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**CHAPTER**




# Environmental Accounting for Competitive Advantage

## ALIGNING FINANCIAL CONCERNS AND ENVIRONMENTAL RESPONSIBILITIES

The concerns of environmental managers spill over into both the financial accounting and managerial accounting concerns of the company. Although MacLean and Rappaport discuss the significance of these concerns in the following piece, it is important to reflect on the basic reasoning behind integrating environmental issues into accounting metrics and decisions.

According to a recent article in *Managerial Accounting,* the accounting functions are considered "one of the primary groups responsible for developing firm's strategies." [1] While this assertion may be overstated, it is true that when it comes to decision-making, as well as the selection of firm strategies, Watergate investigators and *Washington Post* reporters Bob Woodward and Carl Bernstein's credo to "follow the money" rings especially true.

In a very basic sense, accounting functions have three roles to fill for companies: aiding in strategic decisions, controlling current costs, cash flows and current decisions, and finally, filing required information (i.e., SEC, federal tax law, etc.).[2] The spillover that occurs on issues of environmental consequence covers these three areas as well.

Surprisingly, the same *Management Accounting* study of five firms revealed that of those three basic roles that accountants play in firms, often accounting information is most useful in the last two roles: controlling costs and adhering to filing requirements. As one corporate executive in the article stated, "while the strategic plan may contain little accounting information, accounting information is useful for the process."[3] As discussed in the environmental measurement section in Part I, the right *financial* information serves to guide the decision-making process at a minimum.

| Company | Finding |
|---|---|
| Amoco Oil | Nearly 22 percent of operating costs (excluding feedstock) were considered environmental at the Yorktown Refinery. |
| Ciba-Geigy | The environmental component was estimated at over 19 percent of manufacturing costs (excluding raw materials) for one chemical additive. |
| Dow Chemical | Between 3.2 and 3.8 percent of the manufacturing cost for a polymer-based product was considered environmental. |
| DuPont | Over 19 percent of manufacturing cost was identified as environmental for one agricultural pesticide. |
| S.C. Johnson Wax | Environmental costs identified for one consumer product were approximately 2.4 percent of the net sales. |

**Figure 6-1** Results of WRI's *Green Ledgers* Study

*Source:* Ditz, Daryl, Janet Ranganathan, and Darryl Banks, *Green Ledgers: Case Studies on Environmental Cost Accounting,* World Resources Institute, Washington, D.C., 1995.

Studies on environmental accounting over the last few years have shed light on the lack of information reaching top management. A 1995 study on the state of environmental accounting practices conducted by the World Resources Institute (WRI) offers one clear example. The results of WRI's case research on a number of multinationals, shown in Figure 6-1, reveals how information on environmental costs often goes unrealized by corporate decision makers.

Identifying environmental costs and related financial opportunities is a tangible way of gaining the attention of upper management by linking environmental responsibilities with costs. The following piece by MacLean and Rappaport will help you to understand the significance of translating these environmental concerns into bottom-line considerations.

**NOTES**

1. Akers, Michael D., and Grover L. Porter, "Strategic Planning at Five World-Class Companies," *Management Accounting,* July 1995.
2. Please see Ditz, Daryl, Janet Ranganathan, and Darryl Banks, *Green Ledgers: Case Studies in Corporate Environmental Accounting,* World Resources Institute, Washington, DC, 1995.
3. Akers, Michael D., and Grover L. Porter, "Strategic Planning at Five World-Class Companies," *Akers,* July 1995.

## Greening the CFO: Implementing Environmental Accounting in Industry

***Ann Rappaport and Richard MacLean***

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For decades governments have relied on cost-based decisions to set environmental policy. For example, in Europe the "Polluter Pays Principle" assigns costs for environmental degradation to the industries that generate waste. The international agreement to phase out ozone-depleting CFCs balanced the longterm costs to switch to safer substitutes against the health risks from increased ultraviolet exposure. Much of the debate over the Clean Air Act Amendments of 1990 was driven by cost/benefit considerations. Corporate financial officers (CFOs) are beginning to notice such large-budget items and developments.

The 1990 Clean Air Act Amendments also embraced a move away from command-and-control legislation and toward market-based incentives for environmental protection. The acid rain program is structured on a $S0_2$ allowance trading system designed to achieve pollutant reductions with maximum economic efficiency. Proponents of the scheme produced analyses showing that total costs for compliance are considerably lower under the trading scheme than under the conventional approach of requiring each regulated facility to achieve a percentage reduction in emissions. But what exactly is environmental accounting, and what might we expect from it in the next century?

At the same time that cost considerations are being given increasing weight in national environmental policy, there is recognition that tools available for policy makers need further development. For example, economists have observed that indicators used for assessing national economic viability, the gross national product or the gross domestic product, have the perverse effect of rising when the environment is damaged. When primary resources are extracted, the

country derives income, but there is no offsetting factor for resource loss. The massive oil spill from the *Exxon Valdez* had a positive impact on the gross national product because millions of dollars were spent on cleanup.

In *Saving the Earth,* Lester Brown, Christopher Flavin and Sandra Postel examine current efforts to develop alternative national accounting systems that do not require exploitation in order to value natural resources. All of the emerging systems, the authors note, require the use of data that are currently unavailable for many countries.[4] Emerging efforts are under way in companies to take a comprehensive enterprise-level approach to examining environmental costs, but like countries, companies face some data challenges.

## WHAT IS ENVIRONMENTAL ACCOUNTING?

The systematic analysis of environmental costs offers real advantages for sound business decision-making. According to Paul Bailey, senior vice president of the environmental consulting firm, ICF, environmental accounting is a useful modification of life-cycle costing. Life-cycle costing was developed in the 1960s and 1970s to reflect rising ownership costs of systems, including labor and energy costs. In addition to life-cycle costs, environmental accounting includes pollution control and waste management costs. Bailey describes environmental accounting as having four levels of costs (shown in Figure 6-2) that accumulate to strategic proportions:[5]

If a conventional project that produces waste is compared to a project that incorporates pollution prevention technology, the project with pollution prevention will often be financially more attractive when environmental accounting is used. This attempt to factor all environmental costs into enterprise-level decision-making is similar in principle to environmental-cost-driven decisions emerging at the national level.

*Conventional costs*—include the usual capital and operating costs such as equipment, labor, materials, etc.

*Potentially hidden costs*—include hidden regulatory costs such as monitoring, paperwork, testing, training, inspections, etc.

*Contingent liability costs*—include penalties, fines, and future liabilities.

*Image and relationship costs*—include corporate image, community relations, consumer response, etc.

**Figure 6-2** The Four Levels of Corporate Environmental Costs

In practice, however, the considerations that guide a decision for a business—at the enterprise level—are different. In the United States, national-level environmental analyses involve government agencies, elected officials, nongovernment organizations, academics, industries and the public openly debating issues and assumptions. On the other hand, environmental accounting decisions by business are made in private. The outcome may impact customers, employees, shareholders and/or neighbors with limited access to the data and/or voice in the outcome. The distinction is crucial.

Environmental accounting is relatively new at the enterprise level; this guidance for its implementation is still emerging. Practical considerations for companies will allow financial decision makers to become full participants in environmental decision-making.

## SUPPORTING THE EXISTING ENVIRONMENTAL HIERARCHY

Environmentalists generally agree that there is a hierarchy of product, process and waste disposal options. Products and processes that use the fewest resources and least toxic raw materials, and/or generate the least waste, are preferred. If waste is generated, waste management practices that recycle or reclaim the material are better than those that treat it. At the bottom of the hierarchy is landfilling. This hierarchy has been an explicit part of federal waste management policy since the Resource Conservation and Recovery Act was amended in 1984.

It was around this same time period that the first discussions were occurring within industry and government over accounting techniques to fully capture the true costs associated with the generation and management of waste. It was recognized that, in principle, environmental accounting drives the decision up this hierarchy toward better choices, at least from an environmental standpoint. The assumption by proponents of environmental accounting is that any decision that moves the current practice up this hierarchy is better for the environment and best for business. In fact, it may not be better for either. As the following examples indicate, decision tools are imperfect and should be used with care.

## CONCERN OVER WHAT YOU REJECT, NOT WHAT YOU APPROVE

Ideally, an environmental accounting analysis will lead to the selection of a new process involving nontoxic raw materials and zero waste generation. In the real world, the selection is rarely this clear cut. For example, a company may be considering alternatives for an existing waste stream. An environmental accounting analysis may indicate that on-site incineration with energy recovery of a nonhazardous waste is more cost effective than continued off-site disposal at a municipal landfill. The alternative of a process modification that will result in zero waste generation, although technically feasible, may not be cost justifiable, even after considering indirect costs and long-term liabilities.

The decision to reject the technically feasible process modification in favor of the more cost-effective incineration option may some day come under the scrutiny of hindsight. If a thorough analysis was conducted, the merit of the decision will stand. If a superficial analysis was done, problems, possibly more serious than if landfilling had continued, may result. Consider the following scenario:

An attorney files a toxic tort lawsuit on behalf of neighbors claiming that the emissions from the incinerator damaged their health. If the health concerns were not thoroughly evaluated and subsequent analysis confirms their potential existence, the defense is weak. If health issues were identified in the original analysis and not given sufficient weight, no precautions were taken and alternatives were available but rejected on financial grounds, the company may be subject to substantial punitive damages. In this case, a faulty full-cost financial analysis may be worse than no analysis at all.

## UNCHARTED TERRITORY: ENTERING THE RAPIDS OF THE NEXT CENTURY

If a faulty analysis can be damaging, then what constitutes a good one? Unfortunately, there is little definitive guidance at the practical, operational level. In principle, the mechanics of environmental accounting is identical to any financial analysis that considers readily identifiable costs (e.g., capital, operating expenses, revenues) and displays these in a standard format (e.g., financial spread sheet).

There are, however, significant differences: first, the time period is considerably longer (e.g., 20 years); second, a more rigorous analysis is conducted of potential future costs; and finally, it includes costs that are often very difficult to quantify.

This analysis might include projected regulatory changes (e.g., land disposal restrictions), indirect compliance costs (e.g., record keeping requirements) and other overlooked or "hidden" regulatory costs associated with waste generation. Potential incentives (e.g., loan guarantees) and disincentives (e.g., waste end taxes) may also be factored in. Less tangible factors, such as potential long-term legal liabilities or the loss of sales revenues due to adverse publicity arising from environmental incidents, can only be estimated from available data or established through some internal company policy mechanism.

While the financial principles are conceptually straightforward, it is extremely difficult to estimate long-term liabilities. Case law and remediation cost data have been accumulated only over the past 20 years. Both the technology choices and the legal settlements are in a state of flux. Without a stable platform and historical database, there is no commonly accepted and widely used approach to predicting future costs. This instability is the primary reason why non-sudden, environmental liability insurance is extremely costly and all but impossible to buy.

The bottom line is that the practical application of environmental financial analysis is in its infancy; the first journal devoted to these issues, *The Journal of Environmental Financing, Accounting, Taxation & Reporting*, first appeared in 1991. Over the past five years, however, there has been a wealth of information published on the theory and mechanism of environmental accounting.[6]

## IS PRECISION NECESSARY?

From a practical standpoint, the inability to *precisely* estimate long-term liabilities and other hard-to-quantify factors is not a reason to avoid environmental accounting. Companies can use general, published guidelines and modify these to suit their degree of "risk avoidance" (i.e., how much risk the company is willing to accept). Environmental accounting's advantage is that it provides a persuasive vehicle to communicate to the people who control resource allocation. Environmental managers have traditionally not been skillful in addressing environmental issues in business terms that executives can readily understand. Executives informed of the full range of issues are more likely to seek prudent environmental practices than they would if less quantitative methods were employed. Access to quantitative data is at the core of any informed business decision.

For example, the release of the first SARA 313 (Community Right-to-Know) emission estimates produced a flurry of programs to voluntarily reduce emissions. There is no question that avoiding negative publicity was a major factor. But many executives learned for the first time of the large volume of wasted raw materials and the potential liabilities created by these emissions. The information, available at a plant level, had never before been consolidated and presented to upper management. In a similar fashion, implementing environmental accounting, even if it is approximate at first, will provide top decision makers with new and useful information.

## WHAT CONSTITUTES GOOD ENVIRONMENTAL ACCOUNTING?

A good analysis -- one that will stand the test of time -- is determined by the thoroughness by which the alternatives are evaluated by a multifunctional team of professionals. Finance, legal, engineering, environmental, health, safety, R&D and production should be involved, at a minimum.

A thorough check list of costs to evaluate, a financial model and a software program to process the information facilitates the process but should not control it.[7] These tools are no substitute for an informed analysis. A team effort is critical; the surefire way to disaster is to place even the best financial analysis model in the hands of an engineer or finance manager and rely on a single individual's limited perspective. As noted earlier, corporate environmental strategy requires a range of expertise to remain viable.

## Advice to Practitioners of Full-Cost Accounting

**Build Alliances**

You are trying to change the way the Accounting/Finance Department has traditionally reported data. It is essential that top management understand and support the need to better identify environmental costs. Their collaboration will facilitate this important change. You should establish a contact within the Accounting/Finance Department that has sufficient stature and knowledge to facilitate this process.

**First Understand Their World**

Accounting and budgeting systems were originally structured to answer specific business questions and to satisfy external requirements (e.g., Securities and Exchange Commission). Even in a new company, this framework will dominate how the accounting systems are structured. You will need to work within this structure to identify existing information and mesh new needs conveniently with the existing system.

Some internally or externally dictated accounting systems may prove especially challenging. For example, in the utility industry much of the accounting practice and culture is centered around reporting according to Federal Energy Regulatory Commission (FERC) accounting practices. In the regulated utility environment, additional cost breakdowns were deemed unnecessary because all costs could be recovered through rates. Currently, accounts are not broken down by specific processes. If they were, costs could be easily categorized for their environmental impact. You will need to understand preexisting constraints, since these requirements will have to be incorporated into any future system.

**Do Your Homework and Network**

Ten years ago there was relatively little information available on environmental accounting practices. This is no longer the case, so take advantage of others' wisdom; read the available literature. Equally important is networking among your peers. They can give you useful insights into the do's and don'ts of working with the Accounting/Finance Department and management.

One of the best ways to sell full-cost accounting in your company is to explain to your management the progressive steps taken and the benefits gained by other companies. You may want to set aside a modest budget for benchmarking in this area.

**Be Strategic in Data Collection**

Determine the questions you need to answer for decision-making now and in the future. Differentiate between nice-to-know data and must-know information. There is nothing that turns off line organizations more than their valuable time being spent gathering information of little value. On the other hand, you will gain staff and line support if they perceive that the data have an influence on the outcome of decisions.

**It Is More Than a Numerical Exercise**

Your financial analysis is just one part of the overall analysis. Legal, regulatory, and ethical issues, along with company philosophy, must be taken into consideration. Use a team approach to develop a balanced financial analysis.

**Timing Is Everything**

Trying to get the Accounting/Finance Department's attention during year-end close is unwise. On the other hand, good opportunities may present themselves; for example, the Finance and Information Systems Departments may be undertaking major overhauls in the way data are gathered and analyzed. Find out if these windows of opporhmity are on the immediate horizon, even if you are not very far along in your activities,

**This Is an Emerging Field—Precision Is in the Future**

You are trying to assist management in making key decisions. These decisions are made by examining the most significant factors. Don't be overly concerned if future disposal liability has a sensitivity of plus or minus 50 percent. At this point, it is more important to inform management that there is, in fact, a future liability and that liability may be relatively large compared with other process costs. You are probably better off developing a workable system influencing management today and striving for continuous improvement over time, than waiting five years for a perfect system.

## MAKING ENVIRONMENTAL ACCOUNTING SYSTEMS WORK

Even if there were no organizational issues, environmental accounting faces institutional issues that, unless addressed, will impede its future use. The most obvious is management's concern over the future use of records by adversarial parties. The situation is not unlike the sensitivity over facility compliance audits. Management recognizes their need, yet worries over the creation of discoverable records.

There is growing pressure from environmental groups to require public disclosure of environmental audit results.[8] In the European Community this issue has been resolved for the moment by making the Eco-Audit program voluntary. Despite the concern over environmental compliance audits, they typically use yes/no checklists and rarely create a liability concern if prompt corrective action is taken when problems are identified. In contrast, public disclosure of financial analysis for environmental projects can be very complex and subject to misinterpretation if taken out of context.

Also missing are widely accepted risk management guidelines for environmental accounting. Societies, not companies, define acceptable risk. There is a considerable body of literature that defines acceptable risk for catastrophic accident analysis, nuclear plant operation, remediation cleanups, pesticide use and so on. For environmental accounting, the accounting mechanics exist, but not with a framework to perform the accompanying risk analysis. Large corporations with specialized talent and resources can use internal expertise and external assistance to perform custom evaluations and feel relatively secure in their decisions. A concern is that companies with limited resources will perform simplistic evaluations, thus compromising the value of the decision-making tool.

Much easier to address is institutional guidance on how the information should be used in a financial context. The Financial Accounting Standards Board (FASB) and the American Institute of Certified Public Accountants (AICPA) have provided guidance on some environmental finance issues (e.g., capitalization of costs to remediate environmental contamination).[9] The Securities and Exchange Commission (SEC) has also provided some information on contingent liability disclosure requirements. Specific guidance for performing environmental accounting is still emerging. It is needed for several reasons.

First, there is a gray area between theoretical estimates of liability for planning purposes and actual estimates that must be accrued and/or disclosed. In general, the dividing line is over the certainty of actual funds being expended within a specific time frame. For example, there are sufficient data for many products to estimate and reserve funds to cover product warranties. On the other hand, an environmental accounting model may predict that for each ton of waste generated, $200 in liabilities will be generated. Do you accrue this amount? A project may have an estimated liability (remote, but very large). If you proceed, do you report the information as a contingent liability to the SEC, since environmental liability insurance is virtually unavailable?

With so little data currently available it seems unreasonable to accrue for these contingent liabilities. But could accruals be required in the future? Environmentalists might press a case even now that this should be done. Generating full-cost evaluations presents a dilemma. The more generally acceptable liability cost factors become, the more useful they are to guide business decisions. At the same time they become a powerful basis to justify subjecting industry to additional financial burdens (e.g., waste or raw material taxes such as those that currently finance Superfund). If long-term liability costs became predictable to the extent that industrial accidents are today, environmental liability insurance could become available at "reasonable" rates. Insurance would

make it easier to make informed business decisions, since liability uncertainties can be translated into specific business costs.

For example, several years ago the managers of a business were considering starting a new venture to renovate used equipment that contained a hazardous substance. Although the numbers looked promising, management could not reach a decision because of their concern over the waste disposal liability issues. Waste minimization was not an option, since the hazardous substance already existed and would have to be disposed as a first step in the renovation process. An environmental accounting analysis was used to place the environmental issues in perspective: The liabilities were not significant when compared with the total venture.

Second, buy-in from the financial community is essential. Accounting managers by their very nature tend to be very conservative — "by the book." In the absence of widely accepted institutional guidelines, they will be reluctant to change current practice and institute new methodologies. Their actions are not only subject to scrutiny by regulatory auditors, such as the SEC, but also by external, third-party auditors that review their practices and disclose significant issues in the company's financial reports to the SEC and shareholders.[10]

Defining financial procedures, because of their potential significant impact, also raises political issues. For example, the EPA developed an extremely detailed financial model for evaluating the indirect costs of environmental requirements. The model has never been officially approved and released. If it were, it would serve as the standard for the Office of Management and Budget to evaluate the costs for EPA regulations. [11]

## MAKING TOTAL COST ACCOUNTING WORK ON BEHALF OF THE ENVIRONMENT

Environmental accounting presents a dilemma. On the one hand it can be a powerful tool to systematically analyze environmental issues and convincingly communicate this information to management. On the other hand, it is so powerful that it has the potential to significantly change the products, processes and organizational structure of its users.

For environmental accounting to become a more vital part of corporate decision-making, corporate decision makers and the financial community must:

1. *Define the risk management process appropriate to environmental accounting.* Companies need a framework within which to operate that will provide institutional approval and foster consistency. With this framework, companies will not be concerned about creating discoverable records or being criticized for the methodology used in their analyses.
2. *Consolidate the model information to date into a user-friendly package.* There is a growing body of information that can be consolidated into a tool that industry can readily use.
3. *Provide financial guidance.* Accounting groups can take the lead in providing institutional guidance on procedures, and can help with difficult questions, such as those related to liability analysis.
4. *Educate business and finance managers about the environment.* Business schools are beginning to address environmental issues in their curriculum. The process needs to be accelerated and expanded to include current managers.

**Bristol-Myers Squibb-Cost Accounting for Productivity**

As their contribution to companywide productivity efforts, in 1995, the Environment, Health and Safety group at Bristol-Myers Squibb launched several operational initiatives, one of which was environmental full-cost accounting. Five elements were identified for implementation over a four-year period: [12]

1. Develop and implement enhanced methodology for capital project evaluation.
   By justifying EHS spending on quantifiable financial benefits and compliance, approval and implementation of projects with positive financial returns will be accelerated.
2. Develop EHS capital project tracking and reporting system.
   By coding all significant EHS projects, the company will facilitate analysis and expect economies of scale in executing similar projects across the company.
3. Track and report priority EHS operating costs.
   Activity-based costing will help link EHS costs to specific products and businesses, and is expected to hold down increases in EHS operating costs by helping decision makers identify the most cost-effective areas of focus.
4. Develop electronic systems for managing remediation projects.
   Development of software and establishment of cost centers will reduce administrative time for data gathering, analysis and reporting.
5. Investigate revised treatment of workers' compensation costs.
   Just as companies' decisions to push responsibility for waste management costs down to the facility level has created an incentive for pollution prevention, Bristol-Myers Squibb is considering allocation of workers' compensation costs down to the department or facility level as an incentive for improved safety performance.

These environmental full-cost accounting efforts complemented the company's commitment to pollution prevention throughout the product life cycle, a strategic approach to environmental issues launched in 1992.

According to Bristol-Myers Squibb's Vice President for Environmental Affairs, Occupational Health and Safety, Dr. Thomas Hellman, the company anticipates significant cost savings and cost avoidance associated with the total package of EHS productivity measures. Implementation of environmental full-cost accounting may well result in additional savings beyond those initially anticipated.

## EFFECTIVE ENVIRONMENTAL DECISION-MAKING

Companies have been making environmental decisions for decades, yet they have been slow to make environment a core business issue. Rather, environmental decisions have been handled on the periphery, falling under government-business relations, ethics, public relations, or social responsibility Company stakeholders, both internal and external, now expect more.

There is an expectation that environmental considerations can and will be woven into companies' decision-making fabric, and environmental accounting represents a powerful tool for achieving this objective. Financial analysis is at the heart of companies' "real" business and when the environment is taken into account at this level, companies can legitimately claim to be proactive with respect to the environment. Business executives, especially the CFO, play a critical role in the greening process by encouraging the use of decision-making tools that convert environmental strategy into action.

**NOTES**

4. Brown, Lester R., Christopher Flavin, and Sandra Postel, *Saving the Planet*, Norton, New York, 1991, pp. 121-130.
5. Bailey, Paul, "Environmental Accounting-Making It Work for Your Company," *Total Quality Environmental Management*, Summer 1996.
6. The United Nations has prepared a guide to literature on corporate environmental accounting called "Environmental Accounting: Current Issues, Abstracts and Bibliographies," United Nations publication No. E.92.1l.A.23. Call the United Nations Publications Sales Section (212) 963-8302.
7. There are a number of commercially available software systems and tools to support environmental accounting. The ERKs Office of Pollution Prevention and Toxics published two reviews: "Incorporating Environmental Costs and Considerations into Decision-Making," EPA742-R-95-006, February 1996, and "Valuing Potential Liabilities for Managerial Decision-Making: A Review of Available Techniques," EPA742-R-96-003, December 1996, both available through the PPIC or NTIS (National Technical Information Service), (800) 553-NTIS.
8. The Canada Institute of Chartered Accountants, Toronto, Canada, has published relevant research reports and study group reports, including "Environmental Costs and Liabilities: Accounting and Financial Reporting Issues," (1993), and "Environmental Auditing and the Role of the Accounting Profession" (1992). To order call (416) 3322; fax (416) 204-3416.
9. The American Institute of Certified Public Accountants (AICPA) and the Financial Accounting Standards Board (FASB) have published accounting standards related to environmental accounting. Much of this work is related to accrual and reporting of environmental liabilities such as AICPA's "Statement of Position on Environmental Remediation Liabilities." For a current listing call AICPA at (800) 8624272 and FASB at (203) 847-0700.
10. The Society of Management Accountants of Canada, Hamilton, Ontario, Canada, has published management accounting practices handbooks, including "Tools and Techniques of Environmental Accounting for Business Decisions, #40" and "Accounting for the Environment." Call (905) 525-4100.
11. The U.S. Environmental Protection Agency makes available a wealth of information on environmental accounting through the Pollution Prevention Information Clearinghouse (PPIC). Contact PPIC at (202) 260-1023, Fax (202) 260-0178, or e-mail PPIC@epamail.epa.gov and request their list of available documents. This should be your first stop in obtaining additional information on environmental accounting. The EPA also sponsors a number of projects through the Environmental Accounting Project managed by Holly Elwood or Susan McLaughlin at EPA (202) 260-4362 or 3844 respectively; e-mail: elwood.holly or mclaughlin.susan @epamail.epa.gov, respectively They publish periodic updates on EPKs activities in this area and maintain a Network Directory of professionals interested in environmental accounting.
12. Bristol-Myers Squibb, "EH&S Strategic Plan Update: Productivity, Growth, and Customer Focus," prepared by ERM, Inc., 1995, and Bristol-Myers Squibb, "Environment 2000: Pollution Prevention Throughout the Product Lifecycle," 1992.

**QUESTIONS FOR FURTHER THOUGHT**

1. Why do pollution prevention projects become more attractive when full-cost accounting is applied to the decision-making process? Will they always be more economically attractive?
2. What are some of the challenges in gathering the data necessary to perform a full-cost analysis?
3. Do the uncertainties surrounding a full-cost accounting analysis obscure the value of the methodology?
4. What are the potential downsides of environmental full-cost accounting?
5. In the early 1980s, Du Pont led producers and users in opposing CFC regulations. At the end of the decade, it completely reversed itself and actively supported the phase-out. What could have motivated a company to willingly agree to discontinue a profitable product line? Can companies economically benefit from the discontinuation of environmentally unsafe products? If so, how?
6. What might be some of the techniques that a company could employ to measure—in financial terms—the impact of environmental issues on corporate image?
7. The legal system is significantly different in the U.S. from those in most countries. Concepts such as class action suits, adversarial expert witnesses, jury trials and punitive damages are relatively uncommon in other countries. How might these differences encourage or discourage the development of future innovative tools and techniques to identify and quantify environmental risk?