy Committee by the California Solid Waste Management Board. Examines alternative methods of waste (source) reduction, costs and benefits, and various policy aspects. Looks at 12 options for waste reduction, including direct regulation of individual products, mandatory disclosure of environmental impact, and subsidies to offset capital costs of converting from one-way to reusable products.

Conway, R.A., John H. Frick, David J. Warner, Calton C. Wiles, and E. Joseph Duckett. *Waste Minimization Practices*. Baltimore: American Society for Testing and Materials (ASTM), 1989. [III.A]

Practical book that focuses on the implementation of waste minimization (pollution prevention and recycling) programs. Includes four relevant chapters. "General Managerial Practices" introduces several practices that can be used to initiate and improve waste minimization programs. "Waste Minimization

Audits" stresses importance of these surveys and how they can be used effectively in waste minimization programs; it also includes a summary of a model hazardous waste minimization audit procedure and a six-phase auditing strategy. "Solvent Recovery" presents problems and solutions associated with waste minimization. "Used Oil Recovery" lists options for minimizing waste generation.

Cook, James. "The Ghosts of Christmas Yet To Come." *Forbes* (22 June 1992): 92–95. [III.A]

A review, of sorts, of *Beyond the Limits* (by Meadows et al.). In the author's opinion, the book promotes a new socialism. The review's theme is generally quite critical of the book's perspective. "For all the risks, the world might better take its chances on something more dynamic."

Corporate Conservation Council, National Wildlife Federation. *Gaining Ground: Environmental Education in Business Schools*. Final report of the Curriculum Development Project, NWF. Washington, D.C., June 1992. [V.B]

Describes seven conceptual approaches for developing a business-environment course: environmental problems, public policy, corporate policy, environmental ethics, industry life cycle, economic orientation, and ecological principles. Includes preliminary outlines for each of the seven approaches and a brief bibliography. The conceptual approaches may be useful beyond business school courses.

Crossen, Cynthia. "How 'Tactical Research' Muddied Diaper Debate." *Wall Street Journal* (17 May 1994): B1, B8. [II.C]

Profiles the life cycle assessment (LCA) "tactical research" carried out by Procter & Gamble to support the environmental worthiness of its disposable diapers. Author points out that while this and other studies are not unethical, they exploit the shades of gray between absolute fact and fiction. The psychology of researchers themselves has been increasingly permeated by private funding sources and by the realization that human behavior is more unpredictable than was previously thought. Author points out that LCAs started out in the 1960s as an internal tool for measuring the efficiency of manufacturing processes, and, typically, studies still are neither standardized nor given much peer review.

Curran, Mary Ann. "Broad-Based Environmental Life Cycle Assessment." *Environmental Science and Technology* 27, no. 3 (1993): 430–436. [key doc.]

Overview of life cycle assessment (LCA). Discusses the importance of LCA in the evaluation of waste minimization programs. Topics discussed involving LCA are: product stages, system boundary definitions, the difficulty involved in financing an LCA, methodologies, and the LCA impact analysis. Author works at EPA. Article not subject to copyright restrictions. (See also Wang and White & Shapiro.)

Dake, Karl. "Myths of Nature: Culture and the Social Construction of Risk." *Journal of Social Issues* 48, no. 4 (1992): 21–37. [II.A]

Author examines the cultural contexts of risk and humans' relationship with nature, providing insight on the attitudes different groups may have toward P2. Proposes five cultural patterns, using a two-dimensional matrix of "grid" (degree of social prescriptions allowed) and "group" (group identity).

1. High grid and high group cultures are hierarchically arranged; nature is robust and resilient but only up to a point, hence the need for "sustainable development."
2. Egalitarians have low grid but high group characteristics. To them nature is fragile, justifying a precautionary, preservationist approach to environmental management.
3. Individualists are low grid and low group; they see nature as benign. Deregulation is the appropriate risk management strategy since they view individual judgement as superior to collective control.
4. Fatalistic cultures, high grid and low group, see nature as capricious. Their cultural bias rationalizes isolation and, along with it, stringent control.
5. Autonomy is a fifth group that is completely lacking in any social patterns, e.g., "asocial."

De Young, Raymond. "Changing Behavior and Making it Stick: The Conceptualization and Management of Conservation Behavior." *Environment and Behavior* 25, no. 4 (July 1993): 485–505. [III.C]

A "big-picture" scholarly article that introduces the need to change human behaviors and reviews different approaches to conservation behavior change. Characterizes behavior change techniques according to (a) information or motivational emphasis, and (b) source of the change (personal involvement, other people, or environmental influence). Assesses the effectiveness of these techniques by examining durability of the behavior change plus four other criteria.

\_\_\_\_\_. *NR561/NR361: Conservation Behavior*. (Syllabus.) University of Michigan–Ann Arbor, 1993. [V.A]

Detailed syllabus of a course that examines source reduction and recycling from the perspective of conservation-behavior. Focuses on changing individual behavior, thus psychological principles are more prominent than sociological principles. Also includes an extensive reading list.

\_\_\_\_\_. "Some Psychological Aspects of Living Lightly: Desired Lifestyle Patterns and Conservation Behavior." *Journal of Environmental Systems* 20 (1991): 215–227. [III.C]

An introduction to conservation behavior concepts and their relationship to individual lifestyles and personal choices. Includes results from a number of surveys showing constructs of conservation behavior.

Design for Recycling Team. *Teaching Environmentally Responsible Design*. Shirley T. Fleischman, ed. Grand Valley State University, Grand Rapids, Michigan, 22 October 1992. [V.A]

A thick notebook of original and copied materials, resembling a coursepack for an undergraduate engineering design class; also useful for non-engineering students. The ethics chapter includes an essay, creeds, codes, and ethical mission statements for engineers, along with discussion questions. Essays in the chapter on secondary materials cover designing for recovery and reuse. The "Paper vs. Polystyrene Cups" chapter is a teaching module for a thermodynamics course. The paper-making chapter includes two classroom projects: one is paper-making for engineers, the other examines secondary materials from an engineering economics perspective. There is also a "Design for Disassembly" freshman curriculum unit.

Dorfman, Mark H., Warren R. Muir, and Catherine G. Miller. *Environmental Dividends: Cutting More Chemical Wastes*. New York: INFORM, Inc., 1992. [III.A]

Follow-up profile of P2 activities instituted in 29 organic chemical facilities in California, New Jersey, and Ohio, after the original 1985 "Cutting Chemical Wastes" book. Much of the included information is documentation of P2 activities at these plants. Besides individual profiles, interesting tables include "Source reduction program features" (pp. 36-43) and "137 source reduction activities categorized by technique used" (pp. 52-87).

Durning, Alan T. *How Much Is Enough? The Consumer Society and the Future of the Earth*. New York: W.W. Norton, 1992. [III.C]

Short book presenting an argument that overconsumption in developed countries will lead to an environmental apocalypse, and points to other ways to satisfy human needs. Describes current consumption patterns in food, transportation, possessions, etc. Concludes with suggestions for reorienting society towards more sustainable consumption patterns. Provocative.

Dyllick, Thomas. "Ecological Marketing Strategy for Toni Yogurts in Switzerland." *Journal of Business Ethics* 8 (August 1989): 657-662. [III.A]

A case study describing a Swiss dairy cooperative's switch from throwaway plastic to returnable glass yogurt containers in the 1970s and 1980s. Their integration of ecological and economic concerns resulted, after a number of years, in environmental packaging improvements among the entire Swiss yogurt sector without the need for regulatory measures. An effective marketing strategy was essential for the glass containers' success.

EarthWorks Group. *50 Simple Things You Can Do to Save the Earth*. Berkeley, CA: Earthworks Press, 1989. [III.C]

Gives an introduction to major environmental problems, then 50 "things to do." Each action includes background information, "did you know ..." - type facts, and recommended actions.

\_\_\_\_\_. *The Student Environmental Action Guide: 25 Things We Can Do*. Berkeley, CA: Earthworks Press, 1991. [III.C]

Describes waste reduction, energy conservation and other environmentally sound activities that can be implemented on college campuses and other schools.

Elkington, John, Julia Hailes, and Joel Makower. *The Green Consumer*. New York: Penguin, 1990. [III.C]

Guide to green products and environmentally responsible actions individuals can take. Topics include automobiles, food, household products, garden and pet supplies, gifts, home energy and furnishings, personal care products, and green travel. Also discusses how to get more involved.

Flavin, Christopher. "Jump Start: The New Automotive Revolution." *World Watch* 6, no. 4 (July 1993): 27-33. [IV]

Introduction: "Super-efficient, non-polluting cars are no longer just a dream deferred. At last, the first generation of environmentally responsible cars is on the way."

Fleischman, Marvin. *Pollution Prevention, Waste Treatment, and Disposal* (syllabus). University of Louisville, Kentucky, March 1993. [V.A]

Detailed syllabus for an introductory P2 engineering course. Lists many handouts about current topics in the news. Includes several engineering homework problems. The course covers fundamental issues such as definitions in more depth than similar engineering courses.

Forester, William S., and John H. Skinner. *Waste Minimization and Clean Technology: Waste Management Strategies for the Future*. San Diego: Academic Press, Inc., 1992. [III.A]

Representation of recent examples of what industry is doing to promote a safe environment. Lists specific examples and international programs, which include: low waste technologies; economic aspects of waste minimization; implementation of technology; legislation; programs in China, Cuba, and France; the role of research and development; the pollution prevention program of the EPA; and product design in waste minimization. Industries discussed include: electroplating, pulp and paper, chemical, oil and petroleum, and pharmaceutical.

Frankenfeld, Philip. "Simple Gifts: Complex Environmental Hazards and the Responsibility to Leave a Controllable World." *Futures* 25, no. 1 (1993): 32–52. [II.A]

Scholarly article from an ethical and theoretical political science perspective. Argues that there is a moral obligation to leave future generations a world that is as livable as the present world. Livability encompasses material resources and pollution as well as time and money resources. Author calls for "simple gifts," e.g., pursuing simplicity over complexity, as a morally superior and politically feasible strategy.

Freeman, Harry, Teresa Harten, Johnny Springer, Paul Randall, Mary Ann Curran, and Kenneth Stone. "Industrial Pollution Prevention: A Critical Review." *Air and Waste* (Journal of the Air and Waste Management Association) 42, no. 5 (1992): 618–656. [I.C]

Comprehensive review of the industrial P2 topic. Many citations. Emphasizes the prevention of pollution closer to its point of origin to eliminate transfers between media. Included are descriptions of the following pollution prevention programs and laws: Clean Air Act; Pollution Prevention Act; U.S. EPA and their pollution prevention strategy; various industrial programs; and various local, state, and federal programs. Other topics discussed include cost effectiveness, incentives and barriers regarding P2, and the importance of product design and life cycle assessment. (See also Purcell.)

Garfield, Bob. "Beware: Green Overkill." *Advertising Age* (25 January 1991): 26. [III.A]

Subtitle: "Touting a product's environmental benefits in ads is all well and good. Being crassly opportunistic about the ecological movement is something else." Short article indicating that some marketing personnel have pushed the limits of "eco-marketing" with general, unsubstantiated claims. Gives movie review-style ratings for four different advertisements on their environmental worthiness.

Gasbarro, Ron. "Getting Rid of Batteries." *Garbage* 3, no. 5 (September 1991): 42–43. [IV]

Brief primer on household and automobile batteries. Distinguishes between primary batteries, which are used once and thrown away, and secondary batteries, which are rechargeable. Mentions several developments to make batteries more environmentally friendly.

Geiser, Ken. "The Greening of Industry." *Technology Review* 94 (August 1991): 64–72. [III.A]

Article describes how toxics use reduction (TUR) and P2 laws in the states and in federal government are helping lead the transformation to more sustainable materials and technologies. Critical features of "sustainable industry" include: appropriate technologies, environmentally safe and compatible materials, products to meet basic social needs and some individual wants, low- and no-waste production processes, safe working conditions, energy efficiency, and resource conservation. Describes TUR and P2 laws in several states. Advocates a precautionary principle for eliminating or reducing environmental emissions. Mentions "clean technology" and explains why industry has been reluctant to invest in it. Concludes with a comment on using the LCA framework as a tool for sustainable industry.

Goldstein, Nora. "Marketing Strategy for Green Products." *In Business* 12, no. 3 (May 1990): 38–39. [III.A]

Brief article describing the conference presentation of a marketing firm representative. Discusses diffusion of innovations and psychographics—"understanding consumer goals, motivations, and values and how these drive their lifestyles." Useful chart that compares seven psychographic profiles with willingness to be innovators. Discusses the need for a long-term marketing strategy approach.

Goodland, Robert. "The Case That the World Has Reached Limits." In *Population, Technology, and Lifestyle: The Transition to Sustainability*, pp. 3–22. Robert Goodland, Herman E. Daly, and Salah El Sarafey, eds. Washington: Island Press, 1992. [I.A]

Gives five compelling arguments for the case that global physical and ecological sustainability is threatened: biomass appropriation by human activity, global warming, ozone rupture, land degradation, and decrease in biodiversity.

Gore, Al. *Earth in the Balance: Ecology and the Human Spirit*. Boston: Houghton Mifflin, 1992. [I.A]

Written before Gore was elected Vice-President, this book for general audiences combines scientific evidence with the author's personal convictions about the precarious nature of human sustainability. The first section examines the sustainability issue, using various resource and pollution issues—climate, water resources and pollution, air pollution, wastes, and

food resources—to illustrate the author’s concern. The second and third sections are a search for balance, utilizing such tools as democracy, environmental economics, technology, psychology, spirituality, and social forces. P2 does not appear as a chapter or section, but rather as underlying theme to promote an appropriate human-environment balance.

“The Green Revolution: Procter & Gamble.” *Advertising Age* 62, no. 5 (29 January 1991): 16, 34. [IV]

Describes rising public concern with disposable diapers and the “garbage crisis” in general. Discusses P&G’s move towards composting (and recycling) disposable diapers as a solution. Mentions industry-commissioned studies that show neither disposable nor reusable diapers are clearly superior.

Habicht, F. Henry II. *EPA Definition of “Pollution Prevention”* (internal memo to all EPA personnel). 28 May 1992. [key doc.]

Clarifying note about what the U.S EPA officially considers pollution prevention. Cites the 1990 Pollution Prevention Act and other sources.

Hanlon, Deborah, and Julie Bartenstein. *Teaching Those Humans to Learn: Creative Approaches to Pollution Prevention Training*. Washington: EPA, August 1992. [V.A]

Internal EPA compilation contains guidelines for a three-hour training session introducing new EPA employees to the concept of pollution prevention. The session covers introductions, concepts of P2, barriers and incentives, ways to prevent pollution, and P2 resources. Includes a number of helpful pointers. Accompanying this are a set of 17 P2 role-playing exercises from a variety of sources. Most of the scenarios are at the manufacturing level. Documentation for some exercises is better than others.

Harris, Mark. “Bright Makes Blight.” *E Magazine* 4, no. 6 (November 1993): 51–52. [IV]

Subtitle: “Laundering strategies that won’t take the earth to the cleaners.” Briefly describes some of the environmental effects of clothes washing and the \$4 billion laundry detergent business, including water consumption, water heating costs, detergent production, water pollution, and dry cleaning solvents. Goes on to describe ways to make clothes washing as environmentally benign as possible, including

total omission of phosphates, true biodegradability, concentrated detergents, and recycled packaging. For clothes washing, the article includes recommendations for using less water and lowering temperature settings; for drying, using energy sensors to cut off dryers when done, or using clotheslines. Also recommends limiting dry cleaning or using an “EcoClean” non-toxic dry-cleaning alternative.

Harris, Mark D. *Embracing the Earth: Choices for Environmentally Sound Living*. Chicago: The Noble Press, 1991. [III.C]

Book describing actions individuals can take to reduce their use of materials (wastes), toxics, water, and energy. Includes sections on transportation, ecological education, and environmental organizations.

Hawken, Paul. “A Declaration of Sustainability.” *Utne Reader*, no. 59 (September 1993): 54–61. [III.A]

Article claiming that the socially responsible corporation is a have-your-cake-and-eat-it-too myth. The author’s agenda for reform includes:

- adjusting the price of goods to reflect true environmental and other social costs;
- incrementally replacing the present U.S. tax system with revenue-neutral “green fees”;
- rearranging the linear industrial economy into a nature-mimicking cyclical system [industrial ecology];
- designing for decomposition, closed-loop reuse/recycling, and toxic materials stewardship;
- restoring the balance between commerce (business sector) and the guardian (government); and
- shifting from electronic literacy to biologic literacy

The author also has written *The Ecology of Commerce* (1993), which covers these topics in more detail.

Hayes, Dennis. “Energy, Environment, and Architecture.” Keynote speech, American Institute of Architects, Committee on the Environment. Atlanta, Georgia, 6 December 1991. [I.C]

Text of a keynote speech given to an environmental architecture conference. More a commentary about the United States’ myopic energy policy than about architecture. Calls for significant increases in efficiency and uses vivid numbers to point out different rates of energy usage around the world.

Henion, Karl E., and Thomas C. Kinnear, eds. *The Conservator Society*. Chicago: American Marketing Association, 1979. [III.A]

Collection of conference papers examining what might now be called “sustainable living” from the business perspective. The 1970s “conservator society” concept is dated, although it can be compared with the 1990’s “green consumer” movement noted by marketing departments. The variety of papers also reflects the tug between business school social scientists, liberal arts social scientists, and practitioners.

Hileman, Bette. “UN Environment Program Pushes for Cleaner Production.” *Chemical and Engineering News* 70, no. 48 (30 November 1992): 17–21. [I.C]

Coverage of a UN Environmental Program (UNEP) sponsored international conference on cleaner production. Describes programs in The Netherlands, Poland, and China that are being used to foster the spread of cleaner production techniques. Mentions obstacles, especially in less-developed countries.

Hirschhorn, Joel S., and Kirsten U. Oldenburg. *Prosperity Without Pollution: The Prevention Strategy for Industry and Consumers*. New York: Van Nostrand Reinhold, 1991. [key doc.]

Comprehensive book that could be used either as general reading or as a textbook for a P2 course. Covers manufacturing, commercial, government, and consumer perspectives of P2. Thorough introduction to the P2 concept in the first chapter. Other specific topics include: sustainability and P2, stages of and obstacles to a P2 program, generation rates of wastes and toxics, individual P2 practices, pesticides and P2, ozone-depleting chemicals and P2, and P2 policy. Little specific discussion of life cycle impacts. Well researched.

Hocking, Martin B. “Paper Versus Polystyrene: A Complex Choice.” *Science* 251 (1991): 504–505. [II.B]

Widely circulated brief article that illustrates the use of life cycle assessment. From the analysis given, plastic cups are clearly more environmentally benign than paper cups. Useful in showing that one’s intuition is sometimes incorrect. [See also Wells et al.]

Holmes, Hannah. “Eating Low on the Food Chain.” *Garbage* 4, no. 1 (January 1992): 32–37. [IV]

Article describing the environmental effects, including both resource use and pollution, of meat consumption. Also mentions human health effects. Notes that vegetarianism is more environmentally beneficial, promotes better health, and is less expensive than eating meat. Gives general recommendations for preventing pollution by eating less meat and more plant products. Includes charts and sources for more information.

\_\_\_\_\_. “Telecommuting.” *Garbage* 5, no. 2 (April 1993): 32–37. [IV]

Subtitle: “Yes it saves gasoline, air pollution, driving time, and stress—wait—does it save stress?” Article outlines the advantages and disadvantages of telecommuting—doing “office work” at home. Gives practical advice on setting up a home office.

Holmes, Hannah, and Patricia Poore. “Packaging in the ‘90s.” *Garbage* 4, no. 6 (January 1993): 24–31. [IV]

Article discussing the status of current packaging issues from an environmental perspective. Authors’ perspective is that many types of packaging are not as environmentally harmful as is commonly perceived. Discusses the demise of most refillable containers. Also mentions “lightweighting” and “concentrates,” two packaging reduction strategies that have gained considerable acceptance by business. Describes other package reduction examples and policy initiatives to regulate packaging.

Holusha, John. “Diaper Debate: Cloth or Disposable?” *New York Times* (14 July 1990): Section 1, p. 46, col. 1. [IV]

Newspaper article using cloth and disposable diapers as an example to show how the life cycle assessment methodology can be controversial.

“How To Get Industry to Clean Up On Its Own.” *Business Week* (7 June 1993): 122. [I.C]

Short editorial noting that the information disclosure aspect of the Toxic Release Inventory (TRI) is prompting some companies to voluntarily decrease their emissions of toxic substances. Recommends a similar approach for future EPA efforts, rather than the traditional “command-and-control” pollution control regulations.

Hume, Scott. "The Green Revolution: McDonald's." *Advertising Age* 62, no. 5 (29 January 1991): 32. [IV]

Short article discussing the hamburger chain's commitment to the environment. McDonald's had switched from paperboard to foam polystyrene hamburger wrappers after a 1970s life-cycle assessment indicated the latter was environmentally preferable. The company's switch to paper wraps was due to public concern over the foam plastic and the paper wraps' lower overall environmental impacts. Also mentions McRecycle program to buy \$100 million worth of recycled items for building and remodeling.

Jamieson, Dale, and Klasina VanderWerf. *Cultural Barriers to Behavioral Change: General Recommendations and Resources for State Pollution Prevention Programs*. Boulder: Center for Values and Social Policy, July 1993. [key. doc.]

Report of an EPA-sponsored project that takes a new perspective on P2. Summarizes decades of psychological, sociological, and other social science research on environmentally beneficial behavior change. Integrates the relatively new P2 approach and the research literature with a lengthy introduction of P2 as a cultural and behavioral issue. Concludes with 16 recommendations to overcome cultural barriers to P2 and proposes a research agenda. An annotated bibliography comprises more than half the report. Includes a short executive summary.

Kane, Hal. "Put It on My Carbon Tab." *World Watch* 6, no. 3 (1993): 38-39. [III.C]

Short article that examines the amount of carbon dioxide each person is directly or indirectly responsible for generating.

Kenworthy, Lauren, and Eric Schaeffer. *Preventing Industrial Toxic Hazards*. New York: INFORM, 1993. [III.C]

A guide to help concerned individuals learn how to use the Toxics Release Inventory (TRI) and other data to understand the operations and toxic discharges of local plants. Methods are offered for building positive communications with plant officials and for gathering the information necessary to assess source reduction efforts. Explains the source reduction concept and contrasts this with pollution control. Outlines techniques and strategies of a company source reduction program. Provides step-by-step process for studying local plants; mentions legislative approaches to source reduction. Appendices detail the TRI.

Keoleian, Gregory A., and Dan Menerey. "Disposable vs. Reusable Systems: Two Source Reduction Case Studies." *Journal of Environmental Systems* 20 (1991): 343-357. [IV]

First of two articles examining 1) replacing polystyrene foam dishware with washable ceramic dishes at a hospital, and 2) replacing disposable diapers with washable cotton diapers at a day-care center. The case studies include a description as well as process and cost analyses.

\_\_\_\_\_. *Life Cycle Design Guidance Manual: Environmental Requirements and the Product System*. (EPA/600/R-92/226). Cincinnati: EPA, Office of Research and Development, Risk Reduction Engineering Laboratory, January 1993. [II.B]

Provides a framework for incorporating environmental requirements into product system design. Emphasizes that all four components of product systems (product, process, distribution, and management/information) should be integrated in design. Suggests that, whenever possible, design activities should encompass all life cycle stages from raw materials acquisition through processing, manufacturing, use/service, resource recovery, and disposal of all residuals. Provides matrices for developing and evaluating life cycle environmental requirements, then coordinating these with performance, cost, legal, and cultural requirements. Lists and discusses strategies for reducing product systems' environmental impacts. Introduces life cycle assessment (both inventory and impact analysis stages) as a possible evaluation tool in design while also suggesting alternative or more streamlined methods. A summary of major environmental laws, overview of environmental impacts, and primer on decision-making models are included as appendices.

\_\_\_\_\_. "Packaging and Process Improvements: Three Source Reduction Case Studies." *Journal of Environmental Systems* 21, no. 1 (1992-92): 21-37. [IV]

Second of two articles examining (1) bulk merchandising at a cooperative grocery, (2) process improvements and packaging reduction at a large office furniture manufacturer, and (3) a department store chain's use of shredded waste paper as a packing material. The case studies include a description as well as process and cost analyses.

\_\_\_\_. "Sustainable Development by Design: Review of Life Cycle Design and Related Approaches." *Air and Waste* (Journal of the Air and Waste Management Association) 44 (May 1994): 645–668. [II.B]

From the abstract: "Necessary changes to achieve a more sustainable system will require that environmental issues be more effectively addressed in design . . . . Although not yet fully embraced by industry, the product life cycle system is becoming widely recognized as a useful design framework for understanding the links among societal needs, economic systems and their environmental consequences. . . . Life cycle design (LCD), Design for Environment (DFE), and related initiatives based on product life cycle are emerging as systematic approaches for integrating environmental issues into design. This review presents the life cycle design framework developed for the U.S. EPA as a structure for discussing environmental design literature. Specifying environmental requirements and evaluation metrics are essential elements of designing for sustainable development. A major challenge for successful design is choosing appropriate strategies for reducing environmental burden. . . . The future of life cycle design and sustainable development depends on education, government policy and regulations, and industry leadership, but fundamental changes in societal values and behavior will ultimately determine the fate of the planet's life support system. "

Kidd, David. *Industrial Waste Reduction: A Three-Credit University Curriculum for Environmental Engineering*. Alaska Health Project, Anchorage, October 1991. [V.A]

A comprehensive, introductory, graduate course outline. Although oriented toward engineering students, parts of the curriculum are relevant to non-engineering majors. Gives 15 weekly lesson plans, each of which includes: readings, additional instructor references, objectives, class activities (lecture notes, etc.), and homework. Some of the lecture outlines are quite extensive, and a number of homework problems include worked solutions. Main focus is hazardous wastes. Lengthy notes and homework problems on waste reduction approaches (week 5); waste reduction assessments (6); used oil (10); solvents (11); and rinsing systems (12).

Kleiner, Art. "Compact Packaging for the Compact Disk." *Garbage* 3, no. 6 (November 1991): 50–51. [IV]

Short article describing the effort underway to get rid of the 5" x 11" "long box" that has enshrouded compact disks. Several alternatives are mentioned, with the most promising selection reusable long boxes that are removed from the take home "jewel boxes" at the check-out counter. [Since this article was written, almost all CD manufacturers have stopped using the long box and have taken the article's example.]

Kling, David J., and Eric Schaeffer. "EPA's Flagship Programs." *EPA Journal* 19, no. 3 (July 1993): 26–30. [III.B]

Subtitle: "Existing programs promote pollution prevention in innovative ways." Article giving one-to two-paragraph descriptions of numerous U.S. EPA pollution prevention programs. The sections and programs include:

- I. Integrating P2 into EPA's Mainstream Activities: (a) Source Reduction Review Project, and (b) P2 in Enforcement Settlement Policy.
- II. State and Local Partnerships: (a) P2 Incentives for the States and (b) Multimedia Grants.
- III. Private Partnerships to Develop Innovative Cross-Media Approaches: (a) 33/50 Program; (b) Green Lights Program; (c) Energy Star Computers; (d) Design for the Environment; (e) EPA-GSA Cleaners Project; and (f) Water Alliances for Voluntary Efficiency.
- IV. Cooperative Efforts With Other Federal Agencies: (a) Agriculture in Concert with the Environment, and (b) National Industrial Competitiveness through Efficiency: Energy, Environment, and Economics.
- V. Identify, Generate, and Transfer Information: (a) The Toxics Release Inventory; (b) Pollution Prevention Information Clearinghouse.
- VI. Partnerships in Technological Information: Clean Technologies Program.

Also includes EPA contact information for each of these programs.

Koshland Jr., Daniel F. "The Dirty Air Act" (editorial). *Science* 249 (28 September 1990): 1481. [II.C]

Short note about the use of life-cycle assessment in the debate over disposable and cotton diapers. Comments that even though the results are far from clear, using LCA is a much more level-headed approach than the usual political approach to environmental controversies.

Lai, On-Kwok. "Making Sense of the Greening of Consumption and Production." *Journal of Cleaner Production* 1, no. 1 (1993): 43–47. [III.C]

Describes the relationships between green consumption and green production. Examines the issue from a social/political studies perspective. Spotlights the provision of green products in Germany, both officially labelled as such and informally labelled. The author concludes by stating that green products and green labelling are not just a result of advertising and marketing, but a manifestation of a "new advanced eco-cultural project, 'Saving our Earth.'"

Larson, Eric D., Marc H. Ross, and Robert H. Williams. "Beyond the Era of Materials." *Scientific American* 254, no. 6 (1986): 34–41. [I.A]

Subtitle: "The industrial nations now face a historic change: economic growth is no longer accompanied by increased consumption of basic materials. The economic outlook depends on the capacity to adapt to this shift." Emphasizes efficiency improvements as the driving force for decreasing per-capita consumption of materials. Discusses the implications of this new "Information Era" on several specific industries and society in general.

Lave, Lester B., Chris Hendrickson, and Francis C. McMichael. "Recycling Decisions and Green Design." *Environmental Science and Technology* 28, no. 1 (1994): 18A–24A. [I.A]

Takes a life-cycle impact approach to recycling. Shows that design-for-recycling can be a pollution prevention activity.

Lefferts, Lisa Y., and Roger Blobaum. "Eating as if the Earth Mattered." *E Magazine* 3, no. 1 (January 1992): 30–37. [IV]

Introduction: "Environmentally savvy consumers steer clear of toxic cleaners, bleached coffee filters

and plastic bags at the supermarket, and fret about the recyclability of containers. But most of us barely give the environment a second thought when it comes to choosing food, the product we buy most often at the grocery store. But besides profoundly affecting our health, our food choices greatly affect the environment." Mentions pesticides and other chemicals used in producing food, the benefits of organic farming, the connections between diet, human health, and the environment, and the advantages of locally grown produce.

Lehrburger, Carl. *Diapers in the Waste Stream: A Review of Waste Management and Public Policy Issues*. Sheffield, MA: Carl Lehrberger, 1989. [IV]

Cotton diaper industry-sponsored report indicating that cotton diapers are environmentally preferable to disposable diapers.

Lewis, Eleanor J., and Eric Weltman. *Forty Ways to Make Government Purchasing Green*. Washington: Center for the Study of Responsive Law, 1992. [II.B]

Describes 40 specific suggestions at all levels of government to make environmental protection improvements. Divided into three sections: solid waste reduction, energy efficiency, and pollution prevention. Includes numerous examples, contact information, and additional resources.

Lieberman, Joseph I. "Why Not Require Pollution Prevention Planning?" *EPA Journal* 19, no. 3 (July 1993): 34–35. [I.C]

Subtitle: "Required analysis would help companies find ways to cut waste." Short article describing the author's draft U.S. Senate bill to require companies to submit pollution prevention plans. The author is concerned about "command and control" issues, and explains that the bill would not stipulate P2 performance requirements. Instead, the aim of his bill is to stimulate businesses, particularly small and medium sized companies, to examine options for preventing pollution.

Lifset, Reid. "Greener Than Thou Wars—Raising the Ante for Life Cycle Analyses." *Biocycle* 32 (April 1991): 76–77. [II.C]

Short article describing the controversy with competing LCA methodologies and results.

Lis, James, and Kenneth Chilton. "Limits to Pollution Prevention." *Society* 30, no. 3 (1993): 49–55. [I.C]

Critical article arguing that the fixed pollution prevention/recycling/disposal hierarchy and other mandated prevention approaches are not always economically efficient nor scientifically justifiable. Authors note that pollution in the U.S. causes a small percentage of all cancer deaths, despite perceptions to the contrary. While not criticizing the goal of reduced pollution, authors point out the cost of preventing pollution may be greater than the benefits. Prescriptive approaches to P2, such as mandatory P2 planning, required process changes, and burdensome reporting requirements, represent unwarranted expansion of governmental influence and can place U.S. firms at international competitive disadvantage. Instead, they call for flexible, market-oriented approaches to pollution control such as EPA's 33/50 industrial toxics reduction program.

Lotter, Donald W. *EarthScore: Your Personal Environmental Audit & Guide*. Lafayette, CA: Morning Sun Press, 1993. [III.C]

A guidebook for determining one's personal "EarthScore." By answering questions in 14 sections, one can determine a total "impact" and "action" rating—and a label such as "Eco-Titan" or "Eco-Tyrannosaurus rex." Each question also includes a paragraph describing the nature of the environmental impact and suggested resources. The methodology for determining the environmental impacts is based on published information but cannot be considered rigorous life cycle assessment. Impact categories include: household energy, water use, transportation, durable goods use, food and agricultural products, paper and forest products, toxics, waste, environmental advocacy, respect for the land, livelihood, and family planning. The author has also created EnviroAccount, a personal computer program with the same purpose.

Lovins, Amory B. "Abating Air Pollution at Negative Cost Via Energy Efficiency." *Environmental Professional* 12 (April 1990): 164–168. [I.C]

Introduction: "Although abating urban smog, acid precipitation, global warming, and other results of air pollution is . . . assumed to require costly technological investments or inconvenient lifestyle changes or both, new developments in efficient end-use of energy can now reduce emissions even more at zero or negative net internal cost to society, while providing unchanged or improved services to customers."

Maxwell, James, Lola Matysiak, Jennifer Nash, and John Ehrenfeld. "Case Study: Preventing Waste Beyond Company Walls: P&G's Response to the Need for Environmental Quality." *Pollution Prevention Review* 3, no. 3 (June 1993): 317–333. [III.A]

Describes the efforts of consumer products sector corporation Proctor & Gamble to reduce solid waste and other forms of pollution. Mentions such projects as eliminating phosphates from detergents in the 1970s, using recycled plastic packaging, marketing detergent refill units, reducing deodorant packaging, combining shampoo and conditioner products, and composting disposable diapers. Discusses how P&G develops and markets its products, and how environmental concerns are part of the decision-making process.

McDonald's Corporation and the Environmental Defense Fund. *Waste Reduction Task Force: Final Report*. 1991. [III.A]

Comprehensive report covering the innovative waste reduction partnership between a for-profit corporation and a not-for-profit environmental group. Details the packaging and other waste sources in the McDonald's system. Examines in detail source reduction, reuse, recycling, and composting waste reduction options. Source reduction and reuse actions considered or implemented include: elimination of chlorine-bleached paper, switching from polystyrene to paper sandwich wraps, reusable bulk storage systems, and packaging reduction for a variety of behind-the-counter and customer-based items. Report highlights the practical challenges in implementing waste reduction efforts. It also addresses trade-offs between different waste reduction methods, such as choosing a package made with recycled content versus a virgin content package made with less material.

McGraw, Jack W. "The Denver Airport: Pollution Prevention by Design." *EPA Journal* 18, no. 2 (May 1992): 18–19. [IV]

Short article describing some of the many P2 features that are being designed into Denver's new \$2.7 billion airport project. An EPA staff person has been on loan to the airport authority to help design these P2 features.

McMurray, Scott. "Chemical Firms Find That It Pays to Reduce Pollution at Source." *Wall Street Journal* (11 June 1991): A1, A6. [III.A]

Subheading: "By altering processes to yield less waste, they make production more efficient." Feature article that discusses the chemical industry's newfound enthusiasm for P2 as a means to achieve industrial efficiency and cut costs. Includes a brief historical explanation and a number of short P2 case studies from many of the major chemical companies.

Meadows, Donella H., Dennis L. Meadows, and Jorgen Randers. *Beyond the Limits: Confronting Global Collapse, Envisioning a Sustainable Future*. Post Mills, VT: Chelsea Green Publishing Company, 1992. [II.A]

A revised version of the influential and controversial 1972 book, both which use a systems approach to examine global sustainability. Presents a number of future scenarios using a global model with inputs such as resource consumption rates, amount of pollution generated, population growth, and other variables. Shows human life as non-sustainable along the current trajectory; advocates an alternative sustainable path with P2 as a necessary but insufficient component. Somber message delivered with an upbeat tone.

*Metal Industries—Metal Finishing, Manufacturing* (fact sheets). Compiled by the U.S. Environmental Protection Agency, Office of Prevention, Pesticides and Toxic Substances. Washington: EPA, 1993. [IV]

A compendium of fact sheets written by state governments and other entities. A total of 14 different documents discussing P2 opportunities in the metal manufacturing and finishing industries. Topics include machine tooling, ion exchange metal recovery, and silver recovery.

Miller, G. Tyler Jr., ed. *Living in the Environment: Principles, Connections, and Solutions*, 8th ed. Belmont, CA: Wadsworth Publishing Company, 1994. 701+ pp. [key doc.]

One of longest standing and more popular environmental science textbooks. Explains P2 in the first chapter, emphasizing prevention over cleanup. The P2 theme runs throughout the text, with sections on preventing air, water, solid waste, hazardous waste, and pesticide pollution. Human sustainability in the ecosystem is a broader theme, touching on scientific

background, examining current policies and activities, and emphasizing sustainable strategies for the future. Includes guest author essays (including one about P2 by Peter Montague), case studies, and "individuals matter" action strategies. Also includes critical thinking questions and other teaching aides.

Mitsch, William J. "Ecological Engineering." *Environmental Science and Technology* 27, no. 3 (1993): 438–445. [II.A]

Article describing the emerging field of ecological engineering, defined as "the design of human society with its natural environment for the benefit of both." The concept pertains more to managing the natural environment rather than the typical engineering domain of the built environment. Gives examples such as the Biosphere project, constructed wetlands sewage treatment systems, water hyacinth river pollution control, and fish production and wetlands systems as examples of ecological engineering. Most examples mentioned are water based. The concept is more popular in Europe and China than in the U.S.

Mitsch, William J., and Sven Erik Jorgensen, eds. *Ecological Engineering: An Introduction to Ecotechnology*. 472 pp. Somerset, NJ: John Wiley & Sons, 1989. [II.A]

An edited collection of papers all with the common theme of approaching design and engineering so that human society is compatible with the natural environment. Human interactions, from this perspective, are considered a part of rather than separate from nature. The book is divided into two parts. Part One gives basic principles, definitions, and concepts; Part Two is a collection of 12 international case studies. The ecological engineering concept is somewhat broader than P2, incorporating a wider scope of engineering, planning, and applied ecology concepts and including ecologically based recycling. Nevertheless, the book may be a useful bridge among ecology, engineering, and P2. Many of the applications are water-based.

Moberg, David. "Sunset for Chlorine?" *E Magazine* 4, no. 4 (July 1993): 26–31. [IV]

Introduction: "Americans use chlorine in swimming pools, drinking water and laundry bleach. But this popular chemical ingredient contributes to some of our worst pollution problems, from ozone depletion to dioxin. The Great Lakes, long a catch basin for factory wastes, are the site of an ambitious campaign

to ban the industrial use of chlorine.” Includes an inset article: “Can You Live Without Chlorine?” by the same author. This short article describes common consumer products that contain chlorine based compounds, and potential substitutes.

Moore, W. Kent, and David L. Scott. “Beverage Container Deposit Laws: A Survey of the Issues and Results.” *Journal of Consumer Affairs* 17, no. 1 (1983): 57–80. [IV]

Introduction: “Much of the movement toward mandatory beverage deposit legislation has withered away in the current anti-regulation mood of the country. Even before the change in mood, the major focus of deposit laws was moving away from litter control and toward energy and resource savings. In fact, deposit laws have had a variety of repercussions on such factors as jobs, consumer prices, industry capital expenditures, energy consumption, and litter. The cooling emotions and lapse in time since most of the regulations were enacted provide a good opportunity to sort through the arguments and review the results. This paper attempts to present a balanced view of the issues surrounding the complicated topic. It finds that the consequences of mandatory deposits have generally been somewhere between the initial predictions of groups favoring legislation and those opposing it.”

Moos, Shawna. “Pollution-Prevention Power to the People.” *Technology Review* 95 (October 1992): 15–16. [III.C]

Short article describing how the publicly available Toxic Release Inventory (TRI) data is used by citizen groups and others to encourage companies to reduce pollution emissions.

Nash, Jennifer, and Mark D. Stoughton. “Learning to Live with Life Cycle Assessment.” *Environmental Science and Technology* 28, no. 5 (1994): 236A–237A. [II.B]

Short article describing the benefits, drawbacks, and associated issues surrounding the use of life cycle assessments (LCAs) to assess “green products.” Some lessons learned from a recent LCA conference include the following: For consumer products, the indirect impacts of products (e.g., clothes washing) may be far greater than the direct impacts (e.g., clothes manufacturing); The conventional wisdom of reducing environmental impact through “reduce, reuse, recycle” activities may not hold true if all

LCA impacts are considered. Authors also discuss the increasing use of LCAs as a regulatory tool. The lack of conventions for conducting LCAs, however, is a problem.

National Research Council, Commission on Life Sciences, Committee on the Applications of Ecological Theory to Environmental Problems. *Ecological Knowledge and Environmental Problem-Solving: Concepts and Case Studies*. Washington: National Academy Press, 1986. [V.B]

The culmination of a national project to examine how ecological understanding can help solve environmental problems. Book is divided into two sections: (1) a description of ecological knowledge and how it is applied, and (2) 13 case studies of environmental problem-solving. There is an indirect link to P2 in the discussion of the ecological effects from contaminants and toxic substances in the first section. The case studies are more aligned toward ecological assessment than preventive management. Some, such as Washington Lake and DDT cases, may nonetheless illustrate the linkages between ecological knowledge and pollution avoidance.

\_\_\_\_\_, Commission on the Behavioral and Social Sciences and Education, Committee on the Human Dimensions of Global Change. *Global Environmental Change: Understanding the Human Dimensions*. Paul Stern, Oran Young, and Daniel Druckman, eds. Washington: National Academy Press, 1992. [III.C]

Book written by leading authorities outlining social science approaches to understanding and managing global change. A comprehensive review of approaches, with the emphasis on social (sociology, policy, etc.) over individual (psychology) methods.

\_\_\_\_\_, Committee on Institutional Considerations in Reducing the Generation of Hazardous Industrial Wastes. *Reducing Hazardous Waste Generation: An Evaluation and a Call for Action*. Washington: National Academy Press, 1985. [I.C]

One of the earlier books on industrial hazardous waste prevention, reuse, and recycling. In a compact (76-page) form, the report examines the nontechnical institutional factors that affect the generation and reduction of industrial hazardous wastes. Useful discussion of the three (initial, development, and mature) phases of hazardous waste minimization program. Describes both regulatory and non-regulatory policy options.

Ophuls, William, and A. Stephen Boyan, Jr. *Ecology and the Politics of Scarcity Revisited: The Unraveling of the American Dream*. New York: W. H. Freeman and Company, 1992. [II.B]

An ecological critique of American political institutions. Boyan has updated Ophuls original 1977 book. Authors take a Hobbesian approach to ecological problems, arguing that reformist ecological policies are not sufficient, and that liberal democracy is itself doomed. The first chapter introduces principles. The rest of the first section examines the status of population, food, mineral resources, deforestation, biodiversity, managing technology, and pollution. The second section discusses the politics of ecological scarcity, and the third section explores what the authors call “post-modern values” as means for learning to live with scarcity. Advocates a more loosely structured “design” approach to ecological sustainability than the more cumbersome “planning” approach. A P2 theme is not readily apparent, but the book does offer an inquiry into the political nature of resource scarcity and pollution control that would lend itself to a discussion of P2.

Orr, David. “The Campus and the Biosphere.” *Journal of Conservation Biology* 3, no. 2 (June 1989): 33+. [II.A]

Overview of a comprehensive ecological investigation of the Oberlin College food service—where the food comes from, ecological and environmental impacts, etc. (See also the *Where Does Our Food Come From?* videos.)

\_\_\_\_\_. *Ecological Literacy: Education and the Transition to the Postmodern World*. Albany, NY: State University of New York Press, 1992. [V.B]

A post-modern ecological counter to Bloom’s *The Closing of the American Mind*. Includes a chapter entitled “Syllabus for Ecological Literacy.” Stresses fundamental concepts of sustainability by learning from ecological relationships. Critical of “big technology” and, in general, the standard “modern” world-view. Little explicit relationship with P2, but useful as background reading on integrating new concepts such as sustainability, ecological systems, and P2 into liberal arts education.

“A Paper Tale. . .” (Washington Report). *The Office* 117 (February 1993): 14. [III.B]

Short article describing the inefficient process by which the U.S. Government Printing Office publishes the *Federal Register*. Compares this with the much more efficient process the Commerce Department uses for publishing *U.S. Industrial Outlook*.

Peet, John. *Energy and the Ecological Economics of Sustainability*. Washington: Island Press, 1992. [I.A]

Despite the title, the coverage is broader than energy and economics. Provides context for both where humans are now and a practical vision for movement toward human-environment sustainability. Succinctly covers many topics. Three major parts: “Nature: The World as We See it,” “Limits: The Dark Side,” and “Choices: Toward the World as it Could Be.” Sections cover such topics as thermodynamics, current state of economics, paradigms, growth, ecology, human-nature relations, values. Author touches on the relationship between energy, ecological systems and pollution throughout the book but extends the prevention concept into a wider range of issues than are normally considered. Could be used as a textbook.

Piasecki, Bruce, and Peter Asmus. *In Search of Environmental Excellence: Moving Beyond Blame*. New York: Simon & Schuster/Touchstone, 1990. [III.A]

Gives an overview of the major environmental issues, particularly nuclear weapons and greenhouse gases, then examines how citizens, industries, and environmental groups can be part of the solution. Uses the “excellence” concept in the sense of humans properly managing the environment. Discusses P2 and related concepts in broad, non-technical terms, countering what authors note as fallacies in the stereotypical roles of both industry and the environmental movement.

Pojasek, Robert B. “For Pollution Prevention: Be Descriptive Not Prescriptive.” *Chemical Engineering* 98 (September 1991): 136–139. [III.A]

A short, general article that deals with the basics involved in the initial description of an industrial P2 strategy. Discussed are the importance of a process flow diagram, brainstorming solutions, and a feasibility study.

\_\_\_\_. "Pollution Prevention Progress." In *Environmental Risk Management—A Desk Reference*, pp. 503–519. Eric B. Rothenberg and Dean Jeffrey Telego, eds. Alexandria, VA: RTM Communications, Inc., 1991. [III.A]

Describes the progression of pollution prevention, both from a policy perspective as well as from a practical implementation orientation. Gives five stages of progression for a company's pollution prevention program: damage control, pollution control, waste minimization, source reduction, pollution prevention. The author cites 15 milestones at the pollution prevention stage, with each of these described in a paragraph or two.

Poore, Patricia. "Disposable Diapers are OK." *Garbage* 4, no. 5 (October 1992): 26–31. [IV]

Article using disposable diapers as an example for distinguishing between symbol and crisis in the environmental protection movement. The author, publisher of *Garbage* magazine, discusses the controversial cloth/disposable diaper debate as an example of the hyperbole in the environmental movement. She defends her own household's use of disposable diapers and discusses how her opinion has changed since the initial publication of the magazine. An accompanying excerpt from William Rathje and Cullen Murphy ("Cotton vs. Disposables: What's the Damage?") briefly discusses the comparative environmental impacts of cloth and disposable diapers.

Portney, Paul R. "The Price Is Right: Making Use of Life Cycle Analyses." *Issues in Science and Technology* 10, no. 2 (December 1993): 69–75. [II.C]

Article presenting issues associated with what the author terms "product life cycle analysis" (PLCA). Mentions the three phases of PLCAs: inventorying environmental consequences, assessing human and ecological impacts, and making improvements based on the first two phases. Notes advantages of PLCA, particularly its comprehensive scope. Also presents a number of limitations of PLCAs, including the following:

1. Determining the boundary in a PLCA can be daunting, and the effects of changing the boundary can be quite large.
2. Impacts are difficult to standardize because they vary according to time and place.
3. The relative weights of different types of impacts are very difficult to determine.

4. The impact phase of a PLCA can be indeterminate, such as two studies leading to opposite dose-response conclusions.
5. Most PLCAs assume comparable products provide identical services, which is not always true.
6. Non-environmental impacts, such as labor and capital, are often neglected in many PLCAs.
7. The cost to conduct an LCA is often exorbitant.
8. Using a life cycle approach, producers of consumer items would need to make hundreds of decisions about how they make and distribute products.
9. PLCA results quickly become outdated.
10. Accurate PLCAs are confounded by an unwillingness to divulge trade secrets.
11. Results from PLCAs are difficult to convey succinctly to consumers.

The author argues that the price system, although imperfect, offers an easier way to make informed purchasing decisions; he proposes that PLCAs be used selectively to identify environmental impacts that are not covered by the price system.

Post, James E. "Managing As If the Earth Mattered." *Business Horizons* 34, no. 4 (July 1991): 32–38. [III.A]

An introductory article describing the need to reconcile economic activity with ecological viability. Mentions the tragedy of the commons and sustainable development. Describes ozone depletion, global climate change, and loss of biodiversity as common-type problems that profoundly affect business and society. Calls for efficient resource use, waste reduction, and a sustainable level of industrial production as part of the greening of business management.

Postel, Sandra. "Water Tight." *World Watch* 6, no. 1 (January 1993): 19–25. [IV]

Case studies of water conservation programs in Mexico City, Waterloo, San Jose, and Boston plus additional description about the growing movement to make water use more efficient. The article also discusses mechanisms for decreasing water use, such as charging for the amount of water used, pricing water to reflect its true costs, using information campaigns, pushing for government mandates (such as building codes that require water-efficient plumbing), xeriscaping (landscaping with plants that require little or no additional water in the local climate), and repairing leaks in water delivery systems.

President's Commission on Environmental Quality, Quality Environmental Management Subcommittee. *Total Quality Management: A Framework for Pollution Prevention*. Washington, 1993. [I.C]

Describes the findings of PCEQ's Quality Management Subcommittee. From the basis of 12 company "quality environmental management" P2 case studies, the report describes the background for P2 and the steps for a business P2 program. Also includes tools and techniques, metrics, and a limited bibliography.

Procter and Gamble, Inc. *Decision: Earth. An Environmental Teaching Unit for Grades 7-12*. 1993. [V.A]

A collection of teaching materials, including teacher's guide, a municipal solid waste composting teaching supplement, photocopy-ready activity sheets, and two color posters. Much of the unit is devoted to life cycle assessment (LCA) of consumer products. The LCA unit includes four lessons and 14 student activities. The introduction describes it as "an environmental curriculum supplement designed to raise student awareness of the complex consumer product choices they face and help them make informed choices based on a product's ability to meet their needs as consumers." While many of the lessons are general in scope, the activity evaluating disposable vs. cloth diapers has raised controversy for allegedly presenting disposable diapers with a positive bias—P&G is the largest U.S. manufacturer of disposable diapers. Portions can be useful for college audiences.

Purcell, Arthur H. "Invited Comments." *Air & Waste* (Journal of the Air & Waste Management Association) 42 (1992): 1169-1170. [V]

In a brief response to the Freeman, et al., article titled "Industrial Pollution Prevention: A Critical Review," Purcell mentions how little attention is given to P2 in social sciences and liberal arts, noting the inevitable move towards including consumption patterns under the rubric of P2.

Rabe, Barry G. "From Pollution Control to Pollution Prevention: The Gradual Transformation of American Environmental Regulatory Policy." *Environmental and Planning Law Journal* (September 1991): 226-231. [I.C]

Abstract: "The limitations of the United States' medium-based, pollution control-oriented approach to environmental regulation is becoming increasingly evident, prompting individual states and the Federal

Government to give more serious consideration to preventive strategies than ever before. In recent years, states such as Massachusetts, Minnesota, and New Jersey have devised a variety of regulatory experiments designed to link pollution prevention with cross-media regulatory integration. These experiments are far more ambitious than prior prevention-oriented programmes and may constitute models for other subnational and national units of government."

Rathje, William. *Anthropology 337: Modern Material Culture Studies* (syllabus). University of Arizona, 1993. [V.A]

Syllabus and reading list for a unique course using garbage and similar bits of evidence for clues to human behavior and culture. Readings are from a myriad of sources, centering around anthropology.

\_\_\_\_\_. "Rubbish!" *The Atlantic Monthly* 264 (December 1989): 99-109. [I.B]

Describes the findings of the Garbage Project's anthropological landfill excavations in a humorous but enlightening style. The author, an anthropologist, shows how our waste disposal practices can give much insight into human behavior and culture. The author has also published a book by the same title.

Robbins, John. "Can Earth Survive the Big Mac Attack?" *E Magazine* 3, no. 1 (January 1992): 38+. [IV]

Introduction: "Animal agriculture has grown to an industry at odds with the health of the planet. A reduction in meat consumption may be the single most potent act we can take to halt the destruction of our environment. The time has come to think before we eat." Article describes the environmental effects from meat consumption, including a "Robbins Index" of factoids. The author also mentions health problems associated with eating meat as well as ethical concerns.

Robins, Nick, and Alex Trisoglio. "Restructuring Industry for Sustainable Development." In *Making Development Sustainable: Redefining Institutions, Policy, and Economics*, pp. 157-194. Johan Holmberg, ed. Washington: Island Press, 1992. [IV]

This chapter discusses the context and strategies for sustainable development within the global industrial sector. In the North industries are undergoing a "dematerialization" per unit GNP while in the South there is rapid industrialization. Mentions the

partial greening of businesses, from both regulatory “push” and market “pulls.” Problems thwarting sustainable business development include the competitive business model, resistance of businesses to public pressure/legislation, difficulty of changing attitudes and culture, linear industrial ecosystems, and closed decision-making processes. Outlines a 10-point “eco-industrial policy” that could be used to overcome these obstacles.

Rocky Mountain Institute and the U.S. Environmental Protection Agency, Region VIII. *Negawatts—A Goldmine of Opportunity* (video). 1991. 20 minutes. [IV]

Description from EPA’s *Reference Guide to Pollution Prevention Resources*: “Negawatts describes how corporations can join in the energy-efficiency revolution yielding economic and environmental benefits throughout the world. Aggressive energy efficiency programs are enabling many leading corporations to improve bottom-line performance while meeting customer demands for greater corporate responsibility. Energy efficiency devices can generate electricity savings (negawatts) to displace the output of 500 typical power plants. As an added benefit, these technologies prevent pollution by wringing more work out of each unit of energy. Energy efficiency also creates jobs and reduces dependence on foreign oil.”

\_\_\_\_\_. *Transportation 2000—Moving Beyond Auto America* (video). 1991. 30 minutes.

As described in EPA’s *Reference Guide to Pollution Prevention Resources*: “Transportation 2000 discusses different technologies for producing more efficient automobiles.”

Roodman, David Malin. “Power Brokers: Managing Demand for Electricity.” *World Watch* 6, no. 6 (November 1993): 22–29. [IV]

Describes the rise of demand-side management (DSM) programs at electric utilities, using the example of the California electric utility, Pacific Gas & Electric, as a case study. Describes how utilities, under pressure from regulatory agencies and environmental groups, have shifted from investing in more capacity toward investing in more efficiency. The utilities promote efficiency through programs such as low-cost loans for insulation or new equipment, which are paid for through higher electricity rates. With greater consumption efficiency, however, overall electricity costs decrease. The article describes

how these somewhat counterintuitive tactics are gaining credence throughout the U.S. and the rest of the world.

Rose, Julian. “And the Detergent ‘Eco-label’ Goes to. . .” *Environmental Science and Technology* 28, no. 4 (1994): 179A. [IV]

Brief article describing the controversy in Europe over environmental impacts of detergents. The European Union intends to award “eco-label” to environmentally friendly detergents. Detergents including phosphate would not be eligible. However, European phosphate producers commissioned a scientific consultative study (using the Delphi technique) that indicates phosphate is hardly more environmentally harmful than alternative ingredients.

Roy, Manik. “Environmental Law: Pollution Prevention, Organizational Culture, and Social Learning.” *Environmental Law* 22 (1991): 189–225. [I.C]

PIES Abstract: “This document addresses some of the fundamental theories of U.S. environmental protection policy. This policy has proven difficult to practice due to the complexities of evaluating social costs of pollutant discharges and the inability of government agencies to enforce environmental laws on all of the world’s polluters. This document highlights the weaknesses of the simple explanations of environmental protection policy and then explores the role of the social sciences in environmental policies. Finally, the document suggests a direction for environmental policy that helps society to understand how best to limit its pollution through prevention by better reflecting the realities of those companies and individuals that generate waste.”

Schmidheiny, Stephan, with the Business Council for Sustainable Development. *Changing Course: A Global Business Perspective on Development and the Environment*. Cambridge, MA: MIT Press, 1992. [III.A]

Released around the time of the United Nations Conference on Environment and Development (UNCED) in Rio de Janeiro, this book provides a business perspective on sustainable development. Working from the basis that a healthy environment is a prerequisite for a healthy economy, the authors examine how the economy can be reshaped in sustainable development terms. Integrates P2 into the prescription for sustainable business development, although much of the text is framed in broader terms. Includes many case studies from corporations around the world.

Scholand, Michael. "Building for the Future." *World Watch* 6, no. 6 (November 1993): 36–38. [IV]

Describes new trends to improve the energy efficiency of commercial and domestic buildings, which now use 36% of the U.S. energy budget. Gives examples of measures such as thermal windows, insulated walls, auto-dimming lights, variable flow climate control systems, water conservation, and natural lighting. A number of the described programs are outside the U.S. Describes how efficiency increases in buildings are likely to come from two forces: regulatory (such as stricter building codes) and voluntary (from pioneering architects and home-builders).

Schwepker, C. H., and T. B. Cornwell. "An Examination of Ecologically Concerned Consumers and Their Intention to Purchase Ecologically Packaged Products." *Journal of Public Policy & Marketing* 10, no. 2 (September 1991): 77–101. [III.C]

Scholarly marketing-studies article presenting results of a questionnaire-based study that examined variables which may indicate which people are willing to purchase ecologically packaged products. The study found significant discriminating variables to be attitude toward ecologically conscious living, attitude toward litter, locus of control (i.e., whether or not one has a sense of personal control over one's life), and perception of pollution as a problem. Demographic variables were not found to be as important as sociopsychological variables. The research indicates that most consumers would be willing to purchase products with reduced, recyclable, and/or biodegradable packages and that policymakers and marketers may want to increase their efforts to educate consumers about the solid waste problem.

"Selling Green." *Consumer Reports* 56, no. 10 (October 1991): 687–692. [III.C]

Critical article about eco-marketing oriented toward the savvy consumer. Mentions numerous positive and negative examples of green products and packaging. Includes an inset box on the controversy surrounding the U.S. EPA's *Consumer's Handbook for Reducing Solid Waste*.

Seymour, John, and Herbert Girardet. *Blueprint for a Green Planet*. New York: Prentice Hall, 1987. [III.C]

Book by British authors that suggests actions that individuals can take to minimize pollution and reduce resource use. Takes the perspective that individual behaviors are important and that consumption must be moderated. Can take on a moralistic tone at times, although it provides a number of practical suggestions. Major topics include household water use, agriculture, food, solid waste, medicines and toiletries, household toxics, energy use, and automobiles.

Sheridan, John H. "Pollution Prevention Picks Up Steam." *Industry Week* 241 (17 February 1992): 36+. [III.A]

Article describes the success of voluntary P2 programs but warns that stricter regulations may be developed. Begins with several P2 success stories from the manufacturing sector. Mentions common conflicts between environmental and production staff over making P2 changes to the production process. Compares EPA's focus on source reduction with a more "balanced" approach, which would also include recycling, treatment, and disposal.

Smart, Bruce, ed. *Beyond Compliance: A New Industry View of the Environment*. Washington: World Resources Institute, April 1992. [III.A]

A compilation of company information releases and other original material by Smart, former CEO of a Fortune 100 corporation. P2 is a central theme within the broader analysis of business and the environment.

Smith, Emily T., David Woodruff, and Fleur Templeton. "Growth vs. Environment: In Rio Next Month, a Push for Sustainable Development." *Business Week* (11 May 1992): 66–70, 72–75. [key doc.]

Written just before the UNCED Earth Summit, this cover story examines unsustainable human practices and what can be done to bring about sustainable human development. A proposed solution for sustainable development includes increased efficiencies in both resource use and pollution emissions, a framework for change such as environmental taxes and international agreements, population stabilization, and restraints on consumption. "Sustainable development would stress prevention" (p.75). Includes many examples and quotes from leading experts.

Society of Environmental Toxicology and Chemistry (SETAC). *Guidelines for Life-Cycle Assessment: A Code of Practice*. SETAC workshop, Sesimbra, Portugal, 31 March–3 April 1993. Pensacola: SETAC, 1993. [II.B]

An overview, in booklet form, giving an update current on standardizing LCA. Written by members of a working group under the auspices of the professional organization SETAC. The guidelines cover the three-part LCA framework (inventory, impact, and improvement analysis) while addressing data quality, applications and limitations, and future research needs.

Stern, Paul C. "Psychological Dimensions of Global Environmental Change." *Annual Review of Psychology* 43 (1992): 269–302. [III.C]

Comprehensive scholarly review article that weaves together many themes relating to global change, environmental protection, and human behavior. Lengthy bibliography.

Stipp, David. "Life-Cycle Analysis Measures Greenness, But Results May Not Be Black and White." *Wall Street Journal* (28 February 1991): B1, B5. [II.C]

Describes the controversy over the use of life-cycle analyses to defend or market products. Mentions the LCA debates surrounding plastic foam vs. paper hamburger containers and disposable vs. cotton diapers. Concludes that there may be no right answer on how to use and interpret LCA.

Tchudi, Stephen. "A Lesson Plan in Pollution Prevention." *EPA Journal* 19, no. 3 (July 1993): 42–43. [V.A]

A short guide to introducing P2 concepts "from kindergarten on up." Explains P2 through an analogy of preventing one's room from getting messy. Gives suggestions for eight activities to explore P2 beyond the classroom. Most activities are based on actions appropriate for elementary school students can participate in.

Tibbs, Hardin B. C. "Industrial Ecology: An Environmental Agenda for Industry." *Whole Earth Review* 77 (December 1992): 4–19. [II.A]

Gives a non-technical introduction to the industrial ecology concept—that sustainable industrial development needs to mimic ecological systems.

Tolba, Mostafa K., and Osama A. El-Kholy, eds. *The World Environment 1972–1992: Two Decades of Challenge*. 884 pp. London: Chapman and Hall (on behalf of United Nations Environment Program), 1992. [I.A]

Detailed reference book describing current environmental conditions as well as education and management scenarios. Emphasizes the global perspective, including but not stressing the role of the U.S. Chapter 12, "Industry," is a detailed description of environmental impacts of industrial development around the world, including the advent of "cleaner production" as a proactive response. Chapters on other topics also mention prevention-oriented management strategies. Chapter 20, "Understanding the Environment," is a comprehensive overview of environmental monitoring, assessment, and management tools. Overall theme of the book is the promotion of sustainable development.

Tracey, Jim. "Green Lights for Home and Business." *Garbage* 4, no. 5 (October 1992): 49+. [IV]

Article discussing the advent of compact-fluorescent light bulbs—electric light bulbs which fit into most sockets and use a fraction of the electricity drawn by incandescent bulbs. Mentions the electricity and associated environmental impacts reduced by using compact fluorescents. Discusses efforts to promote "compacts" by electric utilities and the U.S. EPA's "Green Lights" program. Also mentions some of the drawbacks to compacts. Includes a chart listing the features of popular compacts, including the amount of avoided CO<sub>2</sub> emissions. Article is adjacent to related advertisements by the EPA's Green Lights program, the Edison Institute, and compact fluorescent bulb vendors.

Underwood, Joanna D. "Going Green for Profit." *EPA Journal* 19, no. 3 (July 1993): 9–13. [III.A]

Subtitle: "Industry has barely tapped its potential." Article first describes some of the history leading up to the present interest in industrial P2. The author, president of the environmental research group INFORM, goes on to describe some of the P2 research projects INFORM has undertaken: a landmark 1986 study and a 1992 follow-up, both examining P2 in the chemical industry. Author mentions some of the trends from these reports and discusses the key features of a P2 program. The article ends with some still-to-be-answered questions about preventing chemical waste.

U.S. Congress, Office of Technology Assessment. *Changing by Degrees: Steps to Reduce Greenhouse Gases*. Washington: U.S. Government Printing Office, 1992. [III.B]

In-depth report that explores mechanisms the U.S. and other countries can use to reduce carbon dioxide (CO<sub>2</sub>) emissions. Major sectors examined include buildings, transportation, manufacturing, forestry, and food. The study found that major CO<sub>2</sub> reductions are possible but will require major new efforts by the federal government, the private sector, and individual citizens. Many of the initiatives will pay for themselves, while other efforts involve significant economic costs over many years.

\_\_\_\_\_. *Green Products by Design: Choices for a Cleaner Environment*. Washington: U.S. Government Printing Office, 1992. [II.A]

Comprehensive report focusing on design principles to help produce more environmentally friendly products. Focuses on the design process both to increase international competitiveness as well as reduce the life cycle (manufacture, use, and disposal) impacts from products. OTA's conceptualization of green design is divided among *waste prevention* (reducing weight, toxicity, and energy use, and extending service life) and *better materials management* (facilitating remanufacturing, recycling, composting, and energy recovery). For designers, there are often tradeoffs between beneficial design features. Overall, however, green design has the most impact by taking a product (life cycle) system perspective rather than changing the composition of the product itself. The report includes a discussion of U.S. and foreign "eco-label" programs. OTA points out that, in contrast to other countries' product focus on environmental protection (hence eco-labels), the U.S. environmental protection policy is focused on industrial pollutants. Concludes with three guiding principles for environmental policy development:

1. Identify the root problem and define it clearly;
2. Give designers the maximum flexibility that is consistent with solving the problem; and
3. Encourage a systems approach to green design.

\_\_\_\_\_. *Serious Reduction of Hazardous Waste: For Pollution Prevention and Industrial Efficiency*. Washington: U.S. Government Printing Office, September 1986. [I.C]

Report giving a pre-Pollution Prevention Act of 1990 introduction to P2 policy—why P2 should be the environmental goal and what policies can forward that goal. Makes the case for an aggressive national P2 policy. One of the first major reports to recommend pollution prevention. Out of print but not copyright protected.

U. S. Environmental Protection Agency. *Beyond Business as Usual: Meeting the Challenge of Hazardous Waste* (video). Denver: EPA. 28 minutes. [II.C]

From EPA's *Reference Guide to Pollution Prevention Resources*: "This video promotes source reduction and recycling as the best hazardous waste management options. It offers treatment as an alternative after all pollution prevention opportunities have been realized. *Beyond Business as Usual* supports its case with success stories from industry, federal agencies, and state and local government programs. The video stresses that successful P2 requires both industrial initiatives and governmental direction. It includes a short discussion of the Federal legislative foundation for this strategy and presents the opinions of a cross section of individuals involved in hazardous waste management."

\_\_\_\_\_. *Less Is More: Pollution Prevention is Good Business* (video). 1986. 23 minutes. [II.C]

From EPA's *Reference Guide to Pollution Prevention Resources*: "*Less is More* highlights industry success stories proving that P2 is the best alternative to costly end-of-the-pipe waste management strategies, such as treatment and disposal. The success stories draw from the experiences of both large and small industries, which include electroplating, ink manufacturing, metal parts manufacturing, pesticide formulating, and polyethylene producing concerns. The video describes three needs essential to successful P2 programs: top-down corporate commitment to lead the way, employee involvement, and procedures to track costs and potential liabilities. *Less Is More* demonstrates that, with regard to P2, company innovation—not regulation—is the key to cost savings, better worker health, and a cleaner environment. Preventing industrial waste generation is a 'win-win' situation in which government and industry can work as partners."

\_\_\_\_\_. *Turning the Tide: Keeping Pollution at Bay* (video). 1991. 31 minutes. [IV]

Video examining coastal protection and non-point source water pollution in the Buzzards Bay, Mass., area. Shows how the decisions of individuals, organizations, and elected officials can affect the quality of coastal resources. Indirect P2 message.

\_\_\_\_\_, Office of Communication, Education, and Public Affairs. *EPA Journal*—special issue on pollution prevention. Vol. 19, no. 3 (July 1993). 50 pp. [key doc.]

An issue of U.S. EPA's *EPA Journal* almost entirely devoted to pollution prevention. Most articles pertain to industrial P2 and the "win-win" aspect of P2 (protecting the environment and saving money). [For articles listed separately in this bibliography, see Baucus, Browner, Cebon, Kling & Schaeffer, Lieberman, Tchudi, and Underwood.]

\_\_\_\_\_, Office of Policy, Planning, and Evaluation. *Promoting Source Reduction and Recyclability in the Marketplace: A Study of Consumer and Industry Response to Promotion of Source Reduced, Recycled, and Recyclable Products and Packaging*. Washington: EPA, 1989. [III.B]

Report and annotated bibliography that examine source reduction and recycling marketing issues in the consumer products sector. Primary emphasis is the effect on the municipal solid waste stream. After examining the popular and academic literature, the report summarizes important components of successful consumer marketing programs. Includes recommendations for the implementation of a successful government-business program to encourage the sale of source-reductive and/or recyclable consumer products. Includes an extensive (58-page) annotated bibliography of relevant documents. Most are from popular journals and similar sources; some are from academic journals. The majority cover recycling rather than source reduction.

\_\_\_\_\_, Office of Policy, Planning, and Evaluation. *You Can Make a Difference*. Washington, January 1990. [III.B]

Pamphlet showing how individuals can help prevent pollution and set an example for others to follow. Activities are suggested in such areas as home energy conservation, reuse/repair/recycling,

transportation alternatives, pesticide use reduction, indoor air pollution reduction, lead-based paint reduction, and tree-planting. Also includes a list of additional contacts.

\_\_\_\_\_, Office of Pollution Prevention. *Pollution Prevention 1991: Progress on Reducing Industrial Pollutants*. Washington: EPA, 1991a. [III.A]

A comprehensive description of industrial P2 activities in businesses, the federal government, state and local governments, academia, and NGOs as of 1991. Includes one chapter describing national trends in industrial P2 and another outlining non-industrial dimensions of P2. A useful if already dated reference.

\_\_\_\_\_, Office of Pollution Prevention. *Pollution Prevention Fact Sheet: Local Governments and Pollution Prevention*. Washington: EPA, 1991b. [III.B]

Fact sheet describing the role of local governments in promoting P2. Mentions that they can provide: educational programs to raise awareness in businesses and the community; technical assistance programs to businesses and organizations; regulatory mechanisms such as codes, licenses, and permits; and procurement policies for recycled or recyclable products. The fact sheet reproduces two model ordinances, one establishing a recycled product procurement policy and the other establishing a hazardous waste minimization program for industrial pollutants discharged to sewers.

\_\_\_\_\_, Office of Pollution Prevention. *Report on the U.S. Environmental Protection Agency's Pollution Prevention Program*. Washington: EPA, 1991. [III.B]

Short report describing the EPA's P2 program. Gives a brief historical policy synopsis of the P2 program. The bulk of the report outlines various activities within the Office of P2, the rest of the EPA, and the rest of federal government. These include activities in the agriculture, consumer, energy and transportation sectors. Also described are efforts in EPA's offices of Air, Water, Solid Waste, Pesticides and Toxic Substances, Enforcement, and Research and Development, as well as in the EPA's 10 regional offices. The final section examines future directions, including life cycle assessment, creating a P2 ethic, and measuring P2. Provides insightful though somewhat dated overview of EPA's P2 activities. Also briefly describes three state programs.

\_\_\_\_\_, Office of Prevention, Pesticides, and Toxic Substances. *1993 Reference Guide to Pollution Prevention Resources*. Washington: EPA, February 1993. [key doc.]

An annual EPA publication with abundant information about P2 programs and resources throughout the U.S. Includes a lengthy listing of university-affiliated P2 research and training centers, state P2 programs, federal P2 programs, training guides, videos, and clearinghouses. Most listings include descriptions and contact information. Information is oriented to practitioners rather than teachers or researchers. (No 1994 guide issued.)

\_\_\_\_\_, Office of Research and Development, Risk Reduction Engineering Laboratory. *Pollution Prevention Case Studies Compendium*. Cincinnati: EPA, 1992. [III.B]

A compilation of case study summaries from EPA's Waste Reduction Innovative Technologies Evaluation (WRITE), Waste Reduction Evaluations at Federal Sites, Waste Minimization Assessments, and University-Based Assessments programs. The summaries, all two or three pages long, describe current practices and potential waste minimization/P2 alternatives. Some case studies are quite technical and relevant for specific manufacturing processes, others are more general relating to common manufacturing and service industry practices. Primarily addresses RCRA hazardous wastes, not all pollutants.

\_\_\_\_\_, Office of Research and Development, Risk Reduction Engineering Laboratory. *Running a Conference as a Clean Product*. EPA/600/2/91/026. Cincinnati: EPA, June 1991. [IV]

Report describing how to prevent pollution through environmentally sound conference management practices. Uses a 1990 EPA P2 conference as a model. Discusses successes and failures of the strategies pursued. Includes an interesting appendix of suggestion letters from others within and outside of EPA.

\_\_\_\_\_, Office of Research and Development. *Facility Pollution Prevention Guide*. EPA/600/R-92/088. Washington: EPA, 1992. [III.A]

A general "how-to" manual for industrial P2 programs. Updates the popular 1988 "Waste Minimization Opportunity Assessment Manual," which was aimed for generators of hazardous wastes. The focus

has been broadened to cover all pollutants (air emissions, wastewater discharges, solid wastes), energy and water consumption, and life-cycle impacts of product manufacture, use, and disposal. The primary audience remains manufacturing industries. Chapters address different aspects of a P2 program: initial organization, assessment of P2 options, measurement of progress, program maintenance, and economic analysis.

\_\_\_\_\_, Office of Solid Waste. *The Consumer's Handbook for Reducing Solid Waste*. EPA/530-K-92-003. Washington: EPA, August 1992. [III.C]

A guidebook to source reduction and reuse opportunities for individuals. Introduces the concept of source reduction and integrated waste management. Gives numerous suggestions for reducing household waste at the source. Includes examples of source reduction in communities and businesses, and appendices of terms and EPA resources. Has full color illustrations using a "the cat's out of the bag" theme. (An earlier version of this guide was considered too controversial to distribute.)

\_\_\_\_\_, Science Advisory Board. *Reducing Risk: Setting Priorities and Strategies for Environmental Protection*. Washington: EPA, 1990. [I.C]

Summary report describing the findings and recommendations of the Relative Risk Reduction Strategies Committee. The report is a follow-up to the 1987 "Unfinished Business" EPA report, which compared the relative risks of 31 environmental problems. This report outlines 10 findings of the committee and 10 EPA policy recommendations for reducing risk. One of these recommendations is that EPA should "emphasize pollution prevention as the preferred option for reducing risk."

\_\_\_\_\_. "Pollution Prevention Strategy." *Federal Register* 56, no. 38 (1991): 7849-7864. [I.C]

An official announcement of EPA's non-regulatory pollution prevention program as of the early 1990s. It serves a dual purpose: (1) providing guidance about incorporating P2 into existing EPA programs and (2) initiating a voluntary industrial toxics reduction program. The more lengthy guidance component describes general principles behind EPA's P2 program and discusses a number of P2 activities that EPA is pursuing. The second component justifies and outlines the industrial toxics project (also known as the 33/50 Program). Noteworthy and readable.

U.S. General Accounting Office. *Pollution Prevention: EPA Should Reexamine the Objectives and Sustainability of State Programs*, Washington: U.S. General Accounting Office, January 1994. [III.B]

Report to Congress evaluating the activities of state P2 programs. GAO identified 105 programs, both regulatory and non-regulatory (e.g. technical assistance, outreach, and education). "GAO found that many of the state programs claiming to conduct P2 activities were inordinately involved in waste recycling, treatment, and/or disposal." The report also mentions states' over-reliance on federal funding and EPA regional offices' lack of emphasis on P2.

U.S. President. Executive Order 12856 of August 3, 1993. "Federal Compliance with Right-to-Know Laws and Pollution Prevention Requirements." *Federal Register* 58, no. 150 (6 August 1993): 41981–41987. [III.B]

Requires federal agencies to comply with Toxics Release Inventory (TRI) reporting requirements and with the prevention-first pollution management hierarchy of the Pollution Prevention Act of 1990. Calls on federal agencies to develop voluntary toxic chemical reduction plans. Stipulates that agencies should use "life cycle analysis" and "total cost accounting" principles to meet the requirements of this order.

\_\_\_\_\_. Executive Order 12873 of October 20, 1993. "Federal Acquisition, Recycling, and Waste Prevention." *Federal Register* 58, no. 203 (22 October 1993): 54911–54919. [III.B]

Calls for federal agencies to prevent waste, maximize recycling, and procure recycled and other "environmentally preferable" products. Establishes a "Federal Environmental Executive" post to be appointed by the President and located within EPA. Includes specific provisions for minimum recycled content of printing and writing paper, revision of brightness specifications and standards for paper products, procurement of re-refined lubricating oil and retread tires, and product testing.

\_\_\_\_\_. Executive Order 12902 of March 8, 1994. "Energy Efficiency and Water Conservation at Federal Facilities." *Federal Register* 59, no. 47 (10 March 1994): 11463–11471. [III.B]

Calls on federal agencies to improve energy efficiency and water conservation in new as well as existing buildings. Stipulates that "life cycle analysis" is to be used to determine full fuel cycle costs.

Uusitalo, Licsa. *Environmental Impacts of Consumption Patterns*. New York: St. Martin's Press, 1986. [II.A]

After laying out the problem of consumption of resources, author describes three conceptual approaches for dealing with consumption. Traditional economics is not seen as a viable alternative; and a systems approach is equally discounted. Author endorses a third "way of life" approach which incorporates changing cultural and social mores.

Vargish, Thomas. "Why the Person Sitting Next to You Hates Limits to Growth." *Technological Forecasting and Social Change* 16 (1980): 179–189. [III.C]

Abstract: "Proponents of limits to growth continue to meet with widespread public resistance to the concept, a resistance that in part lies beneath or beyond the practical economic and political objections. In order to establish a 'sustainable dialogue,' the broad historical and psychological sources of public antipathy need to be understood. One such source may be found in our long-standing cultural adherence to belief in a providential world order and such of its diverse elements as *laissez faire* capitalism and Marxism. These have in common the peculiarly reassuring assumption that the major ordering forces of human social destiny lie beyond particular human calculation or design. The irrational threat that a planned sustainable society poses for most of Western humanity lies in the implication that the time has come for us to take full responsibility for our future, that we can no longer remain the children of a cosmic process or the secure beneficiaries of economic or social laws. . ." Provides a humanities perspective on a behavioral approach to P2.

Walley, Darlene, Karen Blumenfeld, Nancy Kolodny, and Nasir Ali. "Case Study: A Product Life-Cycle Assessment of Arm & Hammer Baking Soda." *Pollution Prevention Review* 3, no. 1 (December 1992): 51–64. [II.B]

Examination of the total environmental impacts over the product life-cycle of a leading brand of baking soda (sodium bicarbonate). The life cycle assessment (LCA) includes resources consumed and pollution generated at the raw material acquisition, material manufacture, product manufacture/packaging, transportation, use, and disposal stages of baking soda's life cycle. A narrative description of these impacts takes up the bulk of the article along with some numeric data of impacts. There is also discussion of the analytical LCA challenges, such as how to quantify the impacts of using industrial waste CO<sub>2</sub> as a feedstock, whether to count flushing of old baking soda down drains as "reuse," and how to categorize various transportation and waste management loadings.

Wang, Michael Q. "Life Cycle Assessments." *Environmental Science & Technology* 27, no. 13 (December 1993): 2658–2661. [II.C]

An additional article in a series, commenting on an original article by Curran and a comment by White and Shapiro. Uses transportation sector examples. Issues include: how to treat emissions of a given pollutant at different points in the life cycle and/or in different locations; using unweighted lists of pollutants; the need for participation by private companies, government agencies, and public interest groups. Author gives examples of life cycle assessments for energy end-uses and for energy production processes.

Wang, Penelope. "One Family's Finances: It's Not Easy Being Green." *Money* 19, no. 4 (April 1990): pp. 100+. [III.C]

"One environmentally conscious family pays the high cost of living Earth Day every day." A brief profile of one family's finances, with special emphasis on the environmental impacts of their lifestyle. Does not explicitly mention P2, but may stimulate discussion on culture, P2 behaviors, and home economics.

Wann, David. *Biologic: Environmental Protection by Design*. Boulder: Johnson Books, 1990. [II.A]

From the book description: "Wann believes we can create a sustainable society by mirroring biological systems that move toward balance and stability. . . This innovative and pragmatic guide surveys a wide variety of clever and informed designs now in use or being developed. It also outlines principles for reducing environmental damage and replacing wasteful processes with inventive solutions that are modeled after efficient natural processes." The many examples and anecdotes make the book quite readable.

Washington State Department of Ecology, Social and Economic Sciences Research Center, Washington State University, and the Waste Reduction Institute for Training and Applications Research. *Incorporating Pollution Prevention Concepts in Higher Education Curricula*. Minneapolis: WRITAR, 1991. [V]

Thick collection of syllabi, problem sets, other resources compiled originally by WRITAR for the State of Washington. Also includes results from interviews with professors, descriptions of higher education programs, and an introduction to "pollution prevention as a concept."

Washington State University, Social and Economic Sciences Research Center. *Incorporating Waste Reduction Concepts in Higher Education Curricula*. Pullman, WA: Washington State University, 1991. [V]

Summary report describing the results of a statistical telephone survey of professors and businesses throughout Washington state, and of a faculty workshop. Results show that faculty members are interested in incorporating P2, but may not see the relevance to their teaching. A prominent theme from the workshop is the need for college students to have "environmental literacy," with P2 a major component of this education.

Wells, Henry A., Neil McCubbin, Red Cavaney, Bonnie Camo, and M. B. Hocking. "Paper Versus Polystyrene: Environmental Impact" (letters). *Science* 252, no. 7 (June 1991): 1361–1363. [II.C]

Letters responding to Hocking's original article as well as the author's response. The original article is a brief life cycle assessment comparing paper and polystyrene beverage cups.

*Where Our Food Comes From* (videos produced by students at Oberlin and Hendrix colleges). Fox, AK: Meadowcreek. [IV]

Students at Oberlin (Ohio) and Hendrix (Conway, AK) colleges produced hour-long videos about the origins of the food they ate on campus, interviewing growers (in states as far away as California) and distributors. A 10-minute video, produced in 1992 at Oberlin, shows how the college is beginning to buy locally grown food. The shorter video comes with a booklet written for institutions interested in initiating such a program.

White, Allen L., and Karen Shapiro. "Life Cycle Assessment: A Second Opinion." *Environmental Science & Technology* 27, no. 6 (June 1993): 1016–1017. [II.B]

Short article offering additional views responding to Mary Ann Curran's article in an earlier issue of the same journal. Authors mention data accessibility issues, including the need to use published data sources. The issue is particularly relevant in light of industry-sponsored studies that compare one product with another. They also discuss the possibility of conducting streamlined LCAs to help gauge a product's relative harm. [See also Wang, M.]

Winett, Richard A., and Peter Ester. "Behavioral Science and Energy Conservation: Conceptualizations, Strategies, Outcomes, Energy Policy Applications." *Journal of Economic Psychology* 3 (1983): 203–229. [III.C]

Not all of this lengthy article may be relevant to P2, but it provides a useful overview of the behavioral sciences and the role of behavior-change strategies for conserving energy. Much of article is equally applicable to individual P2 strategies as it is to energy conservation. Abstract: "While economic, physical design, and legal disciplines have been the dominant approaches in energy conservation policies, each perspective has limitations with regard to effectively being able to modify energy-related behaviors of consumers. A behavioral science approach which integrates knowledge bases from a number of disciplines and levels of analysis has had relatively little input in energy policy, even though conceptually and technically the approach is well developed, and has recently demonstrated its applicability through many field experiments. . ."

Wise, John. *Challenges for the Future*. Presented at National Roundtable of State Pollution Prevention Programs 1993 Spring Conference: Connections for Pollution Prevention, pp. 54–62. San Diego, CA, 28 April 1993. [key doc.]

Excellent overview of the P2 perspective. Gives background on the command and control approach of EPA and the dramatic shift in both EPA and industry towards a cooperative P2 approach. Also lists four challenges that lay ahead: (1) "articulate prevention-based behavior as a prevailing social/cultural ethic," (2) "diffuse this prevention-based ethic to a larger community," (3) "promote clean and green technology to retool America for the global marketplace," and (4) "promote total quality and continuous improvement by measuring progress and celebrating success."

World Conservation Union (IUCN), United Nations Environment Program (UNEP), and World Wildlife Fund for Nature (WWF). *Caring for the Earth: A Strategy for Sustainable Living*. Gland, Switzerland: IUCN/UNEP/WWF (Earthscan Edition), 1991. [I.C]

A new version of the 1980 "World Conservation Strategy," which was one of the first publications to promote the concept of sustainable development. This book continues with the same theme, taking a holistic, worldwide view of "sustainable living." Includes three major sections: principles of sustainable living; actions for sustainable living; and implementation and follow-up. Actions cover energy, commerce, human settlements, farm and range lands, forest lands, fresh waters, oceans and coastal areas. Pollution prevention, framed as adopting a "precautionary approach to pollution" (pp. 29–30), is emphasized throughout.

World Resources Institute, and Institute for Environment and Development. *World Resources 1994–1995*. New York: Basic Books, 1994. [I.A]

Authoritative and comprehensive reference on resource abundance and use. Includes pollution generation data to a lesser extent. Provides an excellent discussion and explanation of the tables. Published every other year. The 1994–95 edition includes narrative chapters on natural resource consumption, population and the environment, and women and sustainable development. It also includes regional foci on China and India.

Wynne, Brian. "Uncertainty and Environmental Learning: Reconciling Science and Policy in the Preventive Paradigm." *Global Environmental Change* 2, no. 2 (June 1992): 111–127. [I.A]

A scholarly article about risk and the newly emerging preventive paradigm from a philosophy of science/political philosophy perspective. Examines the concepts of risk, uncertainty, ignorance, and indeterminacy, pointing out that problems commonly construed as being "uncertain" are actually much more indeterminate. Author also examines the implications of taking environmental protection further "upstream" as a result of pollution prevention's emphasis on prevention at the source (e.g., R&D, design, etc.). One of the consequences is comparatively more indeterminacy because of the now greater distance between upstream design and downstream environmental effects. Author's concluding sentence: "the preventive paradigm for environmentally sustainable technology is opening up a more radical shift in our relationship with scientific knowledge, and a correspondingly more radical challenge to society, than has yet been recognized."

Yust, Becky. *DHA 1001: Introduction to the Designed Environment* (syllabus). University of Minnesota, September 1991. [VA]

Detailed syllabus for an introductory applied design class. Introduces students to interaction of people and the environment from cultural, ethical, and behavioral perspectives. Course features many guest speakers and field trips. Pollution prevention is included not so much as a topic than as an underlying concept in approaching the designed environment.



**National Pollution Prevention Center for Higher Education**  
430 East University Ave., Ann Arbor, MI 48109-1115  
734-764-1412 • fax: 734-647-5841 • [nppc@umich.edu](mailto:nppc@umich.edu)

The mission of the NPPC is to promote sustainable development by educating students, faculty, and professionals about pollution prevention; create educational materials; provide tools and strategies for addressing relevant environmental problems; and establish a national network of pollution prevention educators.

In addition to developing educational materials and conducting research, the NPPC also offers an internship program, professional education and training, and conferences.

The NPPC provides educational materials through the World Wide Web at this URL: <http://www.umich.edu/~nppcpub/> Please contact us if you have comments about our online resources or suggestions for publicizing our educational materials through the Internet.