United States
Environmental Protection
Agency

Office of Pollution Prevention
and Toxics
Washington, DC 20460

EPA742-R-94-002
May 1994

Workshop Proceedings:
Accounting and Capital Budgeting for Environmental Costs Workshop
(December 5 - 7, 1993)

AICPA
American Institute of Certified Public Accountants

The Business Roundtable

The Association for Total Cost Management
aace International

Basic Assumption:

"Environmental Protection and Economic Well-Being Are Inter-Dependent."

DISCLAIMER

The contents of this document do not necessarily represent the positions of the sponsoring organizations or the Focus Group that planned the Workshop. While there was great deal of agreement about issues and actions, neither the Proceedings nor the Stakeholders' Action Agenda represents a consensus of the Workshop attendees or the working groups that developed the individual Action Agendas.

The Workshop was designed to elicit a diverse set of views from participants. The issues, actions and Agenda produced at the Workshop are the product of this diversity. The ideas and recommendations contained herein are not meant to be exhaustive. Rather they should be viewed as a representative list of important needs and recommended actions that readers can adopt, adapt, and implement as they see fit.

This Workshop began a dialogue, it was not the end of one.

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ACKNOWLEDGEMENTS

The co-sponsors of the Workshop would like to extend their appreciation to the Focus Group that planned this Workshop. Their diligence, expertise, and willingness to work through difficult issues made the Workshop a success. Additional thanks go to all the attendees who can take pride in their participation. You have contributed to a brighter environmental and economic future for all of us.

This document was prepared by ICF Incorporated under EPA contract number 68-W2-0008. ICF's Project Manager Paul Bailey appreciates the comments submitted by the many people who reviewed earlier drafts of this material. Other members of the ICF project team include Keith Bowers, Margo Brown, Michelle Hocketstaller, Rob Lederer, and Ted Wilson.

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PREFACE

This document constitutes the results of an intensive two-day Workshop on management accounting and capital budgeting for environmental costs. The Workshop brought together experts from across the country to share their opinions and perspectives. The material presented here was distributed to all Workshop participants for their review and was revised to reflect their comments. Chapter III of this document has also been reprinted with minor modifications as a stand-alone EPA document Stakeholders' Action Agenda: A Report of the Workshop on Accounting and Capital Budgeting for Environmental Costs (May 1994) EPA #742-R-94-003.

As a facilitator, EPA is committed to helping stakeholders implement this Action Agenda and share information. If you and your organization would like to participate in implementing one or more recommendations in the Agenda, undertake any other activities to promote improved accounting and capital budgeting, or inform colleagues about available resources and publications, EPA will be pleased to communicate this information. The Agency is also interested in exploring cooperative efforts to implement the Agenda. Whether you represent a company, academia, government, an advocacy group, a professional or trade organization, or any other organization, all of the Workshop co-sponsors and attendees encourage you to get involved.

If you are currently implementing or plan to implement any facet of the Action Agenda, please complete EPA's revised Accounting Network membership form. The Agency will be using the Network forms for tracking commitments to implement the Action Agenda and collecting resource information. Additional Network forms may be obtained from EPA's Pollution Prevention Information Clearinghouse (PPIC). Contact the PPIC at (202) 260-1023 or write:

PPIC
U.S. EPA Headquarters Library
401 M Street, S.W. (3404)
Washington, D.C. 20460
FAX (202) 260-0178

If you are interested in discussing cooperative efforts to implement the Agenda, please contact Dr. Martin A. Spitzer or Holly Elwood in EPA's Office of Pollution Prevention and Toxics at:

U.S. Environmental Protection Agency
Pollution Prevention Division (7409)
401 M Street, S.W.
Washington, D.C. 20460
(202) 260-4164

For information about EPA's Design for the Environment, Management Accounting and Capital Budgeting for Environmental Costs Program, to join EPA's environmental accounting Network, or to learn about available resources on management accounting and capital budgeting for environmental costs, please contact PPIC at the above address.

EXECUTIVE SUMMARY

This document describes the Proceedings of an intensive two-day Workshop on management accounting and capital budgeting for environmental costs. The Workshop brought together experts from across the country to share their opinions and perspectives on key issues and recommended actions.

Background

The U.S. Environmental Protection Agency has initiated a Design for the Environment (DfE) program that works closely with private sector partners to promote the incorporation of environmental considerations, including pollution prevention, at the front end of product, process, and decision systems design. The DfE program includes cooperative efforts with stakeholders on several "infrastructure" projects aimed at changing general business practices. The goal of these efforts is to effect voluntary changes in management systems and organizational decision making that will facilitate investment in and expanded use of waste minimization and pollution prevention practices and technologies.

As part of this DfE program, EPA is working on the Management Accounting and Capital Budgeting for Environmental Costs project. Management accounting is the collecting of information primarily for internal decision-making; this information directs management attention, supports decisions, and motivates staff and management behavior. The project is aimed at encouraging business to modify management accounting systems to fully and explicitly account for environmental costs and to incorporate that information into a variety of business decisions, including capital budgeting practices. Doing so, many experts agree, will highlight the advantages of investments in cleaner, pollution prevention practices over end-of-pipe technologies. In the long run, improvements in management systems will promote more accurate costing and pricing of products and processes with emphasis on environmental cost/benefits, will create performance and compensation incentives that reflect environmental goals, and will result in less waste, increased profitability, enhanced competitiveness for U.S. businesses, and, ultimately, improved protection of public health and the environment.

EPA's role is as a facilitator and supporter for outside experts who are willing and capable of addressing these important issues. The focus of the Agency's cooperative effort is to mobilize the expertise of the accounting, business, academic, research, environmental communities, and government to integrate more explicitly environmental costs into managerial accounting and capital budgeting practices.

History of Workshop

To help build momentum, in early 1993 EPA convened a Focus Group of sixteen experts from diverse fields which established the vision and objective of the Management Accounting and Capital Budgeting for Environmental Costs project, as follows:

Project Vision: *"To encourage and motivate businesses to understand the full spectrum of environmental costs and integrate these costs in decision making."*

Project Objective: *"To facilitate understanding and integration of environmental costs through the development and use of improved cost accounting and capital budgeting."*

Based on its project vision and objective, and the need for promoting an interdisciplinary dialogue on the issues, the Focus Group planned a National Workshop of experts in management accounting and capital budgeting. The Workshop had six co-sponsors:

- U.S. Chamber of Commerce
- The Business Roundtable
- American Institute of Certified Public Accountants
- Institute of Management Accountants
- AACE International (Association for Total Cost Management)
- U.S. Environmental Protection Agency.

The Focus Group developed the following objectives for the Workshop:

- *Stimulate ongoing dialogue,*
- *Identify and discuss key issues and needs, and*
- *Develop "Stakeholders' Action Agenda" for improving accounting and capital budgeting*

The Workshop was held in Dallas, Texas in December, 1993. The Workshop focused on managerial accounting, not on financial accounting and public reporting issues. Attendees were all actively engaged in managerial accounting and capital budgeting. To meet its objectives, the Workshop used a combination of plenary sessions and intensive small working group sessions, each with up to 10 participants from across a wide spectrum of disciplines, including the business community (accounting, finance, environment, operations), the accounting community, consultants, professional trade organizations, universities and government.

Stakeholder Action Agendas

After general discussion of issues and needs on the first full day of the Workshop, participants reconvened in 10 working groups on the second day of the Workshop to develop action agendas for ten major stakeholder groups:

(1) Business Financial Staff
(2) Business Accounting Staffs
(3) Business Environmental Health and Safety Staffs
(4) Business Operations Staffs
(5) Accounting Associations
(6) Small Businesses
(7) Non-Accounting Professional Associations

(8) Management Consultants

(9) Education and Research Community

(10) Government Agencies

This numbering scheme is used to identify stakeholder agendas in Attachment A.

The issues discussed in the Workshop and addressed in the action agendas can be grouped into four major themes:

(1) Terms, concepts, and roles

(2) Management incentives

(3) Education, guidance and outreach

(4) Analytic tools, methods, and systems

Each of these issue areas is discussed in turn.

(1) Definition of terms, concepts, and roles.

Terms and Concepts. Because the concept of environmental accounting is new and unfamiliar to many, an important issue in the near term is to clarify what the concept means and what are the goals for its implementation. Participants recommended a number of the actions to clarify the concept of incorporating environmental costs into managerial accounting and capital budgeting. In addition to differences of opinion about what costs ought to be considered by firms, there is also confusion about what people mean when they use terms such as life cycle costing, life cycle assessment, total cost accounting, full cost accounting, total cost assessment, and so on.

Workshop participants expressed in several ways the perceived need for clarification of terms and concepts. Among the recommended actions are:

- identifying a common body of knowledge and terms,
- sharing knowledge and experience,
- using cross-functional teams, including rotation of personnel, to develop common terms and concepts,
- holding workshops and conferences,
- increasing communications, and
- promoting, sponsoring, and conducting research.

Roles. Because incorporating environmental costs into management accounting and capital budgeting is a relatively new approach and because many parties must be part of the solution, many participants saw a need to clarify the roles of key players. Definition of roles appears to be as important an issue as clarification of terms and concepts. The accounting associations action agenda highlights the issue of defining their roles, including such recommended actions as reviewing accounting codes of ethics to incorporate environmental concerns. The government role was an important topic of discussion, with many participants endorsing the

catalytic and facilitation roles that federal and state government agencies can play, while expressing reservations about government regulation and standard-setting.

(2) **Management incentives.**

A second major theme of the recommended actions relates to internal and external incentives for action. This ranges from the need for greater attention to the topic, to identifying and creating reasons for addressing it (both internal and external to businesses), to the necessary conditions for progress.

Internal Incentives. Recommended internal incentives for business include tying the consideration of environmental costs to existing decisions on product mix, outsourcing, capital investments, performance evaluation, promotion/compensation, product costing, and quality assurance. Doing so could involve incorporating environmental goals into business unit objectives, creating specific rewards for achieving such goals, and incorporating environmental concerns into everyone's job description, from top management to line workers.

Participants recognized that simply recommending such actions will not necessarily make them happen. Organizational and management commitment are keys to success. For example, participants made frequent calls for increased management commitment, cross-functional teams, and champions to "overcome inertia."

Demonstrating the added-value of knowing environmental costs is noted in several action agendas as a key activity for securing management commitment and aligning incentives. Showing successes -- defined largely as cost savings -- appears in most of the action agendas as a recommended activity.

External Incentives. Workshop participants identified a variety of potential external incentives, many of which can promote pollution prevention as well as environmental accounting. These include:

- Market-based environmental solutions such as pollution credits and emissions trading that require sound environmental cost information,
- Standardized environmental reporting of, for example, environmental cost information,
- "Safe Harbors" for disclosure of environmental liability estimates,
- Loans, investment tax credits, depreciation policies that could enhance the returns from environmental projects,
- Awards/recognition,
- Pollution prevention planning regulations with environmental accounting components, and
- Voluntary programs (e.g., Green Lights, 33/50, WasteWi$e, Design for the Environment).

The external incentives were viewed as important motivators for action. Business stakeholders tended to distinguish between positive external incentives and negative external incentives.

(3) **Education, outreach, and guidance.**

A third major theme in the agendas for action is the development and dissemination of information through a variety of communications, outreach, and technical assistance channels. While incentives provide the motivation, information provides the know how. Case studies, success stories, clearinghouses, conferences, newsletters, bulletin boards, guidebooks, and training materials appear repeatedly in the action agendas. Workshop participants also viewed information dissemination as key to establishing incentives, such as top management commitment.

Specific actions recommended in the action agendas include the following:

- Develop and deliver university and continuing professional education curricula,
- Disseminate success stories,
- Sponsor workshops to develop common environmental accounting language,
- Distribute training/technical assistance materials for small business,
- Develop topical conferences on accounting methodologies,
- Use association newsletters and magazines as media,
- Publicize electronic bulletin boards,
- Include management assistance in state pollution prevention Technical Assistance Programs,
- Conduct case studies and benchmarking to identify "Best Practices," and
- Publicize primers on pollution prevention.

(4) **Analytic tools, methods, and systems.**

This fourth theme of the action agendas focuses on developing and disseminating needed tools, methods, and systems. Examples include developing analytic tools and methods (e.g., models) to estimate societal costs (externalities) and methodologies for estimating long-term environmental liabilities (non-externalities), creating flow charts of materials and activities that help identify waste reduction opportunities and serve as foundations for costing information, researching the relationship between pollution prevention and employee morale/productivity, and integrating environmental elements into existing management and accounting systems and capital budgeting processes.

Final Plenary Session

The presentation of the action agendas by the individual working groups stimulated much discussion in the final plenary session of the Workshop. The specific points raised in the plenary session often underscored issues and actions included in the agendas. For example, participants reiterated the needs for:

- Corporate managers to change their philosophy to bring "green accounting" to mainstream corporate America,
- The private sector to take the initiative to make it happen, and
- Stakeholders to use a larger vision to motivate action.

It is important to emphasize that the action agendas represent the opinions of individual Workshop participants and not necessarily a consensus of opinion of each working group, the entire Workshop, or the co-sponsors.

I. THE WORKSHOP

I.1 Background

The challenge ahead for securing sustainable development and long-term environmental protection is to develop the link between economic development (including improved competitiveness of U.S. industry) and protection of the environment. One of the ways to accomplish this is to integrate environmental considerations into traditional business functions, including financial functions such as accounting, capital budgeting, risk management, lending, and finance.

The U.S. Environmental Protection Agency has initiated a Design for the Environment (DfE) program that works closely with private sector partners to promote the incorporation of environmental considerations, including pollution prevention, at the front end of product, process, and decision systems design. The DfE program includes cooperative efforts with stakeholders on several "infrastructure" projects aimed at changing general business practices. The goal of these efforts is to effect voluntary changes in management systems and organizational decision making that will facilitate investment in and expanded use of waste minimization and pollution prevention practices and technologies. By helping to translate waste minimization and pollution prevention into meaningful terms for professional groups, the DfE program contributes to building the institutional structure to support both waste minimization and pollution prevention.

As part of this DfE program, EPA is working on the Management Accounting and Capital Budgeting for Environmental Costs project. Management accounting is the collecting of information primarily for internal decision-making; these systems direct management attention, support decisions, and motivate staff and management behavior. The basic assumption of the Management Accounting and Capital Budgeting for Environmental Costs project is that environmental protection and economic well being are inter-dependent. The project aims to encourage business to modify management accounting systems to fully and explicitly account for environmental costs and to incorporate that information into capital budgeting practices. Doing so, many experts agree, will highlight the advantages of investments in cleaner, pollution prevention practices over end-of-pipe technologies. In the long run, improvements in management systems will promote more accurate costing and pricing of products and processes with emphasis on environmental cost/benefits, will create performance and compensation formulas that reflect environmental goals, and will result in less waste, increased profitability, enhanced competitiveness for U.S. businesses, and, ultimately, improved protection of public health and the environment.

Since EPA neither regulates accounting and capital budgeting practices, nor has the expertise to address them directly, the Agency is acting as a facilitator and supporter for outside experts who are willing and capable of addressing these important issues. This cooperative effort mobilizes the expertise of the accounting, business, academic, research, environmental communities, and government to integrate more explicitly environmental costs into managerial accounting and capital budgeting practices.

I.2 History of Workshop

To help build momentum, in 1993 EPA convened a Focus Group of experts in a diverse group of fields to establish the vision and objective of the Management Accounting and Capital Budgeting for Environmental Costs project, through a series of meetings and teleconferences. In addition, the Focus Group worked to reach a consensus on the opportunities presented to businesses by rapidly growing environmental costs and increasing public demand for cleaner products. Specifically, the group determined that the environmental problems we face present many opportunities for businesses to improve their decisions by better identifying and understanding the environmental costs of their operations. The group agreed on the following assumptions:

- *Cost accounting and capital budgeting processes can be improved to more fully incorporate environmental costs.*
- *Better information can help managers evaluate the full spectrum of choices and the costs and benefits of business actions that prevent pollution.*
- *Because much work is currently underway to improve accounting and capital budgeting, there is an unprecedented opportunity to gather this expertise to stimulate an interdisciplinary dialogue.*

Source: Accounting and Capital Budgeting for Environmental Costs Focus Group, October, 1993.

The Focus Group was comprised of the following individuals and the organizations they represented:

Philip Ameen	Institute of Management Accountants and General Electric Corporation
Mary Bernhard	U.S. Chamber of Commerce
Daryl Ditz	World Resources Institute
William S. Garcia	American Institute of Certified Public Accountants and Union Carbide
Terri L. Goldberg	Northeast Waste Management Officials Association
John Hudson	American Institute of Certified Public Accountants
Robert Hummer	American Institute of Plant Engineers and Building Technologies, Inc.
Gary Hunt	National Roundtable of State Pollution Prevention Programs and N.C. Pollution Prevention Program
Dorothy Kellogg	Chemical Manufacturers Association

Dick MacLean	Arizona Public Service
John Morrow	American Institute of Certified Public Accountants
Randy Price	The Business Roundtable and DuPont
Frank Pucciano	Institute of Industrial Engineers and Georgia Power
Richard Selg	AACE International and Westinghouse Savannah River
Christopher Stinson	University of Texas at Austin
Rebecca Todd	New York University

I.3 Project Vision and Objectives

In the course of its deliberations, the Focus Group developed a common vision for the project and defined an objective, as follows:

Project Vision: *"To encourage and motivate businesses to understand the full spectrum of environmental costs and integrate these costs in decision making."*

Project Objective: *"To facilitate understanding and integration of environmental costs through the development and use of improved cost accounting and capital budgeting."*

Based on its project vision and objective, and the need for promoting an interdisciplinary dialogue on the issues, the Focus Group planned a National Workshop of experts in environmental management accounting and capital budgeting. The Workshop had six co-sponsors:

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- Institute of Management Accountants
- AACE International (Association for Total Cost Management)
- U.S. Environmental Protection Agency.

The Workshop was held in Dallas, Texas in December, 1993. The Focus Group developed the following objectives for the Workshop:

- *Stimulate ongoing dialogue*
- *Identify and discuss key issues and needs*
- *Develop "Stakeholders' Action Agenda" for improving accounting and capital budgeting*

The primary audience of the Workshop were members of the accounting and business communities who are actively engaged in managerial accounting and capital budgeting for

environmental costs. The Workshop did not focus on financial accounting and public reporting issues.

Although the focus of the Workshop was on managerial cost accounting and capital budgeting, participants fully recognized that these functions are interdependent components of the overall business decisionmaking system of a firm. For example, internal managerial accounting affects and is affected by other environmental issues that must be addressed in the areas of financial accounting, internal and external reporting, disclosure, accountability to stakeholders, and the progressive internalization of external environmental impact costs. Moreover, management accounting and capital budgeting must interact with efforts to promote total cost assessment , life cycle analysis, design for environment, total quality management, resource recovery, and so on. These approaches, appropriately applied, are increasingly important in environmental management for clean-up, control, remediation, pollution prevention, waste minimization and resource conservation.

I.4 Participants/Workshop Composition

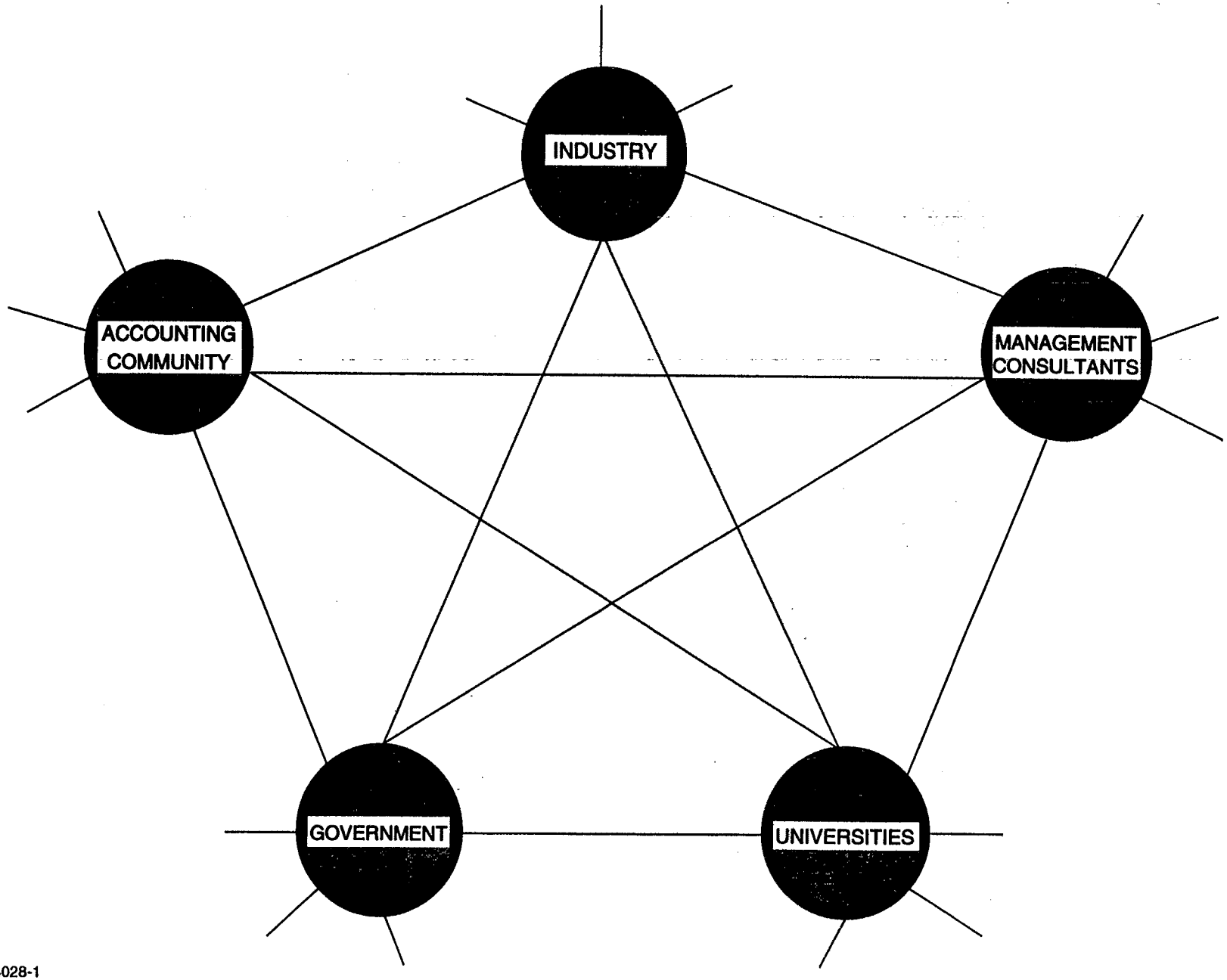
Workshop participants were recruited from the major stakeholder groups including industry, the accounting community, government, management consultants, and universities. Exhibit I-1 illustrates these major stakeholder groups and Exhibit I-2 shows the major industry stakeholder groups.

Flyers about the Workshop were distributed to more than 400 financial and environmental professionals interested and active in accounting and capital budgeting issues; news of the Workshop was distributed by other channels as well. The Focus Group decided to keep attendance at the Workshop below 100 participants to ensure that the group could achieve its objective of having meaningful dialogue and developing an Action Agenda. Most participants were drawn from the accounting and business communities but there was ample representation of other stakeholders also. Within the business community, for example, participants covered the cross section of accounting, financial, environmental, and operations staffs. Appendix I lists the workshop attendees.

The exhibits illustrate some of the groups of people and two-way communication that can be helpful in improving accounting and capital budgeting for environmental costs. Their purpose is to show the major "stakeholder" groups -- those people whose involvement is key to improving accounting and capital budgeting -- and the groups with whom they should interact, termed their "customers and suppliers." The diagrams are intended to be normative in the sense that they illustrate who ought to be involved, not who is currently involved. The diagrams were provided to Workshop attendees to stimulate thinking about how to involve others in problem-solving.

- **Overview of Major Stakeholders**: Exhibit I-1 is an overview of selected stakeholders (Industry, the Accounting Community, Government, Management Consultants, and Universities) and the flows of communication that can be helpful in improving accounting and capital budgeting for environmental costs. Every stakeholder in this diagram has lines of dialogue between it and every other stakeholder. Each stakeholder has reason to dialogue with all others, though the level of dialogue (a lot or a little) may vary.

Exhibit I-1
OVERVIEW OF MAJOR STAKEHOLDERS



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- **Industry Stakeholders:** Exhibit I-2 shows a selection of stakeholders (Operations Staff, Environmental Staff, R & D Staff, Accounting Staff, Financial Staff, and Marketing/Sales Staffs) pertaining to the Industry sector. It illustrates flows of communication among the within-Industry staffs that can be helpful in improving accounting and capital budgeting for environmental costs.

I.5 Organization of the Workshop

The Workshop was an intensive 2 days designed to allow participants to:

- Get to know one another and share experiences and expertise
- Identify and explore key issues and needs
- Select priorities and talk about ways to address them
- Develop a "Stakeholders' Action Agenda"

The Workshop used a combination of plenary sessions and intensive small working group sessions, each with about 10 participants from across a wide spectrum of disciplines, including the business community (accounting, finance, environment, operations), the accounting community, consultants, professional trade organizations, universities and government.

The approach of the Workshop was based on the idea that a diversity of views would produce the strongest recommendations, Using that premise, the Workshop was designed to create an environment where "stakeholders" and their "customers and suppliers" could join together to develop a "mini action agenda" for an assigned stakeholder group. The Workshop also fostered contact and interaction among the working groups to link priorities and recommendations, discuss overlapping issues, and identify committees or groups who could sponsor and carry out future activities to implement the Stakeholders' Action Agenda.

The Workshop commenced with registration on Sunday, December 5, 1993 and an informal evening opportunity for participants to meet one another. Monday morning, December 6, included a variety of presentations about the Workshop's history and objectives, basic concepts of managerial accounting, capital budgeting, and pollution prevention; and success stories presented by business representatives. Following the luncheon keynote speaker Richard Barth, the President, Chairman, and CEO of Ciba-Gigy, the ten working groups were assembled to discuss and prioritize key issues, steps needed to address them, and best practices. The results of the afternoon sessions were presented to the full Workshop in the evening.

The working groups reconvened on Tuesday morning; each was asked to develop an "action agenda" for a key stakeholder group, identifying important issues for the stakeholder group, steps to address the issues, and who else should be involved in implementing each action item. Groups were allowed and encouraged to interact to link priorities and recommendations. In the afternoon, the results of the morning sessions were presented by each group to the entire Workshop. In addition to discussion, workshop participants were invited to raise missing issues, voice concerns, and suggest next steps. Exhibit I-3 displays the detailed agenda for the workshop.

Exhibit I-2
OVERVIEW OF INDUSTRY STAKEHOLDERS

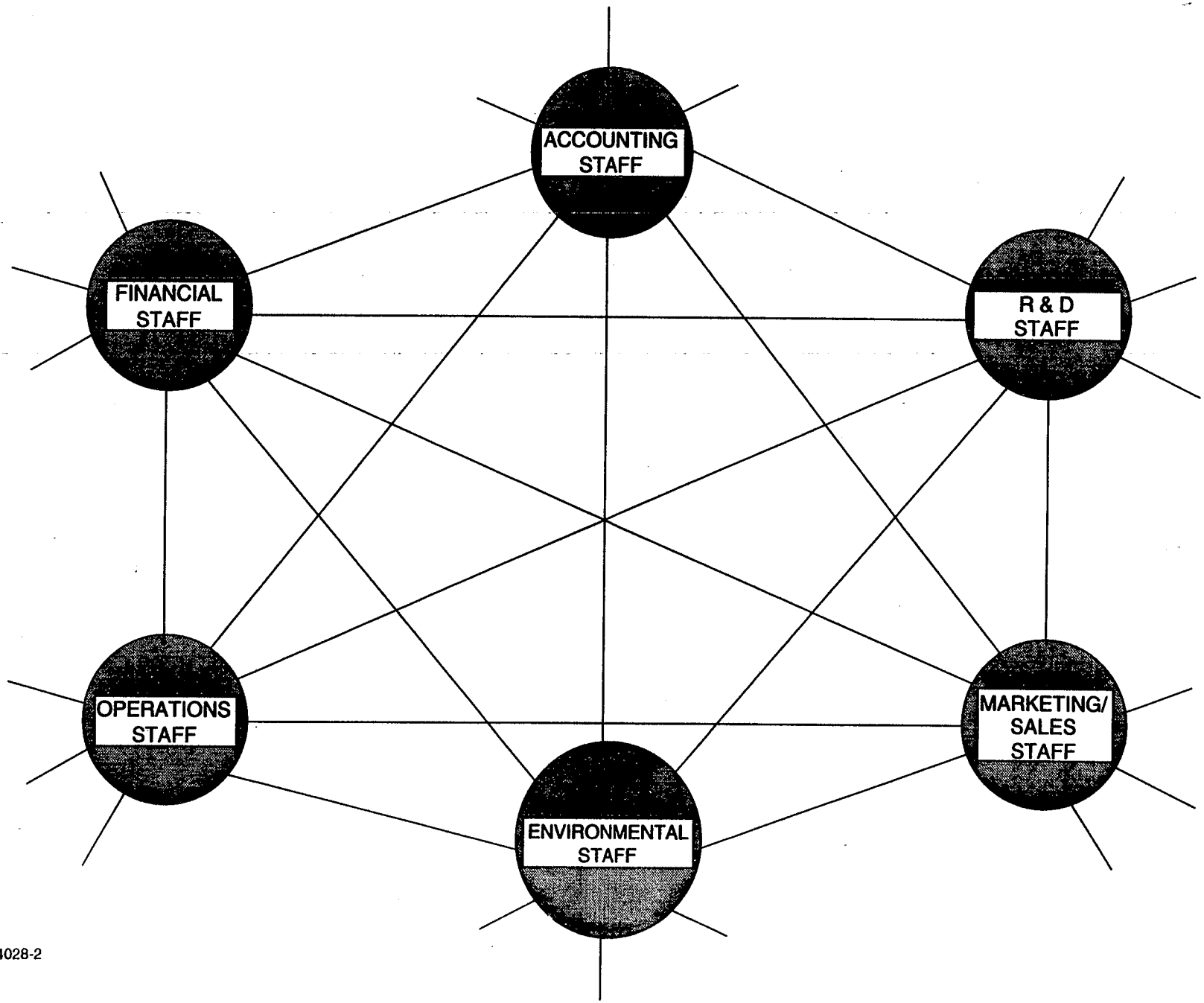

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EXHIBIT I-3: FINAL AGENDA

ACCOUNTING AND CAPITAL BUDGETING FOR ENVIRONMENTAL COSTS WORKSHOP

December 5-7, 1993

◆ SUNDAY, DECEMBER 5 ◆

5:00 - 8:00 p.m.	Registration open
7:00 - 10:00 p.m.	Reception (hors d'oeuvres and cash bar)

◆ MONDAY, DECEMBER 6 ◆

7:00 - 8:00 a.m.	Breakfast Buffet
7:00 - 8:00 a.m.	Registration open
8:00 - 8:20 a.m.	Introductions, Overview and Expectations ◆ Martin A. Spitzer Director, EPA's Accounting and Capital Budgeting Project U.S. Environmental Protection Agency ◆ John Warren Workshop Facilitator
8:20 - 8:40 a.m.	EPA Keynote Speaker ◆ Mark A. Greenwood Director, Office of Pollution Prevention & Toxics U.S. Environmental Protection Agency
8:40 - 8:45 a.m.	Preview of Morning Session (John Warren - Workshop Facilitator)
8:45 - 8:55 a.m.	Presentation of Focus Group Process to Plan Workshop (Randy Price, The Business Roundtable, Manager, Environmental Affairs, DuPont Company)
8:55 - 9:20 a.m.	Basics of Managerial Accounting (Rebecca Todd, Professor, New York University)
9:20 - 9:45 a.m.	Basics of Capital Budgeting (Allen White, Director, Risk Analysis Group, Tellus Institute)
9:45 - 9:55 a.m.	Basics of Pollution Prevention (Dr. Ed E. Quick, Manager, Environmental Health & Safety, Hoechst Celanese Corp.)
9:55 - 10:20 a.m.	Break
10:20 - 11:35 a.m.	Success Stories Presented by Business Representatives ◆ Case Study I (Ciba-Geigy Corporation - George Muhlebach, Director, Environmental Affairs) ◆ Case Study II (Ontario Hydro - Corinne Boone, Economist, Energy Serv. & Environ. Group) ◆ Case Study III (Hyde Tools - Doug DeVries, Environmental Manager)
11:35 - 12:00 Noon	Plenary: Questions & Answers and Implications of Case Studies
12:00 - 1:15 p.m.	Luncheon Keynote Speaker - "Meeting the Challenge" ◆ Richard Barth President, Chairman and CEO Ciba-Geigy Corporation
1:15 - 1:30 p.m.	Overview of Working Group Plans and Activities ◆ Process & Expected Outputs (John Warren - Workshop Facilitator)

EXHIBIT I-3: FINAL AGENDA (continued)

◆ MONDAY, DECEMBER 6 ◆ (continued)

1:30 - 4:30 p.m. Working Group Meetings (Facilitated groups of 10-12 each)
- ◆ Members introduce themselves and discuss their backgrounds
- ◆ Discuss key issues and identify the ones they believe are most important
- ◆ OUTPUT - A list of key issues, steps needed to address them, and best practices

4:30 - 6:00 p.m. Free Time

6:00 - 7:30 p.m. Dinner

7:30 - 9:30 p.m. Plenary Session
- ◆ Working Groups Report
- ◆ Discussion during remaining time
- ◆ Preview of Day 2

9:30 - 10:30 p.m. Optional Social Hour (Cash Bar)

◆ TUESDAY, DECEMBER 7 ◆

7:00 - 8:00 a.m. Breakfast Buffet

8:00 - 8:10 a.m. Plenary - Brief Overview of Morning Session (John Warren - Workshop Facilitator)

8:10 - 12:00 a.m. Working Groups Reconvene
- ◆ Each Group will develop a "mini action agenda" for a key Stakeholder group, identifying key issues for the Stakeholder group, steps to be taken to address them, and who should be involved in addressing them.
  (Groups will be allowed and encouraged to interact with other working groups to link priorities and recommendations).

Working Group Assignments:
- (1) Business Accounting
- (2) Business Finance
- (3) Business Operations
- (4) Business Environmental Health and Safety
- (5) Small Business
- (6) Accounting Professional Societies
- (7) Other Professional Societies (Engineering, etc.)
- (8) Management Consultants
- (9) Academic Research and Curriculum Development
- (10) Federal, State and Local Government

12:00 - 1:15 p.m. Lunch

1:15 - 3:00 p.m. Plenary Session
- ◆ Working Groups Report their "Mini Action Agendas" (10 minutes each)
- ◆ Questions and Answers

3:00 - 3:15 p.m. Break

3:15 - 4:00 p.m. Plenary Session Continued
- ◆ Identify missing issues or ideas not mentioned by any group
- ◆ Begin discussion of some key overlapping issues to begin integration

4:00 - 4:50 p.m. Plenary Session Continued
- ◆ Identify committees or groups to sponsor actions
- ◆ Encourage preliminary sign-up for committees, including those who wish to chair or co-chair various efforts
- ◆ Sign up forms will be distributed

4:50 - 5:00 p.m. Closing

I.6 Materials Provided to Participants

EPA provided Workshop participants with advance materials contained in a notebook supplemented with materials available at the Workshop, such as speaker biographies and abstracts. Exhibit I-4 lists materials included in the notebook. That material is largely incorporated in these proceedings. For example, the information provided in Tab A of the notebook has already been presented in this chapter.

Attendees received two additional items that require further elaboration: the Customer/Supplier Maps and the Issue Papers.

Customer/Supplier Maps. Attendees were provided with diagrams that illustrated the importance of each stakeholder group collaborating with other stakeholder groups. The detailed customer/supplier maps on the following pages use the same basic format: Each diagram focuses on a stakeholder category, located in a box in the center of the page. The box is in a large circle. The large circle represents the stakeholder's firm or organization. There are smaller circles inside and outside of the large circle. The smaller circles represent other stakeholders and customers/suppliers. Circles located within the large circle show stakeholders and customers/ suppliers within the firm or organization. Circles located outside of the large circle show stakeholders or customers/suppliers outside of the firm or organization.

Each designated customer/supplier is a group that the stakeholder probably should be having dialogue with in order to improve accounting and capital budgeting for environmental costs. Some customer/supplier groups may not apply to all organizations. Also, an organization may find that other customer/supplier groups that do apply to it are not present in the diagram.

Arrows link the stakeholder and customer/supplier groups, indicating that they may benefit from dialogue, and that dialogue flows both ways. The level of dialogue (a lot or a little) may vary for different stakeholder and customer/supplier groups.

- **Industrial Customers/Suppliers**: Exhibits I-5 through I-8 focus on four of the six groups identified as industry stakeholders in Exhibit I-2 and their within-firm and outside-the-firm customers/suppliers. The four stakeholder groups are Accounting Staff (Exhibit I-5), Environmental Staff (Exhibit I-6), Operations Staff (Exhibit I-7), and Financial Staff (Exhibit I-8).

  Note: Each industry sector and individual firms have different organizations and divisions of labor. For instance, Operations Staff may be composed of various other staffs, including Operations, Shipping, Maintenance, Quality Assurance/Quality Control, Production, Waste Handling, and so on. Alternatively, each of these staffs may be organized separately from each other. Regardless, the various Operations-type staffs should probably have dialogue with each other to foster improved accounting and capital budgeting for environmental costs.

EXHIBIT I-4:

LIST OF ADVANCE MATERIALS PROVIDED TO WORKSHOP PARTICIPANTS

Exhibit I-5
ACCOUNTING STAFF CUSTOMERS & SUPPLIERS

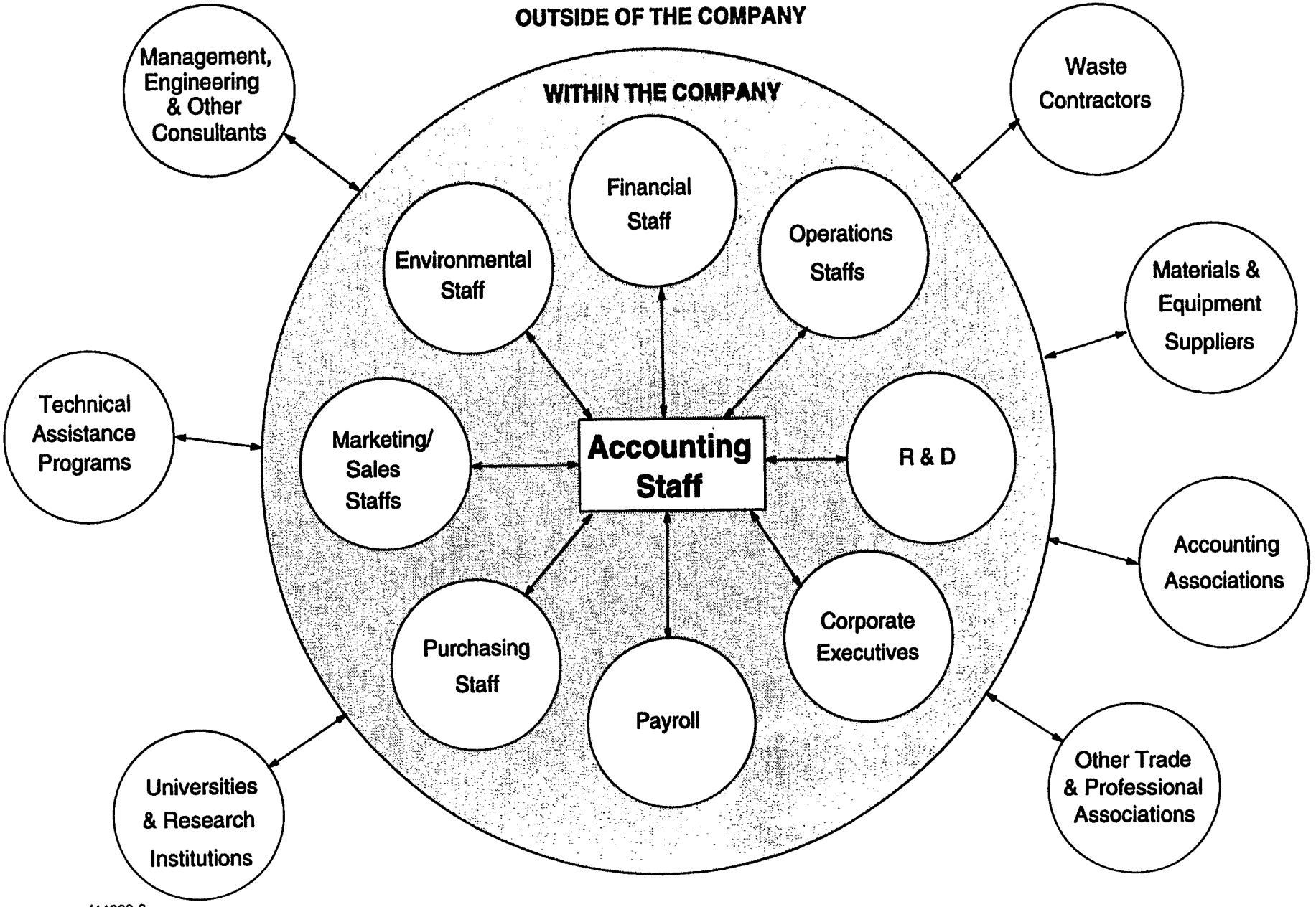

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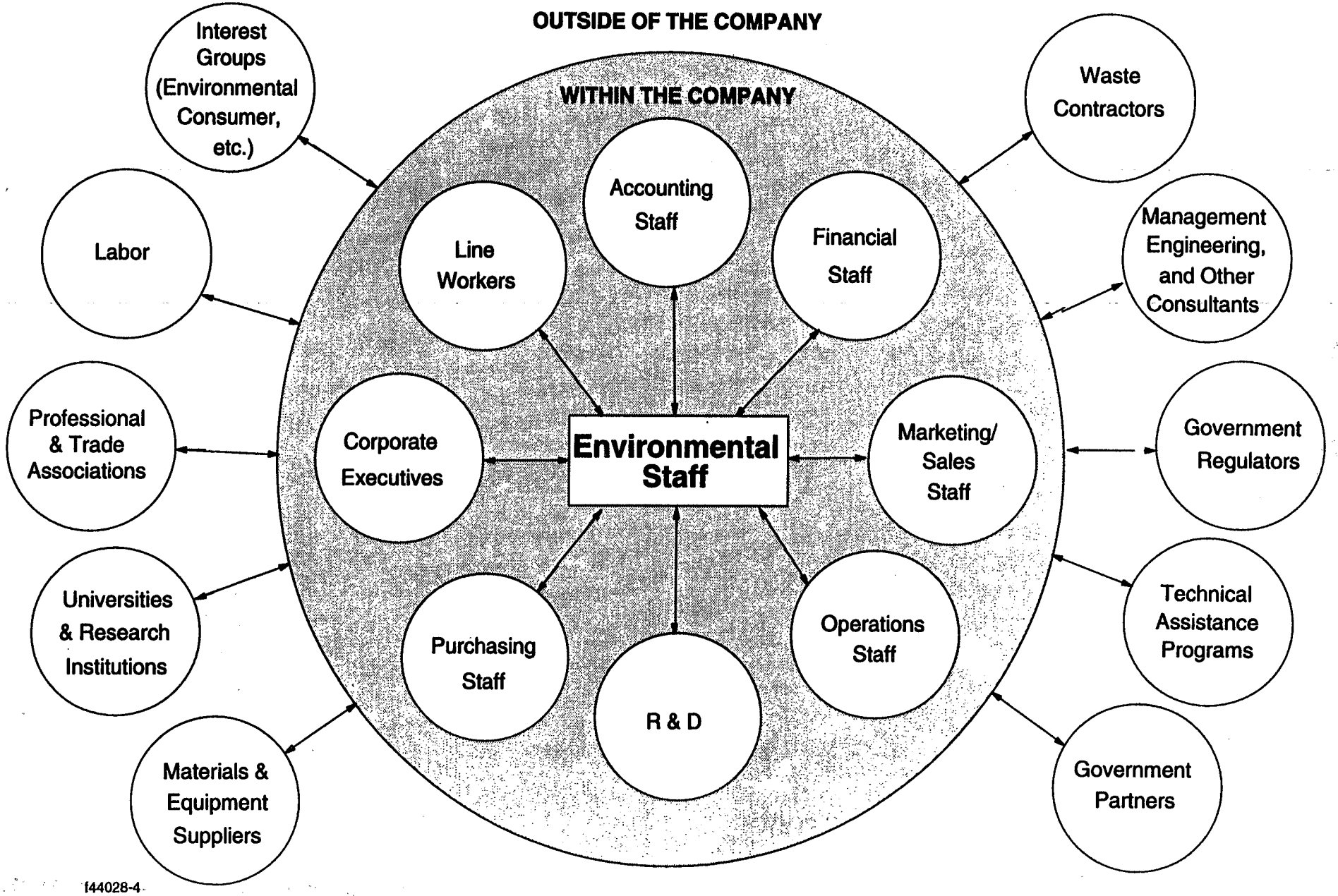
Exhibit I-6
ENVIRONMENTAL STAFF CUSTOMERS & SUPPLIERS



f44028-4

Exhibit I-7
OPERATIONS STAFF CUSTOMERS & SUPPLIERS

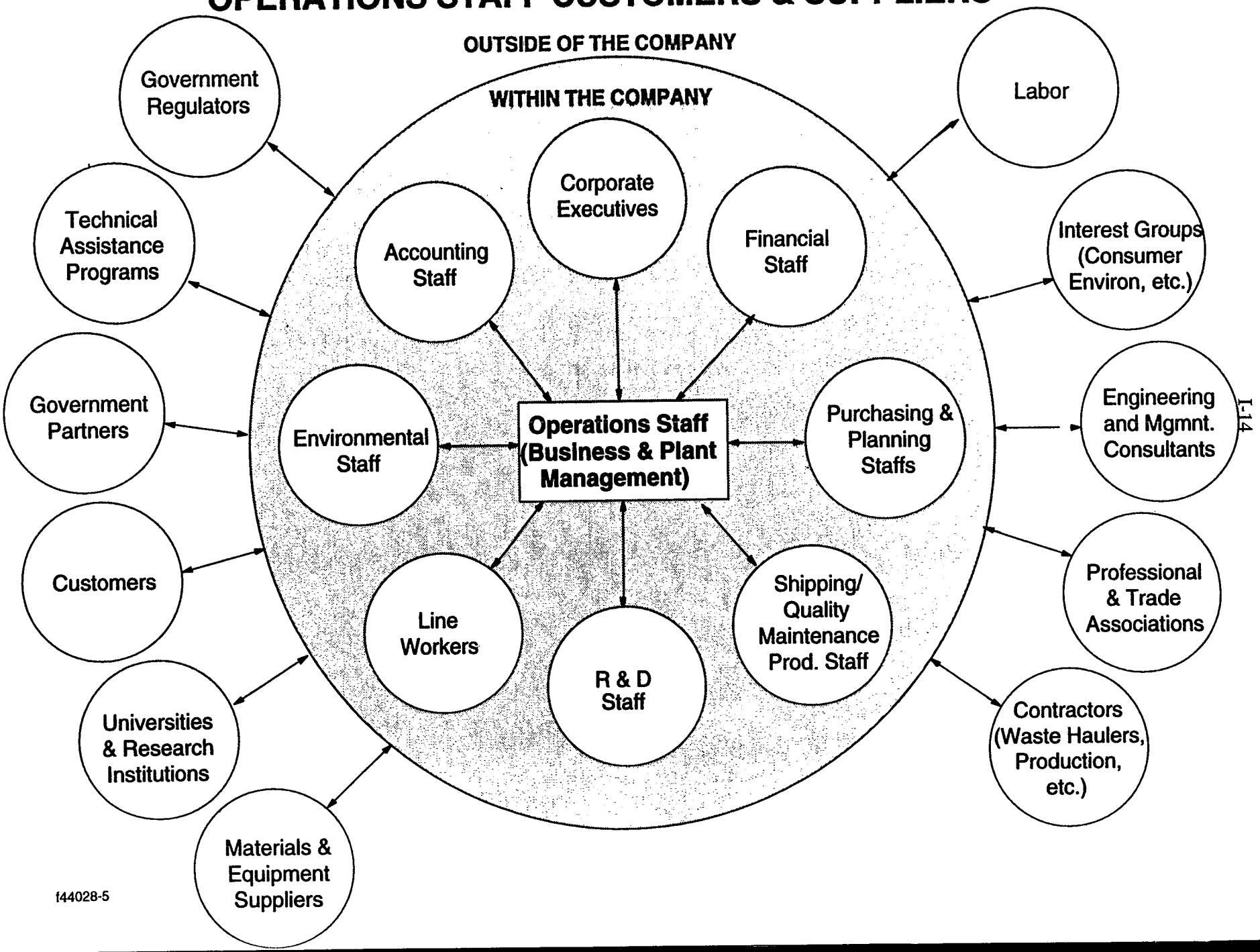


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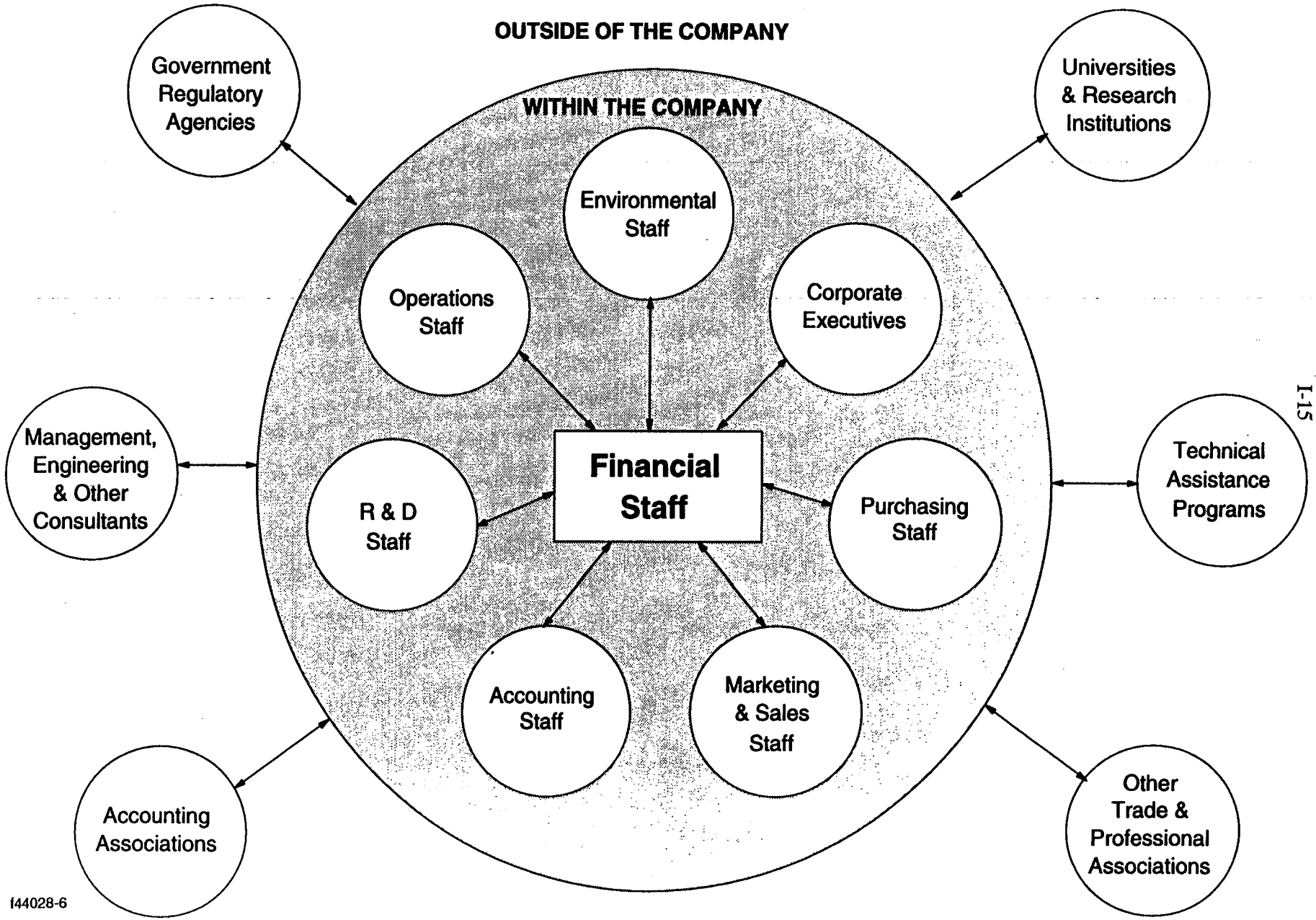
Exhibit I-8
FINANCIAL STAFF CUSTOMERS & SUPPLIERS



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- **Association Customers/Suppliers:** Exhibit I-9 focuses on Accounting Associations (such as the Institute of Management Accounting (IMA) and the American Institute of Certified Public Accountants (AICPA)) and their within- and outside-the-association customers/suppliers. Exhibit I-10 focuses on Engineering Associations (such as AIChE and AIPE) and their within- and outside-the-association customers/suppliers.

- **Consultants (Management, Engineering, and Others) Customers/ Suppliers:** Exhibit I-11 focuses on consulting firms and their within- and outside-the-firm customers/suppliers. Consulting firms may include management, engineering, environmental, auditing, information technology, and accounting practices.

- **Government Customers/Suppliers:** Exhibit I-12 presents the customers/suppliers of federal government agency stakeholders.

Issues Papers. The workshop materials also included a discussion of the types of issues relevant to management accounting and capital budgeting for environmental costs as well as seven individual issue papers intended to stimulate thinking and discussion. These materials follow.

I.7 Issues in Management Accounting and Capital Budgeting for Environmental Costs

Management accounting systems provide cost information for use in: 1) directing management attention, 2) supporting decision-making, and 3) motivating behavior. Capital budgeting is the analysis and decision process by which firms determine how to invest their limited resources/dollars. A number of issues may arise in improving management accounting and capital budgeting practices to more fully account for environmental costs and incorporating the information in business decisions. This section contains:

1) a list of some of those issues grouped into categories for consideration during development of the Action Agenda, the output of the Workshop; and

2) a description of seven (7) relatively broad issues chosen to reflect a range of issues, including both "soft" areas (e.g., communication) and "hard" technical or methodological issues.

The list of issues is by no means complete; it was not meant to be. Workshop participants developed their own lists of issues and needs, which formed the basis for the Action Agendas. Similarly, this description of each selected issue is not exhaustive, but rather a brief overview touching on some aspects of the issue. The issue papers are provided as a starting point, particularly for those not intimately familiar with accounting, capital budgeting, or some of the other concerns that were discussed at the Workshop. This information served as background for workshop participants and was meant to stimulate thinking about the issues. It was hoped that

Exhibit I-9
ACCOUNTING ASSOCIATIONS CUSTOMERS & SUPPLIERS

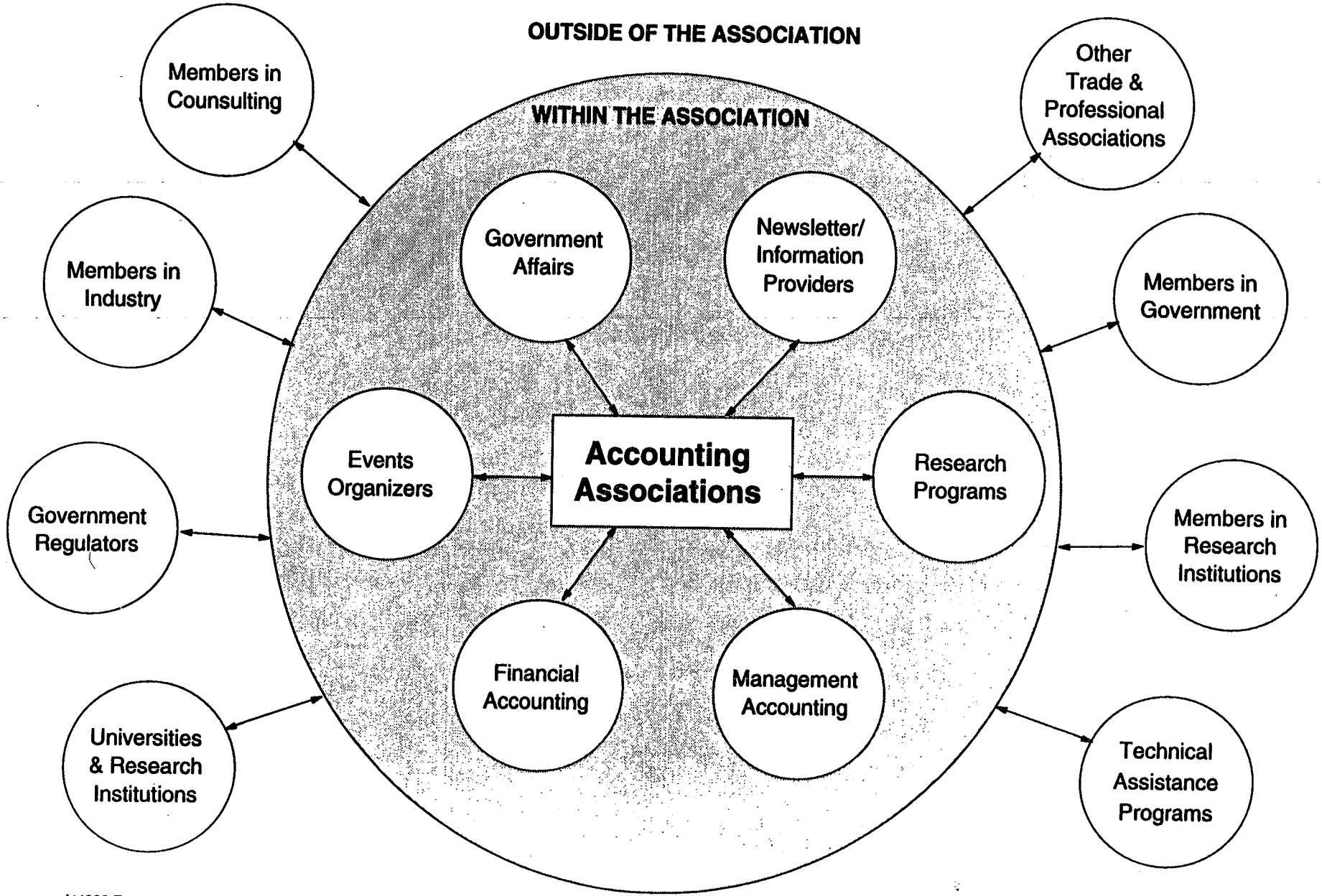

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Exhibit I-10
ENGINEERING ASSOCIATIONS CUSTOMERS & SUPPLIERS

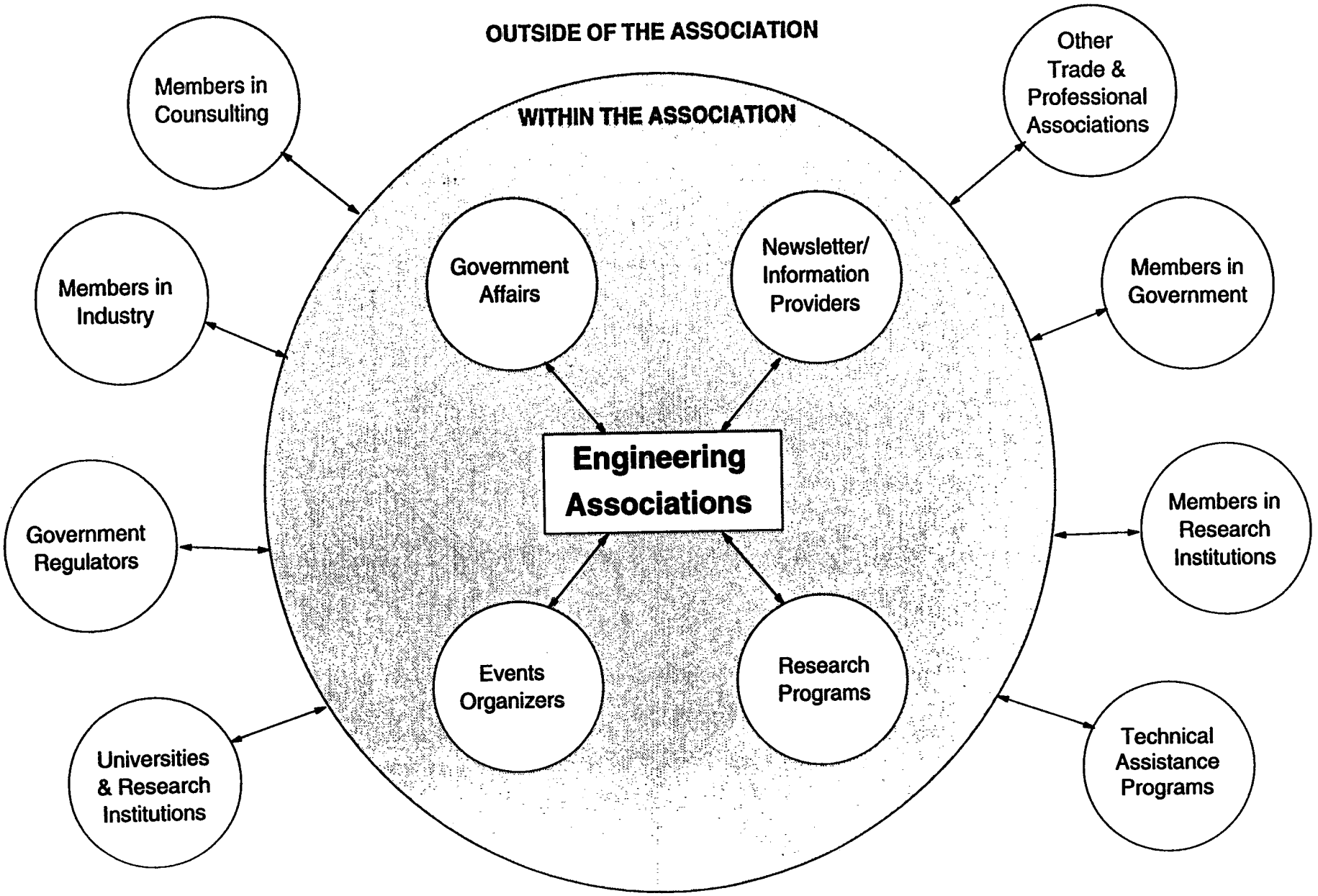

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Exhibit I-11
MANAGEMENT CONSULTANTS CUSTOMERS & SUPPLIERS

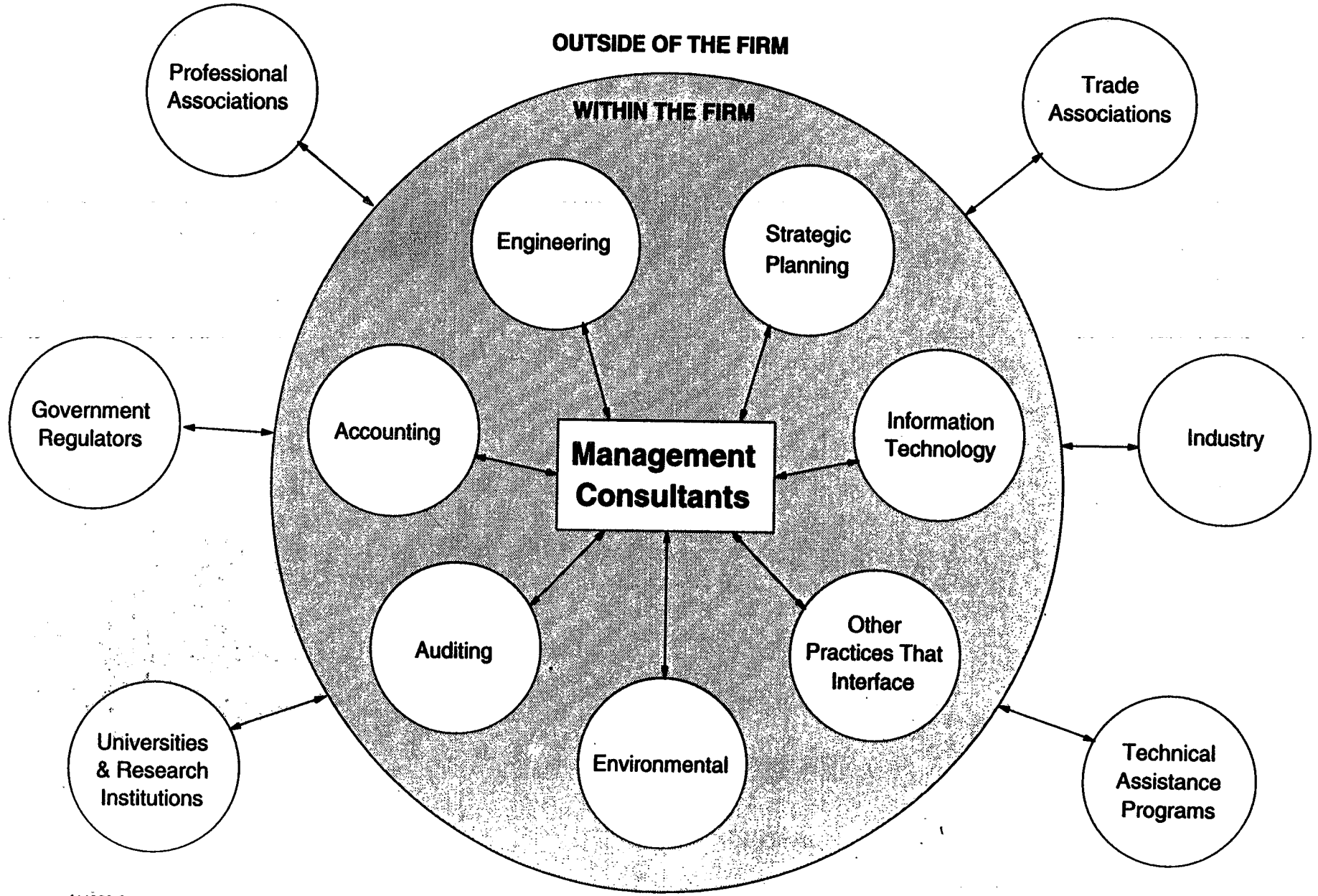

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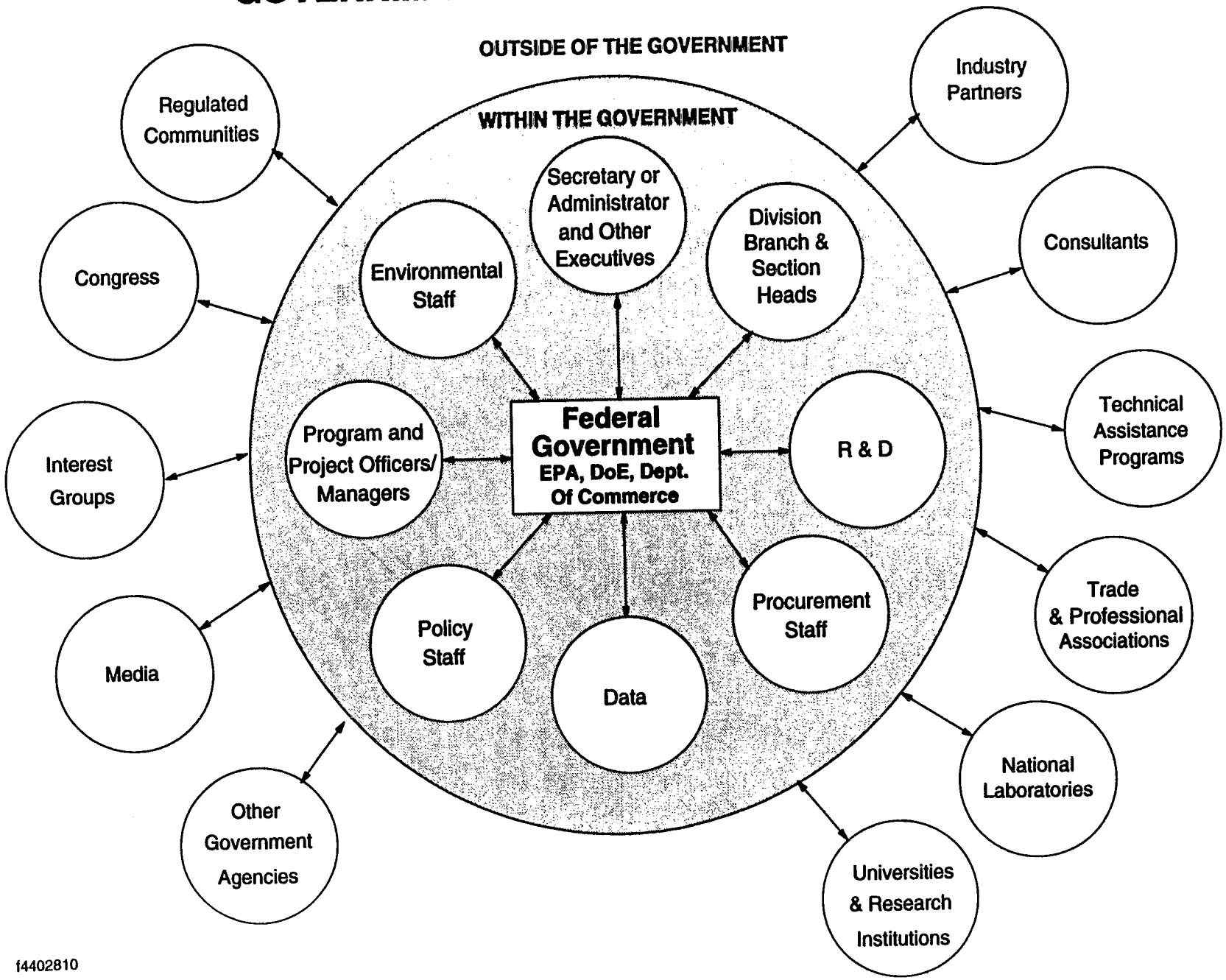
Exhibit I-12
GOVERNMENT CUSTOMERS & SUPPLIERS



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the issue papers enriched the participants' perspectives and encouraged discussion during the Workshop and afterwards.

The issues are sorted into categories designed to focus discussion toward elements of the Action Agenda, which was the ultimate output of the Workshop.

Category 1: Education and Training

- People could benefit from education in methods for fair, unbiased assessment of environmental expenditures.
- Different professions have different vocabularies for dealing with environmental issues.
- Engineers and researchers may benefit from training in how to identify and develop pollution prevention technologies, and how to evaluate the financial aspects of these technologies.

Category 2: Technical Methods and Tools

- It would be helpful to have a generally accepted methodology for estimating future environmental liabilities.
- Financial reporting does not require that environmental costs be linked with specific products, and this often carries over into the managerial accounting system, where many environmental costs may be treated as overhead. There may be a need for use of a different or separate management accounting system (for example activity-based costing, or ABC).
- Training in how to modify methods of applying net present value analysis to better handle environmental costs and benefits may be needed.

Category 3: Information and Communication

- Plant personnel need to know what kind of information they can draw from existing information systems.
- Accounting systems, engineering evaluations, and investment analysis may be separate functions and thus there may be lack of communication and exchange of information across departments.
- Advocates of pollution prevention can be more successful if they learn to articulate the benefits.

- Production managers may not even be aware of many of the environmental costs of their products.

Category 4: Publicity

- There is a widespread belief that environmental expenditures are inherently losing propositions.
- There is a lack of understanding of the need for a change in methods of handling opportunities for pollution prevention.
- There is little awareness of public incentive programs for pollution prevention.

Category 5: Management

- Managers' incentive systems may not reward them, and may in fact be a disincentive, for evaluating the full environmental costs of their products.
- Environmental professionals often work outside the management decision-making process.
- Accounting innovations that aid understanding of pollution prevention opportunities may need to be encouraged and supported.
- Top managers themselves may be unaware of the range and size of environmental expenditures and the opportunities for prevention.

Category 6: Organization

- Pollution prevention could make greater progress if the organization were structured to link efforts among accounting, management, environmental, and production personnel on this issue.
- Environmental affairs departments are often centralized and somewhat separated from other functions.

MANAGERS' MOTIVATIONS

Statement of the Issue

Managers' motivations may not be consistent with a goal of encouraging businesses to understand the full spectrum of environmental costs and integrate these costs in decision-making. Managers may have little incentive to uncover the "full" environmental costs of products and processes, may not be motivated to look at options beyond minimal compliance with environmental standards, and may not be encouraged to innovate.

Background

It is widely recognized that an effective environmental program requires senior management support. And many case studies document that a creative response, such as pollution prevention, to environmental requirements needs a "hero" or "champion" who is committed to overcoming the inertia of the status quo. At the same time, American business is going through an unprecedented down-sizing, particularly in the ranks of middle management who are viewed as generating costs but little value added for the corporation. American managers are criticized for being short-sighted and insufficiently attuned to the needs for profitability and competitiveness.

Description

A recurring issue in any discussion of integrating environmental considerations into traditional business functions is that managers have little incentive to uncover hidden or obscure environmental costs of a product or process. Managers' responsibilities are fundamentally to meet or exceed numerical targets of profitability and/or market share. These over-riding benchmarks, against which managers' compensation is measured, set the priorities. By leaving environmental costs in overhead or indirect accounts, managers may be better able to show enhanced performance.

A related issue is that managers' motivations tend to focus on the short-term, with limited, if any, consideration of longer-run results. This short-term focus may bias decision-making against environmental projects which may have longer payback periods than other investments.

Managers have other reasons for not wanting to uncover the environmental costs of a product or process. Because environmental costs are viewed as problems, there is a natural inclination to sweep them under the carpet. Furthermore, managers may fear that an unbiased assessment of a product's costs could lead to closure of a product line or production center, with resulting job losses. Most mangers want to avoid such situations.

Managers also rarely receive any credit or reward for doing more than the minimum necessary for environmental compliance. Technological or accounting innovation is not rewarded because "the system" in many companies discourages innovation. Cookbook regulatory

compliance carries little downside risk; pollution prevention programs, which are likely to be less proven and therefore considered more risky, are unlikely to be viewed positively and may require more internal review and approvals.

Discussion

Realigning managers' motivations is on the agenda of all companies that are restructuring or "reinventing" themselves to meet the competitive challenges of the 1990s. Managers' incentives are being revised and their motivations subject to increasing scrutiny.

External to the corporation, government agencies such as the EPA and SEC, as well as bodies such as FASB, are increasingly pushing businesses to recognize environmental and other (e.g., unfunded pension, health benefits) liabilities. This trend might help overcome managers' reluctance to uncover or recognize environmental costs; it also means that companies who evaluate environmental costs may find themselves not so competitively disadvantaged.

As companies face environmental costs, they may find that (1) their liabilities are not so large as they feared and (2) they have creative ways of reducing environmental costs while increasing competitiveness. The act of confronting environmental costs can significantly reduce managers' fears of the unknown.

And if managers are rewarded for identifying product lines or processes that are unprofitable due to hidden environmental costs, they will be encouraged to serve the long-term interests of their companies, shareholders, and customers.

TREATMENT OF ENVIRONMENTAL COSTS AS OVERHEAD

Statement of the Issue

Many environmental costs that pollution prevention can affect are treated as overhead in managerial accounting systems (which provide cost information to decision makers in businesses). This treatment reduces the economic benefits apparent to decision makers who might consider pollution prevention measures.

Background: What is Overhead?

"Overhead" is any cost that, in a given accounting system, is not wholly attributed to the manufacture of a single product.

Each cost that is overhead is treated in either of two ways:

- attributed to two or more products by allocating it, or
- left in the business' pool of costs that are not attributed to any of its products.

Overhead treated in the first way is often called "manufacturing overhead." Typical examples include disposal costs, maintenance, waste treatment, safety equipment, and supplies. It becomes part of the product cost for each of the products to which it has been allocated. Product cost is what the accounting system considers the firm has incurred to make the product and to place it into inventory ready to be sold.

Overhead treated in the second way is often called "technical, sales, and general administrative," or "TSGA" costs. Typical examples include research and development; staff departments such as human resources, law, and environmental affairs; and marketing. It is part of the business' period cost. Period cost is what the accounting system considers to be part of operating the business itself, rather than part of making products.

Background: Why are Environmental Costs Treated as Overhead?

Managerial accounting systems treat some environmental costs as overhead partly because such systems have traditionally reflected the structure of financial reporting systems. Therefore, in order to understand the issue better, it is necessary first to look at the requirements for financial reporting.

Financial reporting systems exist to provide information to stockholders, taxing authorities, securities regulators, and the public. Because these audiences are interested only in the "bottom line" and have little interest in knowing environmental costs (or, for that matter, other costs) linked to specific products, the standards (Generally Accepted Accounting Principles, or GAAP; standards of the Financial Accounting Standards Board, or FASB; and the regulations of the

Securities and Exchange Commission, or SEC, and the Internal Revenue Service, or IRS) for such reporting do not require it. In fact, the standards often require just the opposite: that costs not directly measurable and assignable to specific products or processes on a cause-and-effect basis be lumped together as overhead.

Hence the financial reporting system treats a large amount of cost as overhead, and so does the managerial accounting system to the extent it parallels the financial reporting system. The proportion of cost treated as overhead has grown over the years -- it used to be that labor and material were the primary costs, but today labor may be significantly less than years ago, while a large percentage of a firm's costs may be overhead.

The carryover from financial reporting systems cannot explain completely why environmental costs are so often treated as overhead in managerial accounting systems. After all, a business can generate and report to its own decision makers almost any information it desires. An additional issue is that the value of knowing the "full" environmental costs or linking environmental costs more directly to products or processes in reporting to decision makers is often not perceived by the designers of the managerial accounting system to be as high as the cost of the additional information processing necessary to do so. However, that perception may be based on an incomplete understanding of the range and size of costs that decision makers could reduce through environmental measures such as process changes or source reduction.

Description

When environmental costs are treated as overhead, decision makers can fail in two different ways to recognize that they can reduce these costs:

(1) managers may be unable to recognize certain costs as environmental costs, and

(2) they may not believe that recognized environmental costs are reducible through their decisions.

The first situation occurs often with the environmental costs that are not allocated to processes or products, that is, with those in TSGA. A manager may see only the total TSGA cost with no disaggregation, or may not even be reported a TSGA cost at all. In either case, it is impossible for the decision maker to identify through such reports many costs that are in fact environmental, such as regulations and compliance monitoring, reporting and record-keeping requirements, training, and litigation.

The second type of situation occurs often with the environmental costs that are allocated to products or processes, that is, with those in manufacturing overhead. Although managers can see that the costs are environmental, they are aware that the costs reported for their product lines have simply been allocated through an arithmetic formula such as pro-rating cost among product lines according to their water usage. This awareness can lead to two scenarios.

In the first scenario, the decision makers believe that, even if they were successful in reducing the product line's dependence on the environmental service (such as waste disposal or waste treatment) associated with that cost, the arithmetic formula might be difficult to change or won't fully recognize their savings. As a result decision makers may believe that the reported costs for which they are responsible will not reflect the entire benefit, and consequently they forgo the efforts and instead concentrate on cost reductions that carry greater recognition in the accounting system for their operation.

In the second scenario, decision makers believe that the actual total costs to the business will not change even if they are successful in reducing dependence on the environmental service and being fully recognized for the success. This happens when the managers believe (perhaps correctly) that the environmental service is of an "all-or-nothing" nature, that is, that the business will continue to have to pay the full cost of the service as long as even one product line continues to use it. In this case, managers would probably not undertake pollution prevention unless they work jointly in a way that is not directly encouraged by the reports they independently receive.

COMMUNICATION AND ORGANIZATIONAL ISSUES

Statement of the Issue

Full awareness of the benefits of pollution prevention, and effective action to achieve the benefits, depends on good communication among different functions in a business. However, the organizational structures of many businesses discourage such communication.

Description

Most large businesses operate through organizational structures that were established largely before the impact of business on the environment was known, and before the need for environmental protection was recognized. These structures do not, therefore, provide easy avenues for communication on environmental issues.

Two or more departments that need to interact may be separated by distance. Production managers and engineers may be in a plant in one state, research and development personnel may be in another, and environmental staff in yet a third. Regardless of how accessible people may be by phone or fax, communications tend to be more frequent and broader in scope among people at a single location. Moreover, communication among a group of people working at a common site tends to be facilitated by the common vocabulary of the site. This is important in the environmental field, where terms vary among the disciplines.

The way that the activity and personnel of a business are divided into functions may discourage the needed communication. People generally engage in more frequent and easier interactions with people in their own functions or departments. If all the environmental experts are in a separate department and under separate supervision from production, accounting, and research and development departments, the communication needed for pollution prevention is less likely to occur.

Perceptions that people in other functions are at a different level in the organization also may inhibit interaction. If production managers perceive research and development or environmental personnel to have higher status than themselves (or vice versa), they will tend to communicate in a more guarded manner.

Another issue is that people simply may not realize how sharing of information with other departments could reveal opportunities for environmental benefits. Those who develop reporting and communication procedures (outside the managerial accounting system) may lack awareness of information transfer needs.

People often feel that they are just too busy to communicate across departments. This could be caused by there being too few people to devote proper attention to the issue, too low a priority assigned to the issue, or both. Perhaps those who decide head count and hiring plans,

and those who set departments' priorities do not themselves recognize or truly believe that environmental protection, particularly pollution prevention, offers economic benefits.

Discussion

There are many examples of cross-functional communications that can help businesses to recognize and capture savings through pollution prevention.

One example is transferring information from the environmental staff to production managers regarding possible future environmental regulations. When production managers realize that a pollutant generated in their plant might become more heavily regulated, they will be more likely to think about equipment or process changes that reduce the generation of that pollutant.

Production managers will also be more likely to initiate analyses of pollution prevention benefits if they have discussed with accounting department personnel how accounting reports can be used to estimate environmental costs. Production managers may also be more confident in presenting pollution prevention projects if they understand the internal review process for capital approval.

Also, research and development personnel working on new production processes will focus attention on source reduction only to the extent they understand its benefits. Achieving this understanding is difficult without input from production managers and environmental staff.

Likewise, environmental staff will focus more attention on helping to identify pollution prevention technology if they know the true scale of the environmental costs, and which processes are going to be considered for upgrading or replacement in the future. Accountants, production managers, and engineers need to communicate this information.

A final example is that engineers and production managers associated with current operations should receive full information about the lagging environmental costs of past operations. Fuller awareness of the scale of these costs can encourage them to be vigilant for opportunities to reduce the costs and the associated environmental impacts.

UNCERTAINTY IN ENVIRONMENTAL DECISION-MAKING

Statement of the Issue

Decisions involving environmental expenditures may be perceived to entail more uncertainty than other types of business decisions. In particular, uncertainty about future environmental liabilities and compliance needs makes it difficult to assess some of the potential benefits of environmental expenditures. Not only are legal requirements in flux, but society's perceptions about environmental risks change. In addition, lacking a generally accepted method to estimate future liabilities that could be avoided or reduced as a result of environmental investments, managers may find cost-benefit analyses too speculative.

Background

All business decisions involve uncertainties: will demand continue for product X? How will competitors' actions affect margins? Market shares? What will be the cost of capital in five years? Ten years? How will accounting and financial reporting requirements change? How will new technologies affect business? Most significant business decisions are made in the context of many uncertainties.

Decisions about environmental and pollution prevention projects generally involve the types of uncertainties encountered in other types of capital investment, R&D, and production decisions. For example, a key factor in any product or process redesign is whether the new product or process will work well -- what will be the impact on quality or productivity of using a less toxic input? A different cleaning agent? Similarly, economic uncertainties about the future prices of raw materials and the costs of waste disposal are germane to all decisions affecting products and processes, including pollution prevention decisions.

A special aspect of the issue is noteworthy because of the associated uncertainties. Unlike most environmental expenditures, which are undertaken solely to comply with government regulations or orders, pollution prevention expenses are also incurred to reduce or avoid future liabilities, including future environmental regulations. Because future environmental liabilities can appear speculative, managers may conclude that preventive actions cannot be justified. Certainly few managers in 1970 could have anticipated the past twenty years of environmental law-making by Congress, regulatory agencies, and the courts.

Discussion

The additional uncertainties faced in environmental decision-making have been raised by some professionals as an issue in improving corporate decision-making. Because of changing laws, unpredictable societal perceptions of risk, and lack of generally accepted tools for estimating future liabilities, it may be difficult to incorporate environmental liabilities into company decision-making. On the other hand, at this point in time, future environmental liabilities may be easier to predict than they were in 1970, at least with no more uncertainty than the other factors businesses

must estimate. Today, for example, we are much better equipped to assess the potential risks of alternate sites for chemical storage, waste disposal, and product processes; we better understand the relative risks posed by many chemicals in commerce; we can better estimate the potential for human and environmental exposure and the attendant costs of monitoring, remediation, and compensation; and the regulatory agenda is much better defined.

An issue is whether future compliance needs can be predicted with any certainty. And if so, how? Tracking environmental rule-making has become a full-time job, because of the enormous volume of federal and state rules. It can be difficult to assess current compliance needs, given the complexity of regulations, let alone crystal ball future standards. Nevertheless, given the time frame of many corporate decisions (e.g., ten year projections), it is now feasible to project with some certainty future regulatory standards. The legislative and regulatory process typically consumes several years, giving analysts a five-to-ten year advance notice of forthcoming compliance needs. For example, after years of debate, the Clean Air Act Amendments were enacted in 1990; however, by the time most federal and state requirements will be effective, 5-10 (or more) years will have passed. It has taken nearly ten years for the RCRA hazardous waste Land Disposal Restrictions program to be fully implemented from the 1984 enactment of the Hazardous and Solid Waste Amendments (HSWA), which were foreshadowed by the California program. By assessing what is in the regulatory pipeline, what is on the agenda, and prevailing trends, we can develop reasonable expectations of future compliance requirements.

Other uncertainties plague attempts to predict future "third-party liabilities" for property damage and personal injury, and future claims for damages to natural resources. Legal standards of causation and burden of proof are currently inconsistent and subject to change through judicial fiat or legislative enactments. Theories of liability and measures of damages proliferate. Looming in the background is the prospect of CERCLA liability for natural resource damages -- a provision not widely employed to date and subject to political judgments of when and how to apply it. The potential costs of natural resource damages claims could be staggeringly high, or inconsequential if not applied. This context makes future environmental liabilities very difficult to assess.

Are future environmental liabilities (e.g., third-party property and personal injury, natural resource damages) so uncertain as to render their avoidance through pollution prevention too speculative? Assessing current liabilities is not an exercise in great precision, but it is conducted now whenever property is purchased by a sophisticated buyer, and whenever insurers underwrite coverage, as well as for other purposes. Formal tools and informed judgments support such liability assessments, largely based on the experience and scientific/engineering/legal developments of the past twenty years. Drivers of liability, much like drivers of regulatory standards, evolve relatively slowly, allowing projections to be made over time periods of interest to business decision-makers. On the other hand, there is no generally accepted documented method of estimating future liabilities for most situations.

KEY TECHNICAL ISSUES FOR CAPITAL BUDGETING

Statement of the Issue

Calculating the net present values (NPVs) or internal rates of return (IRRs) of proposed investment projects is a common way of quantitatively determining their attractiveness and of comparing projects to establish priorities in capital budgeting. However, the techniques are sometimes not used, and when they are used, they are often used in ways that fail to recognize the economic benefits of pollution prevention projects.

Background: How Does the Technique Work?

The first step in calculating the NPV of a proposed investment project is to forecast the amounts (dollars) and timing (years) of the cash flows that will result from it. A flow of cash out of the business (such as the up-front payments for equipment and installation) are considered negative cash flows, and flows into the business (such as revenues or reductions in labor costs) are considered positive cash flows.

The result of the first step is a schedule of cash flows--normally a large negative cash flow at time zero, followed by a series of smaller positive cash flows through some number of years. Normally some "time horizon" such as ten years is set, beyond which no more cash flows are considered. At the end of the time horizon, some residual value (a positive cash flow) is normally assigned to represent the value to the business of the remaining assets of the project (for example, salvage values).

The second step is to discount the cash flows to the present time and sum them. The discounting is done by applying a discount rate (also called hurdle rate or cost of capital) that has been selected by the business to approximate the cost at which it can obtain capital[1]. If, for instance, the selected rate is ten percent, a cash flow occurring one year after the investment is divided by 1.1, the one occurring two years after the investment is divided by 1.1^2, one occurring three years after is divided by 1.1^3, and so on. All the discounted cash flows are summed, and the result is the NPV.

If the NPV is negative, then the project would not normally be pursued unless there were some qualitative factors overriding pure economic considerations. If there are several projects with positive NPVs but insufficient capital to invest in all of them, then, on purely economic grounds, the projects with the highest NPVs would be chosen.

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[1] Some companies use a discount rate that has been selected to approximate the opportunity cost of their capital--that is, the return they believe they could achieve by diverting the capital to investments other than the one being evaluated. Discount rates selected this way are higher than rates selected to approximate the cost of capital.

A variation of the above technique is used for calculating the internal rate of return (IRR). The IRR of a given project is the discount rate that, when applied to the project's cash flows, results in an NPV of zero. Using this indicator, projects with IRRs below the business' selected discount rate would not be undertaken. Given several projects with IRRs above the discount rate, those with the higher IRRs would be preferable.

Description

There are at least six potential issues in considering environmental costs and projects with the NPV and IRR techniques:

1) Uncertainties may not be well handled. Normally, only the cash flows that are considered quite likely would be included in the evaluation. It may be difficult to assess the probability of the cost consequences of pollution, particularly costs in the future.

2) The discount rate may discriminate against projects with environmental benefits. Given that the techniques often eliminate these projects from consideration at an early stage, should a lower discount rate be used so that environmental projects can "stay in the running" until qualitative considerations can be applied?

3) Pollution prevention projects may not begin to accumulate significant benefits for several years. Therefore, the techniques will not fully reflect the value of the benefits when short time horizons are used.

4) The techniques may be carried out by personnel using engineering tools that don't benefit from all the information on environmental costs, including information available from accounting personnel. The tools may fail to recognize the positive cash flow resulting from reduction in costs from the environmental affairs department, for instance, because the engineers' spreadsheets focus primarily on direct and reasonably estimated costs, and may have only one line item to cover all of technical, sales, and general administrative costs (TSGA), or they may not include the costs of the environmental affairs department at all.

5) The techniques are only as good as the information they're based on. Even the best information from the accounting system may fail to reflect many positive cash flows resulting from pollution prevention. If environmental costs are not tracked and accounted for, for example, their reduction would not be recognized as a positive cash flow in the analysis. Future environmental liabilities, if not quantified, are not factored in either.

6) It is difficult to adequately reflect cash flows that lie in the distant future, such as environmental liabilities (for example, remediation costs). Environmental liabilities for a project's pollution may become apparent only many years beyond the time horizon used to evaluate the project.

CULTURAL OR ATTITUDINAL ISSUES

Statement of the Issue

For cost accounting and capital budgeting processes to more fully incorporate environmental costs changes may be required in corporate culture and professional attitudes. Currently, a number of views combine to limit the creativity with which businesses approach environmental expenditures, including pollution prevention opportunities.

Background

Only in the past twenty years has American industry needed to devote attention and resources to environmental protection, and only in the past ten years has business faced significant costs due to environmental concerns. Although corporate cultures and organizations vary, in general the environmental function is a fairly recent addition to business. Until environmental sensitivity becomes fully institutionalized in businesses, there is bound to be a period of adjustment in corporate culture and professional attitudes. The perception that businesses' self-interest and environmental protection are mutually compatible goals is not yet widespread. This situation raises issues for companies' efforts to improve their decision-making for environmental costs.

Description

Environmental expenditures are often viewed by businesses as just another cost item negatively affecting profitability and competitiveness. Businesses strive to serve their customers and shareholders by spending no more than necessary to satisfy environmental regulations. At best, environmental expenses are viewed as a necessary cost of doing business. The benefits or potential cost savings due to environmental investments are often not considered.

Another attitude is the view that companies should make only the minimum essential investment to comply with regulations: there are only downsides to more creative approaches. If a business controls pollution more than current regulations require, it runs the risk that the standards will be "ratcheted up" and made mandatory, for itself or its industry. Deviating from the regulatory "cookbook" is also more expensive, entailing more negotiations with regulators, more explanations and approvals, and more lawyers.

Consideration of pollution prevention opportunities -- as opposed to end-of-pipe treatment -- is similarly viewed as more of an internal hassle because of the need to work with the operations staff, R&D, Quality Control, utilities, engineering, and other units. All these parties must work together to analyze the multiple complex interrelationships among materials inputs, production processes, products, and pollution. Absent a corporate culture truly supportive of cross-departmental teamwork, the task of getting these units to work together can be daunting.

Lastly, there is an assumption that pollution prevention projects are inherently complex technologically, meaning that innovations are likely to be more difficult to implement.

Together, these attitudes and assumptions can create and support a reactive culture of minimal cookbook compliance with environmental standards.

Discussion

Although these cultural and attitudinal issues are undeniably real and must be acknowledged, many companies and individuals have begun to view environmental expenditures differently. By recognizing the importance of environmental quality and a sustainable environment, managers can view environmental and business goals as mutually compatible. Once the legitimacy of environmental protection is accepted, the issue becomes how can business best do its part? How can business best serve its customers and shareholders while respecting the environment?

This approach can lead to a different attitude in contrast to those described above:

- Rather than view environmental costs as inherently losing propositions with negative returns, environmental costs can be seen as investments that can generate returns

- Rather than assume that there are only costs to making more than the minimum investment to comply with regulations, some managers are exploring the potential benefits and weighing them against the costs

- See the need for cross-departmental teamwork as a means for finding the best approach and fully exploring the alternatives for achieving environmental protection, with their attendant costs and benefits

- Acknowledge that some pollution prevention techniques may be less technologically complex than some end-of-pipe treatment works

Together, these different attitudes and views can create and support a proactive culture of innovative cost-effective compliance with environmental standards while satisfying customer and shareholder needs.

MANAGEMENT SUPPORT

Statement of the Issue

Without management support, it can be difficult to better identify and understand the environmental costs of business operations and integrate these costs in decision-making.

Description

It is widely recognized that, for many reasons, management support is essential to a successful corporate environmental program. Firms that are leaders in this area have senior managers who have made a corporate commitment to the importance of environmental issues. Conversely, without management support, environmental demands may be responded to antagonistically, or, at best, in a reactive, minimalist fashion. Thus, management support is a necessary, though not sufficient, condition for success.

Companies frequently publicize their environmental credo in a policy or statement of principles; this can foster an atmosphere where self-motivated champions set forth to explore more creative alternatives (e.g., pollution prevention) to environmental compliance. More energizing is the issuance of a management directive regarding pollution prevention and the environment. Such a directive can challenge personnel to exercise their creativity and work together in identifying opportunities to improve firm competitiveness and environmental quality.

A related concern is the perceived failure of company management to focus on rising environmental costs and to structure internal procedures so that those costs do not remain hidden. For example, keeping environmental costs in overhead accounts does not provide managers with incentives or information to reduce those costs. For some companies, centralizing or decentralizing decision-making on environmental expenditures can produce suboptimal decisions. Capital budgeting procedures may interfere with reaching better decisions; for example, high hurdle rates or short time-frames for analysis may bias decision-making against environmental investments. Similarly, set budgets for end-of-pipe controls may not motivate broader thinking about materials substitution and process changes that could produce better results.

To assess the full range of alternatives to reducing or controlling environmental costs, management needs to provide support in the form of resources and tools. This is an issue noted by many managers themselves. Resources might include some time of accounting staff to collect and process information or set up an improved accounting system (e.g., activity-based accounting), scheduling a series of cross-departmental problem-solving sessions, some outside consulting assistance, or staff training. Tools can range from "how to" guides, to resource compilations, to software packages.

To ensure better decision-making, executives might ask their managers to develop more complete and better information about environmental costs. To achieve consistency and accuracy, guidance on allocation of overhead and indirect costs across product lines and estimation of

future liabilities may be desirable. Management might then require the company to examine these costs for innovative ways to save money and contribute to a cleaner environment. Because this will be a new way of approaching environmental needs for many companies, management support is essential.

I.8 Key Management Accounting and Capital Budgeting Definitions

(The text below is revised from a paper titled, "Accounting and Capital Budgeting for Pollution Prevention," presented at the 1993 Engineering Foundation Conference "Pollution Prevention -- Making It Pay!")

Clarification of terms is the first step in facilitating a dialogue on issues. As in other areas of pollution prevention, not everyone agrees on the definition of terms or the appropriate use of terms. For this reason some of the generally recognized terms and some of the different uses of terms are presented below. The goals is to cut through some of the rhetoric to ensure that everyone clearly understands the conceptual issues.

A. Accounting

As a general matter, all firms, big or small, collect information to direct management attention, inform decisions, evaluate performance, and prepare necessary financial reports or tax returns. Firms also report data publicly to stockholders, the Securities and Exchange Commission (SEC), banks, etc. The two terms commonly used to refer to these activities are "managerial accounting" and "financial accounting."

Managerial Accounting (Northeast Waste Management Officials Association/Massachusetts Office of Technical Assistance (NEWMOA/MAOTA) Curriculum, 1992; White and Becker, 1992 *New Solutions*; and Todd, July, 1992)

- The process of collecting, preparing, and analyzing information principally for internal decision making.
- Information is used for directing management attention, informing decisions, and rewards and compensation
- In practice, all firms collect some information, but its structure and use varies from company to company. Typically, such systems collect information on the cost of materials and labor, as well as other costs such as overhead, employee benefits, etc.

Financial Accounting (NEWMOA/MAOTA Curriculum, 1992; White and Becker, 1992 *New Solutions*; and Todd, July, 1992)

- The process of preparing financial reports relative to an enterprise as a whole for external parties (e.g., stockholders, creditors, bankers, and government).
- Unlike managerial accounting, there are strict rules governing what information is to be collected and how it is to be reported. Generally Accepted Accounting Procedures (GAAP) govern. These ground rules

are set by Financial Accounting Standards Board (FASB) and the (Securities and Exchange Commission (SEC). The IRS also sets requirements for tax reporting

- Firms report publicly only a subset of the information they collect for internal decision making.

Activity-Based Costing (ABC)

- "Traditional cost-accounting techniques allocate costs to projects based on attributes of a single unit" (e.g., number of direct labor hours required to manufacture a unit, purchase cost of merchandise resold, or number of days). "In contrast, ABC systems focus on activities required to produce each product or provide each service based on each product's or service's consumption of the activities." (Statement on Management Accounting, Statement Number 4T, September 30, 1993, Practices and Techniques: Implementing Activity Based Costing).

- "ABC [is a product costing system] that allocates [costs typically allocated to] overhead in proportion to the activities associated with a product or product family." (T. Gunn, *21st Century Manufacturing* 1992:104-105)

- "[T]he real value of this costing methodology is that it promotes understanding of the total business process associated with each product and of the company's buildup of value added in that product." (Gunn, 1992:105)

- It is a tool to "identify and reduce resource consumption by increasing efficiency (productivity) and effectiveness (T. Gunn, 1992:107).

- Todd, July, 1992:12-13 calls this ABC approach an "Environmentally 'Enlightened' Cost Accounting System."

Several terms have emerged to describe the process of more accurate environmental accounting.

Full Cost Accounting

- A method of "managerial cost accounting" that allocates environmental costs (direct and indirect) to a product, product line, process, service, or activity. Cost items can be divided into direct and indirect costs. (NEWMOA/MAOTA Curriculum, 1992; White and Becker, 1992 *New Solutions*; and Todd, July, 1992)

- Full cost accounting can help managers decide on product costing and pricing, inventory valuation, profitability, and other decisions. It is not by definition limited to environmental costs, although, the term has taken on increasing significance for environmental professionals (NEWMOA/MAOTA Curriculum, 1992; White and Becker, 1992 *New Solutions*; and Todd, July, 1992)

- Different Uses of the Term. Not everyone uses the term "full cost accounting" the same way. Some include only a firm's private costs (i.e., those costs that affect the firm's bottom line) (NEWMOA/MAOTA and White and Becker) while others (MacLean, 1989) include the full range of external costs throughout the life cycle of the product, from raw material extraction to product disposal, some of which do not show up directly or even indirectly in the firms "bottom line" (see definition of life cycle costing below). Complicating matters, FCA has a specific meaning to accountants who do GAAP reporting. It refers to full accounting for historical costs.

Total Cost Accounting

- A hybrid term sometimes used as a synonym for either of the definitions given to "full cost accounting, or as a synonym for "Total Cost Assessment" (see below the definition of Total Cost Assessment under the Capital Budgeting section).

Full-Cost Pricing

- A less-used term again used as a synonym for full cost accounting or life cycle costing including social costs and externalities (see e.g., Washington Post 11/29/92, page, H1.)

Total Cost Assessment

- Long-term, comprehensive financial analysis of the full range of internal (i.e., private) costs and savings of an investment (White and Becker).

Costing and Financial Analysis of Pollution Prevention Projects

- "[i]nvolves the collection of costs from the corporate cost accounting system, the application of a financial tool, and analysis of the quantitative and qualitative aspects of the project." (NEWMOA/MAOTA).

Life Cycle Assessment (LCA)

- LCA is a holistic tool used to identify the environmental consequences of a product, process, or activity through its entire life cycle and to identify

opportunities for achieving environmental improvements. (Society for Environmental Toxicology and Chemistry)

Life Cycle Costing

- A method "in which all (both private and social or internal and external) costs are identified with a product, [process, or activity] throughout its lifetime, from raw material acquisition to disposal of final waste materials (Northeast Waste Management Officials Association/ Mass., Office of Technical Assistance (NEWMOA/MAOTA); Research Triangle Institute.)

- When possible, social costs are quantified; when not possible, they may be addressed qualitatively.

Other Terms

A number of other methods and terms have emerged since the late 1980s to conduct this sort of analysis -- "Benefits Analysis," Financial Analysis of Waste Management Alternatives," "Economic Feasibility."

NOTE: See also the Business Roundtable paper "Environmental Cost Accounting: Key Definitions and Terms"

II. THE PRESENTATIONS

The Accounting and Capital Budgeting for Environmental Costs Workshop included several presentations designed to provide a common basis for communication among workshop participants with different backgrounds. These presentations covered:

- Basics of Managerial Accounting, by Professor Rebecca Todd of New York University
- Basics of Capital Budgeting, by Allen White of the Tellus Institute, and
- Basics of Pollution Prevention, by Dr. Ed E. Quick, Manager, Environmental Health & Safety, Hoechst Celanese Corp.

Each of these presentations appears in this Chapter in the order listed above.

Following these presentations, three case studies were shared with the Workshop that described how three different companies are addressing environmental costs:

- Case Study 1: Ciba-Geigy Corporation, by George Muhlebach, Director, Environmental Affairs
- Case Study II: Ontario Hydro, by Corinne Boone, Economist, Energy Services and Environmental Group, and
- Case Study III: Hyde Tools, by Doug DeVries, Environmental Manager

Each of the case studies is compiled in this chapter in the above order. The materials contained in this chapter are the written materials or overhead slides used by the presenters. The materials have not been edited for reproduction in the Proceedings.

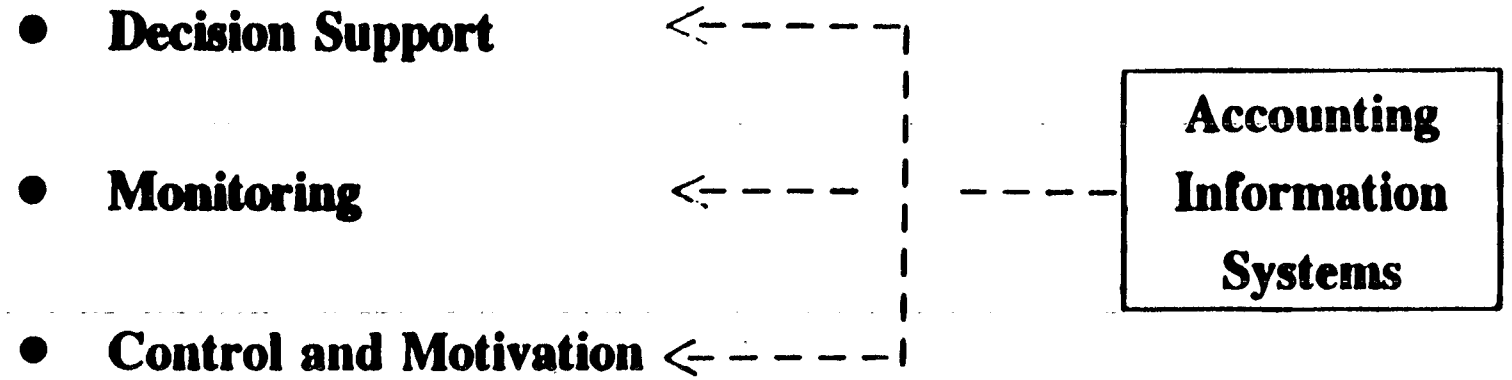
Available biographies for the presenters comprise Attachment A to this chapter.

BASICS OF MANAGERIAL ACCOUNTING

Professor Rebecca Todd (10 pp.)
New York University

December 6, 1993

General Functions of Managerial Accounting Information



- **Decision Support**

  Examples:
  - Product Mix
  - Pricing Decisions
  - Process Choice
  - Make or Buy Decisions
  - Investment Decisions
  - Research & Development
  - Capital Expenditures
  - Waste Treatment Alternatives
  - Liability Management
  - Etc.

- **Monitoring**

  Examples:

  - Tracking "Knowns":
    - Production volumes
    - Production costs
    - Sales $
    - Quality
    - Waste disposal costs
  - Detecting "Unknowns":
    - Major permanent shifts
    - Contingencies
    - Etc.

- **Control and Motivation**

  Examples:

  - Achieving targets:
    - Profit
    - Quality
  - Optimal use of assets
    - Out-of-pocket resources (cash)
    - Fixed assets (opportunity costs)
    - Rights ("quasi-resources")
  - Development of new business
  - Etc.

Environmental Accounting Information Issue 1:

External profit reporting focus of accounting systems:

- GAAP and IRS require firms to produce
  - *a* "full cost" Cost of Goods Sold number
  - *a* "full cost" Inventory number
  - *a few* general expenses numbers

1. *Problem for environmental decision-making with an external reporting focussed system:*

   - numbers highly aggregated
   - "environmental" dimension frequently lost --> not controllable
   - costs hidden as:
     - wages and salaries
     - property, plant, and equipment
     - research and development costs
     - legal expenses
     - etc.

2. *Problem for environmental decision-making with an external reporting focussed system*

- economic nature of cost components is lost:
  - variable out-of-pocket
  - fixed out-of-pocket
  - historical
- environmental alternatives evaluations require:
  - short-term vs. medium-term vs. long-term "escapability" of costs
  - distinctions between relevant and irrelevant costs

3. *Problem for environmental decision-making with an external reporting focussed system*

- Accounting systems currently record **historical** costs
- Environmental decision-making frequently requires understanding of **trends** and **uncertainties**:
  - growth rates for forecasting
  - volatility measures

Problem for environmental decision-making with an external reporting focussed system

- Profit accounting is traditionally oriented along marketing product portfolio lines

- Environmental (and other) costs tend to be driven by **technologies that are shared across product lines**

Summary:

Need to identify:

- **Major Technologies**
- **Environmental Activities**
- **Managerial accounting information needs**
- **Implementation problems**

BASICS OF CAPITAL BUDGETING (26 pp.)

Allen White
Tellus Institute
December 6, 1993

CAPITAL BUDGETING FOR POLLUTION PREVENTION

Allen L. White
Tellus Institute

- Capital budgeting (CB) is an essential business activity, regardless of the scale, product line, market position, and cost-sensitivity of the firm
- The larger the firm, more formalized, routinized the process; smaller the firm, more ad hoc, episodic
- CB decisions are driven by multiple, quantitative and qualitative criteria: e.g., financial performance, market opportunities, flexibility/adaptability
- Owing to certain attributes -- pollution prevention (P2) investments face numerous obstacles to (1) entering and (2) succeeding in the CB process
- These attributes include: "Loser" reputation from association with traditional compliance projects; management systems wedded to traditional compliance/"must do" culture; subtle, indirect, and long-term cost and revenue streams; contingent and less tangible benefits; tendency to decouple savings resulting from P2 investments from processes and products
- These attributes make rigorous, imaginative, and aggressive cost accounting essential to ensuring a level playing field
- This must occur along four dimensions: cost inventory, cost allocation, time horizon, financial indicators
- Frequently, firms are reluctant to change CB methods owing to: possible revelation of unprofitable or inappropriately priced product lines; altering methods is costly and faces substantial inertia; belief that waste management costs are too small to make a real difference
- Ultimately, cost accounts are only good as the physical accounts upon which they are built; improved physical accounting frequently viewed as costly and "risky" for some managers
- No single "best" model exists for improving the CB process to ensure unbiased consideration of P2 investments, but attributes of an improved model are identifiable: based on sound physical accounts; strategically useful; flexible enough to handle technological changes; capable of expressing results in the language/metrics used by decision-makers
- Setting the framework requires leadership by the management accountant; implementing the system is the job of environmental, production, purchasing, marketing, R&D, and other functional areas
- Participation, incentives, and appropriate "protective" measures are the surest route to moving the accounting system in the right direction

For years, the [Du Pont Beaumont, Texas] facility had been spewing out a staggering 110 million pounds of waste annually. Du Pont engineers argued that reduction of the pollution would be too expensive...But when they took a second look last year, they found just the opposite was true. By adjusting the production process to use less of one raw material, they were able to slash the plant's waste by two-thirds. Yields went up and costs went down. The savings: $1 million a year.

"When I heard about it, I just said: 'That's amazing,'" says Edgar Woolard, Du Pont's chairman and chief executive officer.

Wall Street Journal
June 11, 1991

****

I.B.M. ...is replacing chlorofluorocarbons with, of all things, [soapy] water."

New York Times

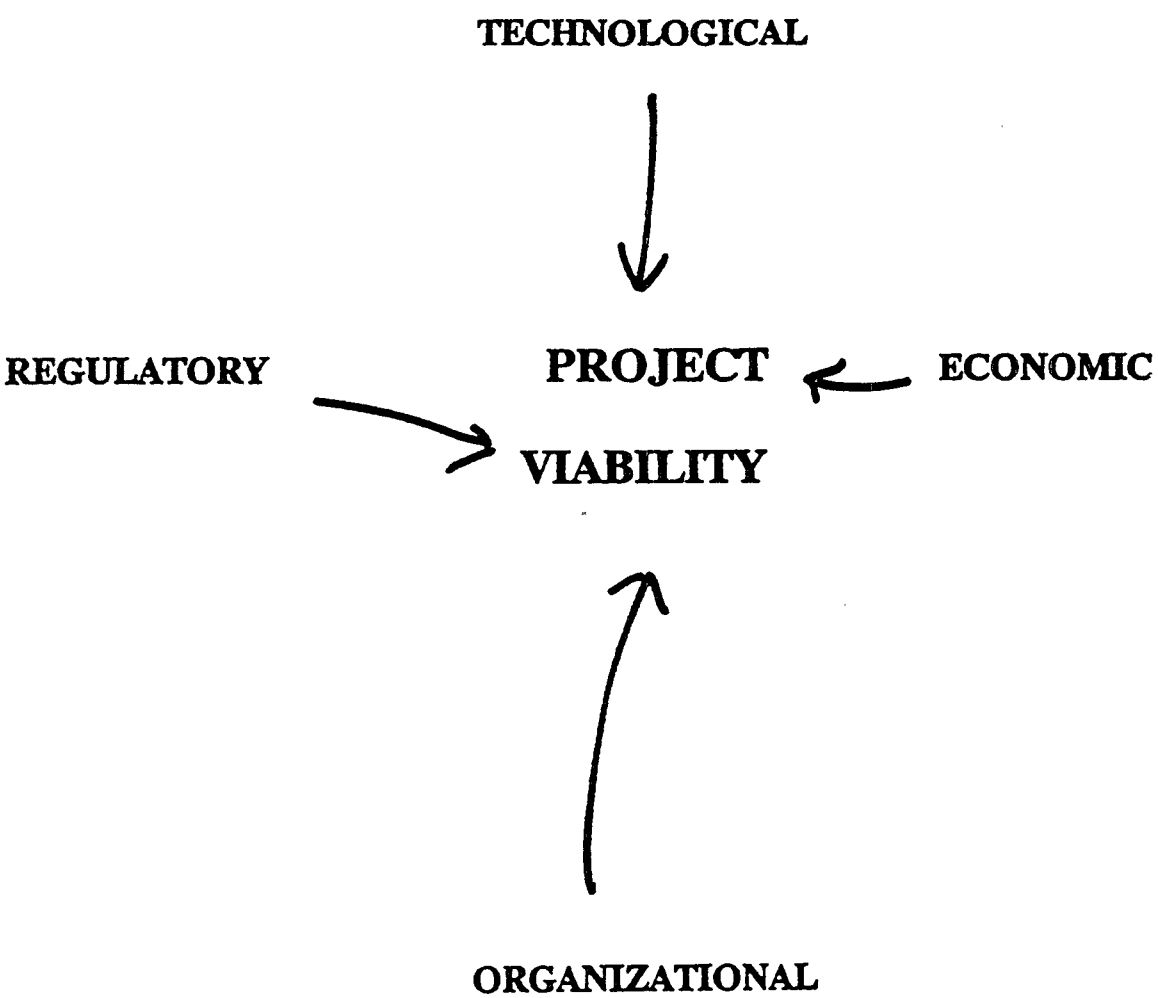
May 15, 1991.

****

Essentially, Turner [a Hughes Aircraft Corporaton production engineer] figured out a way to make CFCs irrelevant by using a mixture of--believe it or not--lemon juice and water. Not only was this citric acid concoction envrionmentally friendly, it boosted productivity and was less expensive, too.

Boston Globe
July 26, 1992

BARRIERS TO POLLUTION PREVENTION



OUR PRINCIPAL HYPOTHESES:

- POLLUTION PREVENTION INVESTMENTS FAIL TO SUCCESSFULLY COMPETE BECAUSE OF BIASES CONTAINED IN CONVENTIONAL FINANCIAL ANALYSIS METHODS

- IF METHODS ARE CHANGED, LIKELIHOOD OF INVESTMENTS WOULD INCREASE

- SUCH BIASES OPERATE DIFFERENTLY, DEPENDING ON THE NATURE OF THE MANUFACTURING PROCESS AND PREVENTION PROJECT

WHAT IS AN "ENVIRONMENTAL" PROJECT?

THE STIGMA PROBLEM IN CAPITAL BUDGETING

- MARKET EXPANSION PROJECT
- PROFIT-ADDING PROJECTS
- PROFIT-SUSTAINING PROJECTS

VULNERABILITIES OF POLLUTION PREVENTION PROJECTS DURING CAPITAL BUDGETING

- RIGOROUS ANALYSIS REQUIRES RIGOROUS "PHYSICAL ACCOUNTS
- SECOND ORDER, INDIRECT COSTS
- CONTINGENT COSTS
- LONGER TIME HORIZONS

Figure B-1.1 SOLVENT/HEAVY METAL PAPER COATING

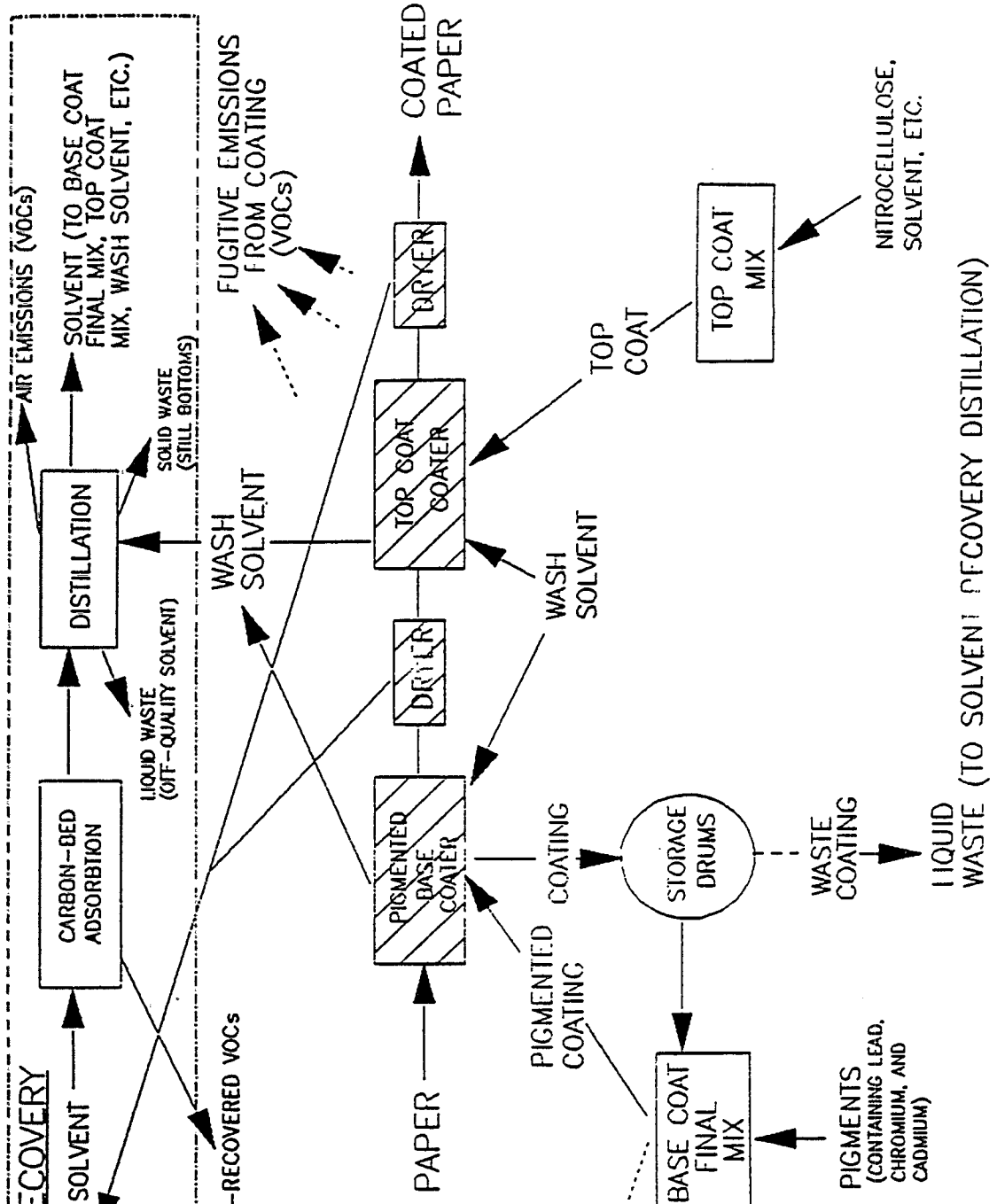
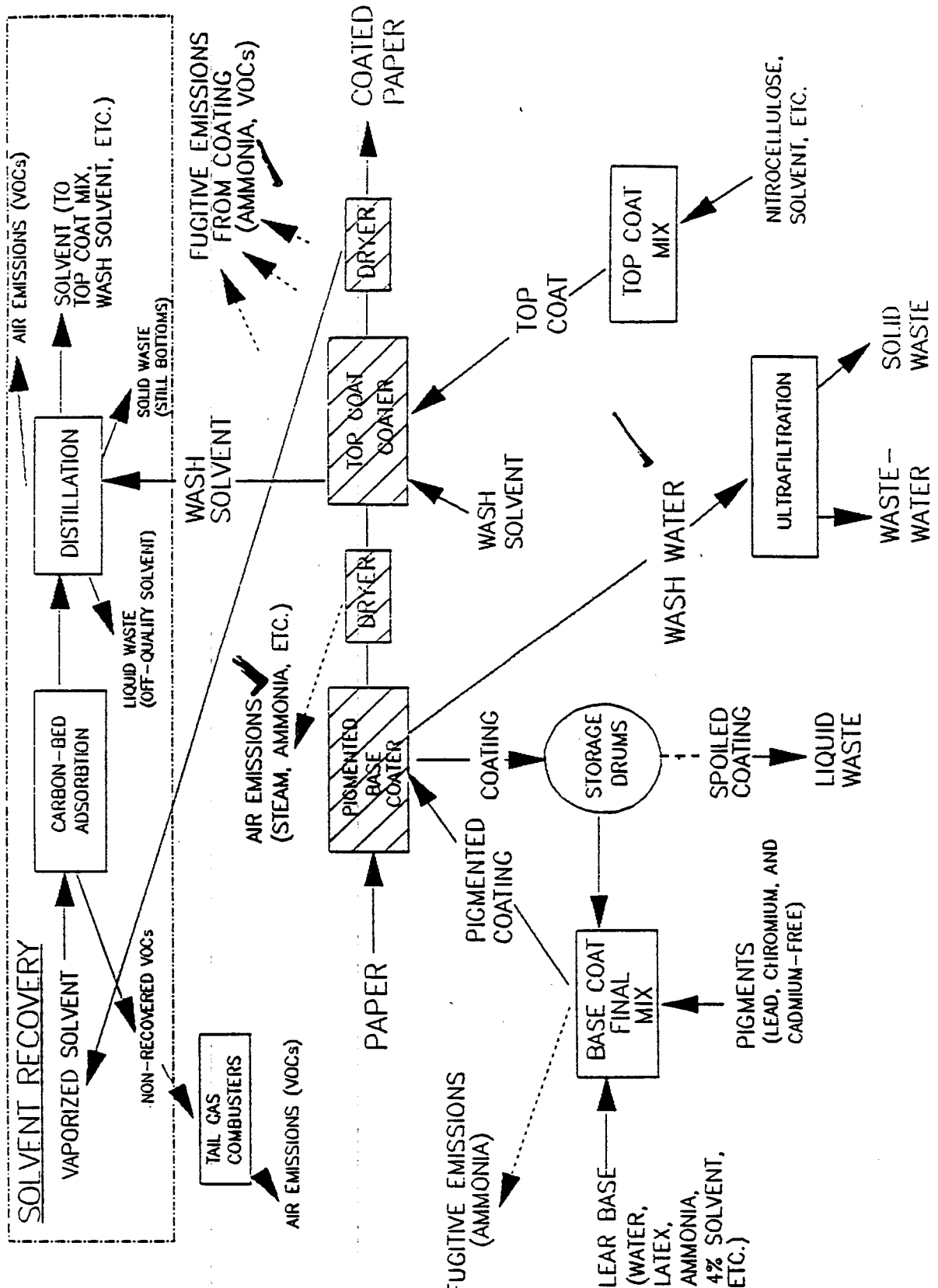
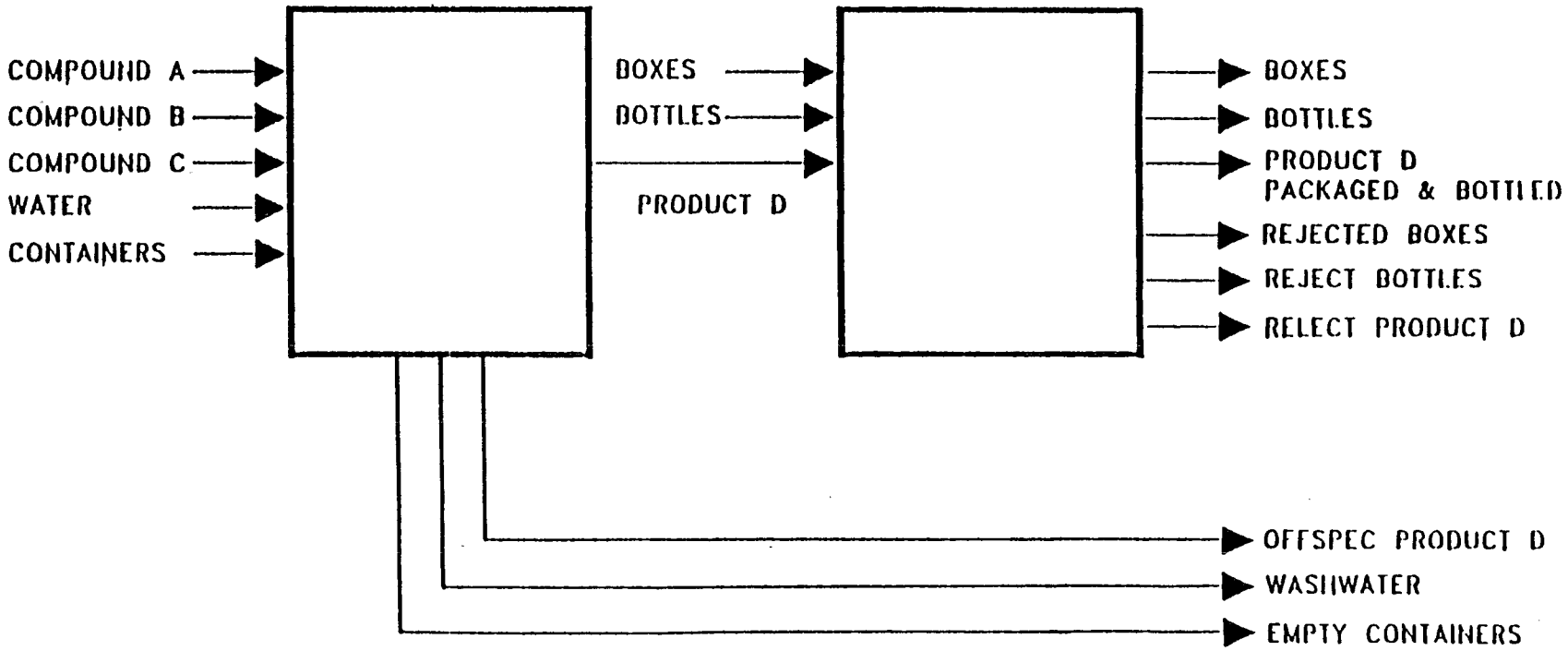


Figure R-1.2 AQUEOUS/HEAVY METAL-FREE PAPER COATING



FLOWSHEET OF A HYPOTHETICAL CHEMICAL BLENDING FACILITY

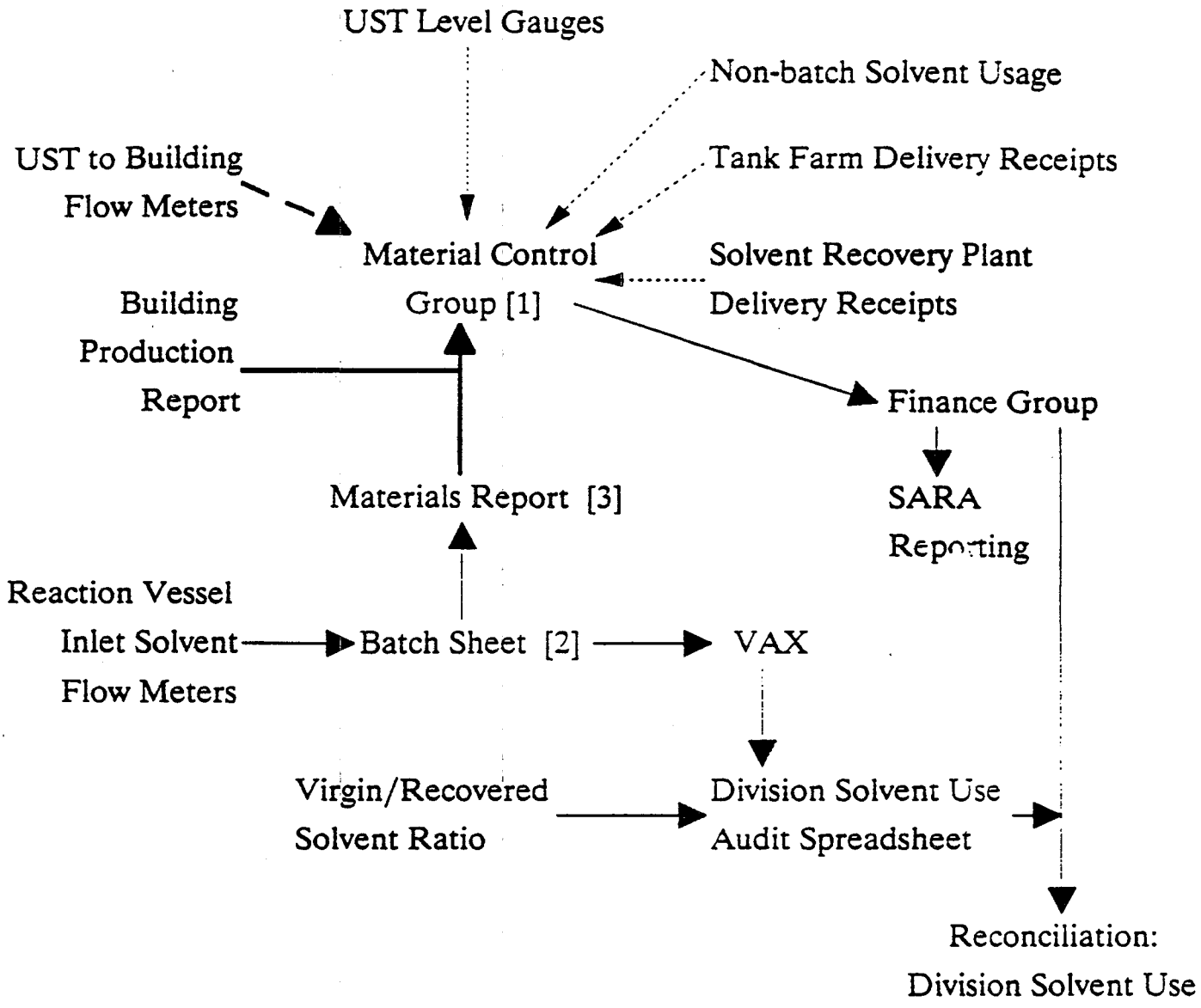


MIXING OPERATIONS

BOTTLING AND PACKAGING OPERATION

Solvent Use Information Flow:

in the Chemical Operations Division of a High Technology Multinational



Omitted Solvent Uses:

[1] Solvent recovered in the building

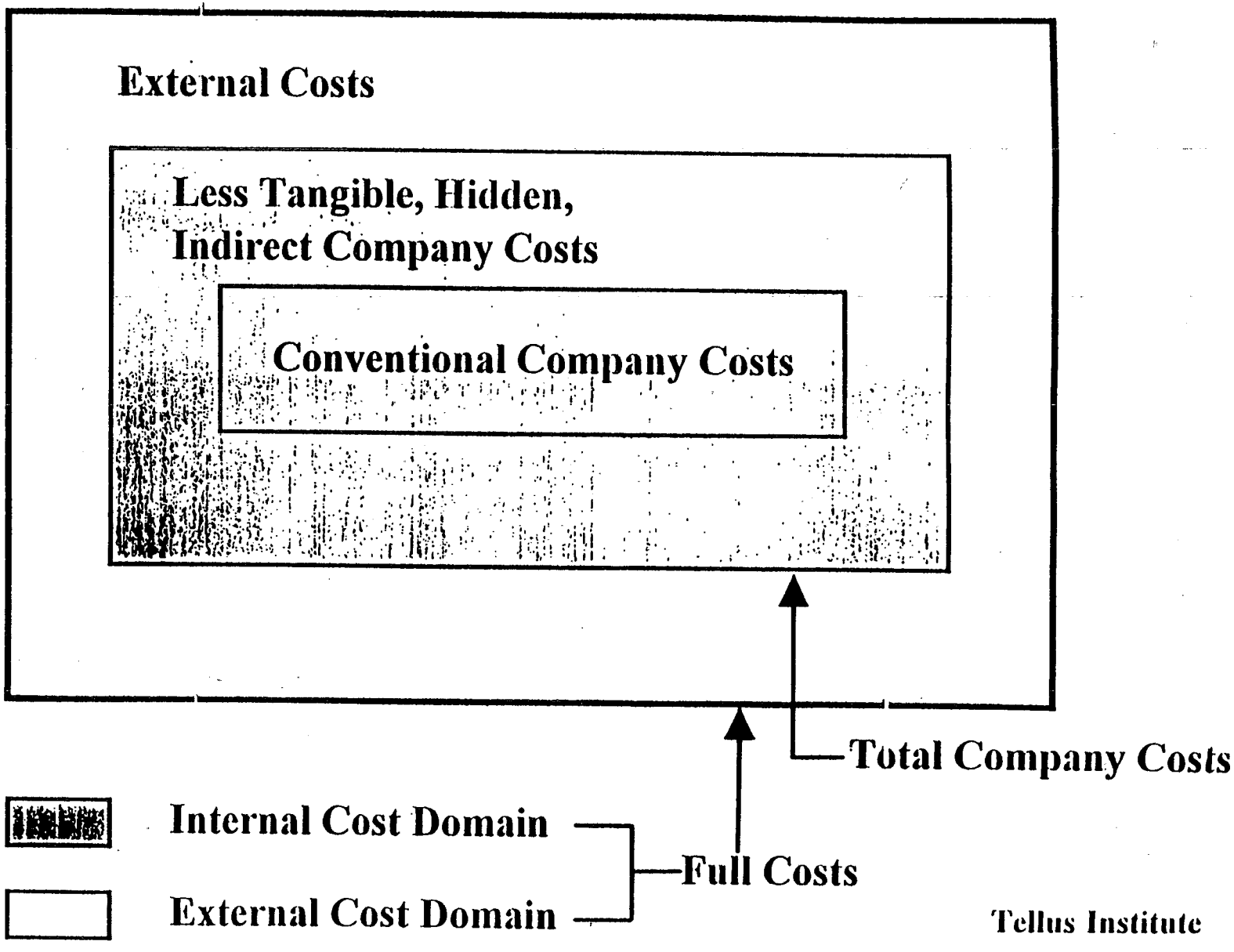
[2] Non-batch solvent usage (clean vessels between batches & campaigns; purge solvent lines)

[3] Deviations from normal solvent procedures

ELEMENTS OF TCA

- **COST INVENTORY**
- **COST ALLOCATION**
- **TIME HORIZON**
- **PROFITABILITY INDICATORS**

COST BOUNDARIES



Tellus Institute
1993

COSTS/SAVINGS OFTEN NEGLECTED IN PP PROJECT EVALUATION

Operation of pollution control equipment

Waste handling, storage, hauling, disposal

Environmental insurance (based on materials use)

Tracking

Notification

Reporting

Monitoring

Testing

Recordkeeping

Planning/modelling studies

Training

Inspections

Manifesting

Labeling

Preparedness equipment and maintenance

Medical surveillance

Special waste taxes

Revenue from sale of recovered product

LESS TANGIBLE BENEFITS OF PP

MARKET CREATION FOR NEW "GREEN" PRODUCTS

ENLARGED MARKET SHARE FOR EXISTING PRODUCTS TIED TO CORPORATE IMAGE

REDUCED EMPLOYEE ABSENTEEISM, IMPROVED UNION RELATIONS

REDUCED COSTS TO HANDLE CITIZEN, COMMUNITY GRIEVANCES AND LEGAL PROCEEDINGS

ADDITIONAL LESS TANGIBLE COSTS

- MARKETABLE POLLUTION PERMITS
- ENHANCED EMPLOYEE PRODUCTIVITY
- AVOIDANCE OF FUTURE AIR QUALITY REGULATIONS
- DIVERSION OF WASTES FROM BIFS

LIST OF POTENTIAL COSTS

CAPITAL COSTS

P2FINANCE List	Additional Items/Examples
Purchased Equipment	
Equipment	Process Equipment
Delivery	Monitoring Equipment
Sales tax	Preparedness/Protective Equipment
Price for Initial Spare Parts	Safety Equipment
	Storage & Materials Handling Equipment
	Laboratory/Analytical Equipment
	Insurance
Materials	
Piping	Building Construction Materials
Electrical	Painting Materials
Instruments	Ducting Materials
Structural	
Insulation	
Utility Connections and New Utility Systems	
Electricity	General Plumbing
Steam	Cooling Water
Water	Process Water
Sewerage	Gas Connection
Refrigeration	Oil Connection
Fuel	
Plant Air	
Inert Gas	
Site Preparation	
Demolition and Clearing	Walkways, roads, and fencing
Old Equipment/Rubbish Disposal	Grading, Landscaping
Construction/Installation	
In-house	Labor
Contractor	Supervision
Vendor	Taxes
	Insurance
	Equipment Rental
Engineering/Contractor	
In-house Planning	Design
In-house Engineering	Drafting
Procurement	Accounting
Contractor/Consultant	Supervision
Start-up/Training	
In-house	
Vendor/Contractor	
Trials/Manufacturing Variances	
Training	
Contingency	

LIST OF POTENTIAL COSTS

CAPITAL COSTS

P2FINANCE List	Additional Items/Examples
Permitting	
Fees	Labor
In-house	Supervision
Contractor/Consultant	Environmental Impact Studies
Initial Charge for Catalysts and Chemicals	
Working Capital	
Raw Materials	
Materials and Supplies	
Product Inventory	
Salvage Value	

LIST OF POTENTIAL COSTS

OPERATING COSTS

P2FINANCE List	Additional Items/Examples
Direct Materials	Raw Materials Catalysts and Solvents Wasted Raw Materials Costs Transport Storage
Waste Management (Materials & Labor) Pre-Treatment On-site Handling Storage Treatment Hauling Insurance Disposal	
Utilities Electricity Steam Water Sewerage	Water (Cooling or Process) Refrigeration Fuel (Gas or Oil) Plant Air and Inert Gas
Direct Labor	Operating Labor/Supervision Manufacturing Clerical Labor Inspection (QA/QC) Worker Productivity Changes
Other	Miscellaneous Indirect Labor Maintenance (Materials & Labor) Medical Surveillance
Regulatory Compliance (Materials & Labor) Manifesting Reporting Monitoring Testing Labeling Permitting Training	Re-permitting Right-to-Know Training Recordkeeping Inspection Closure/Postclosure Care Generator Fees/Taxes
Insurance	
Revenues Sale of Product Marketable By-products	Manufacturing Throughput Change Change in Sales from: Market Share Corporate Image
Future Liability	Fines/Penalties Personal Injury Real Property Damage Natural Resource Damage

COST INVENTORY: COMPANY VS. TCA (cont.)

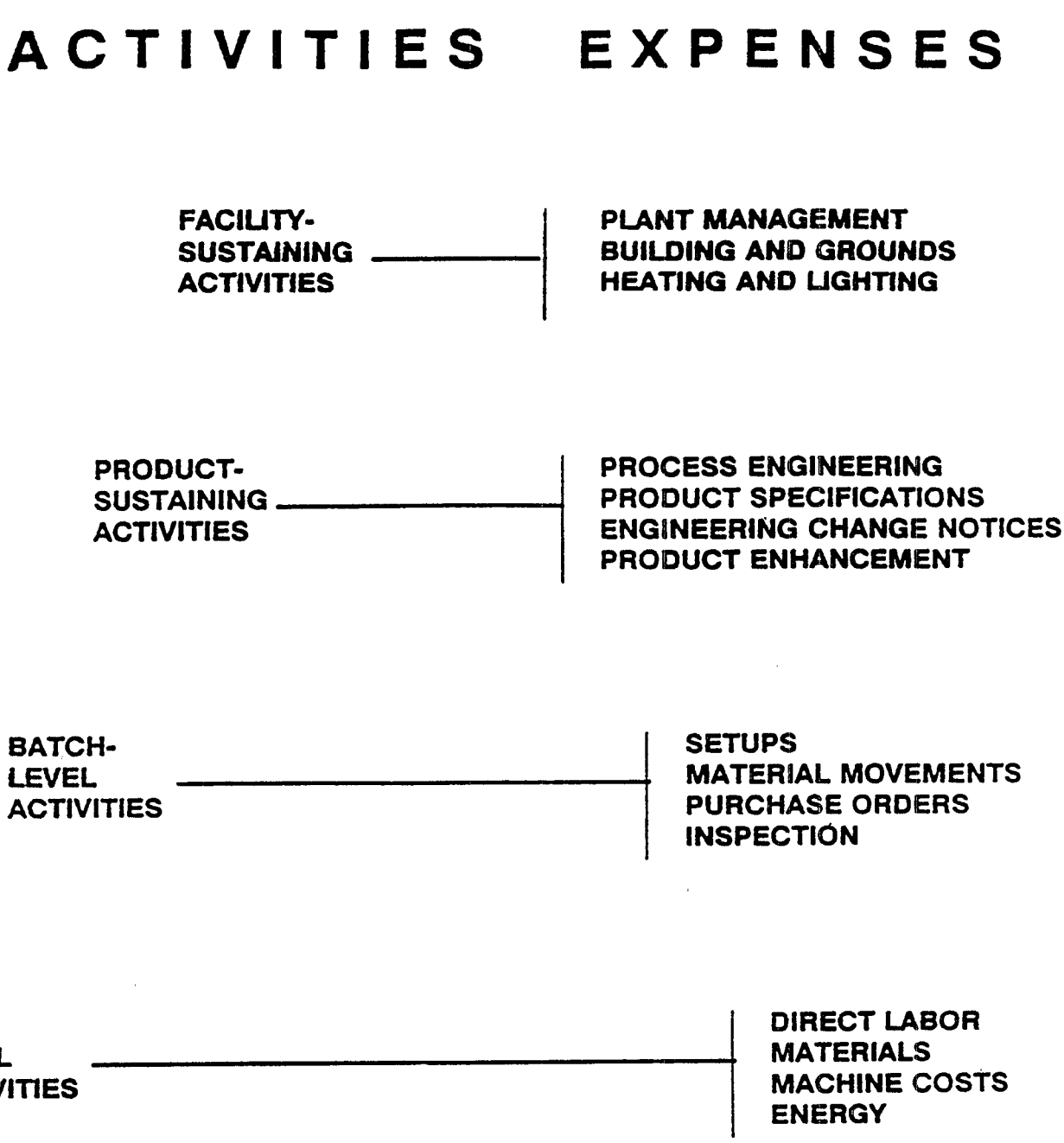
PAPER COATING COMPANY: SOLVENT/HEAVY-METAL TO AQUEOUS/HEAVY METAL-FREE COATING CONVERSION

OPERATING COSTS	COMPANY	TCA
DIRECT COSTS:		
RAW MATERIALS/SUPPLIES	P	X
WASTE DISPOSAL	P	X
LABOR	X	X
REVENUES - GENERAL		
REVENUES - BY-PRODUCTS		
OTHER		
TRANSPORTATION		
INDIRECT COSTS:		
WASTE MANAGEMENT		
HAULING		X
STORAGE		X
HANDLING		X
WASTE-END FEES/TAXES		X
HAULING INSURANCE		
UTILITIES		
ENERGY		X
WATER		X
SEWERAGE (POTW)		X
POLLUTION CONTROL/SOLVENT RECOVERY		X
REGULATORY COMPLIANCE		X
COMPLIANCE		
FUTURE LIABILITY		X

X = Cost(s) Included *P = Cost(s) Partially Included*

X = Cost(s) Included
P = Cost(s) Partially Included

	COMPANY	TCA
OPERATING COSTS		
Direct Costs:*		
Raw Materials/Supplies	P	X
Labor	X	X
Revenues - General		
Revenues - By-products		
Indirect Costs:*		
Waste Management:		
Disposal		
Hauling		
Insurance		
Storage		
Handling		
Waste-end Fees/Taxes		
Utilities:		
Energy	P	X
Water		X
Sewerage (POTW)	X	X
Regulatory Compliance		
Insurance		
Future Liability		


ACTIVITIES
EXPENSES
FACILITY-SUSTAINING ACTIVITIES
PLANT MANAGEMENT
BUILDING AND GROUNDS
HEATING AND LIGHTING
PRODUCT-SUSTAINING ACTIVITIES
PROCESS ENGINEERING
PRODUCT SPECIFICATIONS
ENGINEERING CHANGE NOTICES
PRODUCT ENHANCEMENT
BATCH-LEVEL ACTIVITIES
SETUPS
MATERIAL MOVEMENTS
PURCHASE ORDERS
INSPECTION
UNIT-LEVEL ACTIVITIES
DIRECT LABOR
MATERIALS
MACHINE COSTS
ENERGY

NON-PROPORTIONALITY (NON-LINEARITY) MAY RESULT IN DIFFERENCES AMONG PRODUCTS IN THE FORM OF PER UNIT:

- SETUP HOURS
- NUMBER OF SETUPS
- MATERIAL HANDLING HOURS
- NUMBER OF TIMES HANDLED
- ORDERING HOURS
- NUMBER OF TIMES ORDERED
- PART NUMBER ADMINSTRATION HOURS
- NUMBER OF PART NUMBERS MAINTAINED

...IF DIFFERENCE EXIST, THEN SIMPLE PER UNIT COSTING MAY DISTORT ACTUAL REAL PRODUCT COSTS.

...WHERE PRODUCT OR PROCESS LINES DEMONSTRATE LARGE DIFFERENCES IN WASTE GENERATION, HANDLING, ADMINISTRATION AND OTHER MANAGEMENT COSTS MAY CONTRIBUTE TO THIS DISTORTION

PRESENT VALUES OF CASH FLOWS

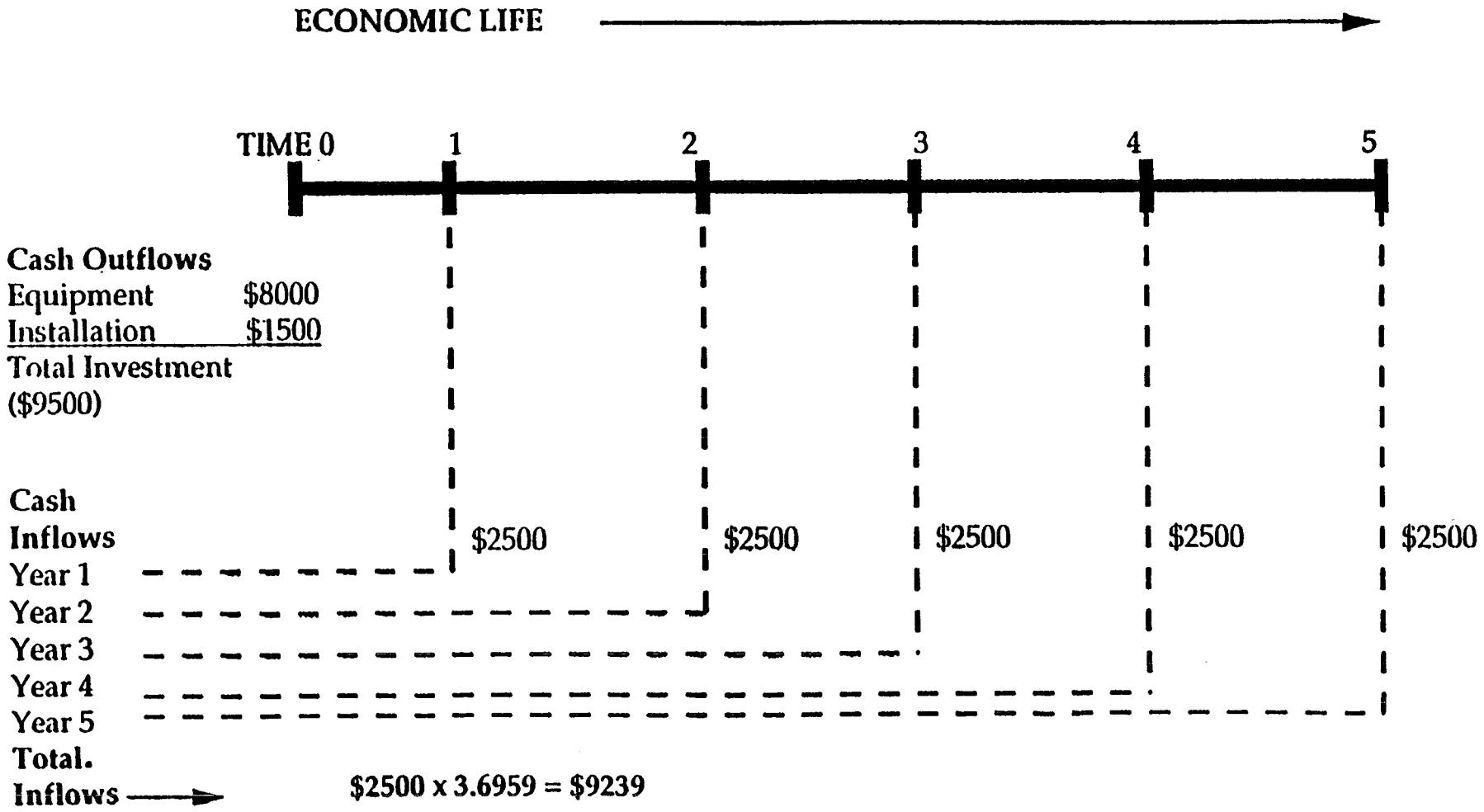


Exhibit G II-36

WHITE WATER/FIBER REUSE PROJECT

PROFITABILITY ANALYSIS

	Company Analysis	TCA
Total Capital Costs	$1,469	$1,469
Annual Savings (BIT)*	$ 351	$ 911
Financial Indicators		
Net Present Value - Years 1-5	($ 476)	$ 784
Net Present Value - Years 1-10	$ 48	$2,074
Net Present Value - Years 1-15	**$ 360**	**$2,852**
Internal Rate of Return - Years 1-5	1%	37%
Internal Rate of Return - Years 1-10	17%	46%
Internal Rate of Return - Years 1-15	**21%**	**48%**
Simple Payback (years)	**4.2**	**1.6**

* Annual operating cash flow before interest and taxes

WHO CONTRIBUTES TO EFFECTIVE MANAGERIAL ACCOUNTING?

MANY ACTORS.....

COMPTROLLER/FINANCIAL OFFICERS

PRODUCTION/OPERATIONS

PURCHASING/PROCUREMENT

MATERIALS MANAGEMENT

ENVIRONMENTAL MANAGERS

R&D

AND...

- **SUCCESS OF TCA IS AS MUCH AN ORGANIZATIONAL ISSUE AS AN ANALYTICAL ONE**

- **TCA SHOULD BE CUSTOMIZED TO FIRM'S NEEDS--NO ONE APPROACH IS RIGHT FOR ALL**

- **TCA EMPOWERS MANAGERS WITH HARD NUMBERS TO SUPPORT SOUND INTUITION**

FUTURE DIRECTIONS

- CONTINUOUS IMPROVEMENT OF TCA METHODOLOGY–ESPECIALLY ESTIMATION OF LIABILITY AND LESS TANGIBLE BENEFITS

- SECTORAL CASE STUDIES

- GUIDANCE MANUAL–COMPANION TO "ENVIRONMENTAL SELF-ASSESSMENT PROGRAM"

- EMERGING STANDARDS AND PRACTICES INTERNATIONALLY

BASICS OF POLLUTION PREVENTION (12 pp.)

Dr. Ed E. Quick
Hoechst Celanese Corp
December 6, 1993

POLLUTION PREVENTION
The Business Integration Challenge

Dr. Ed Quick
Hoechst Celanese Corporation

One of the greatest opportunities and challenges corporate America faces today is in the area of pollution prevention. At present there exist multiple driving forces which have been brought by local communities, internal company initiatives and governmental agencies to eliminate sources of environmental release. The perception exists that these "constraints" are putting unreasonable financial pressure on business. By using basic principles of pollution prevention the challenge can be met through strategic application of a technical hierarchy that prioritizes reduction activities:

1. Source Reduction
2. Recycle/Reuse
   - Closed Loop
   - Co-product Marketing
3. Energy Recovery
4. Waste Treatment
5. Waste Disposal
6. Waste Release

As businesses look to the future in a changing environmental arena, enhancements can be discerned by coupling a prioritized release reduction hierarchy with critical "keys to success" in pollution prevention:

- Unwavering Executive Management Commitment to Pollution Prevention
- Dedication of Technical Resources Towards Options Development
- Persistent Pursuit of Product Recovery, Source Elimination Opportunities
- Strategic Integration of Pollution Prevention Into Business Plans

POLLUTANTS

RECYCLE - REUSE - RECLAIM

SOURCE REDUCTION

RELEASE REDUCTION

POLLUTION PREVENTION

HAZARDOUS WASTE

TRI

HIERARCHY

RESOURCES/COSTS

WASTE MINIMIZATION

CROSS - MEDIA SHIFTS

Book 3/EEQ\PP2\#1

WHAT IS POLLUTION PREVENTION?

It Is A Process To:

- Reduce Pollution At Its Source
- Minimize Generation Of Waste

That Results In:

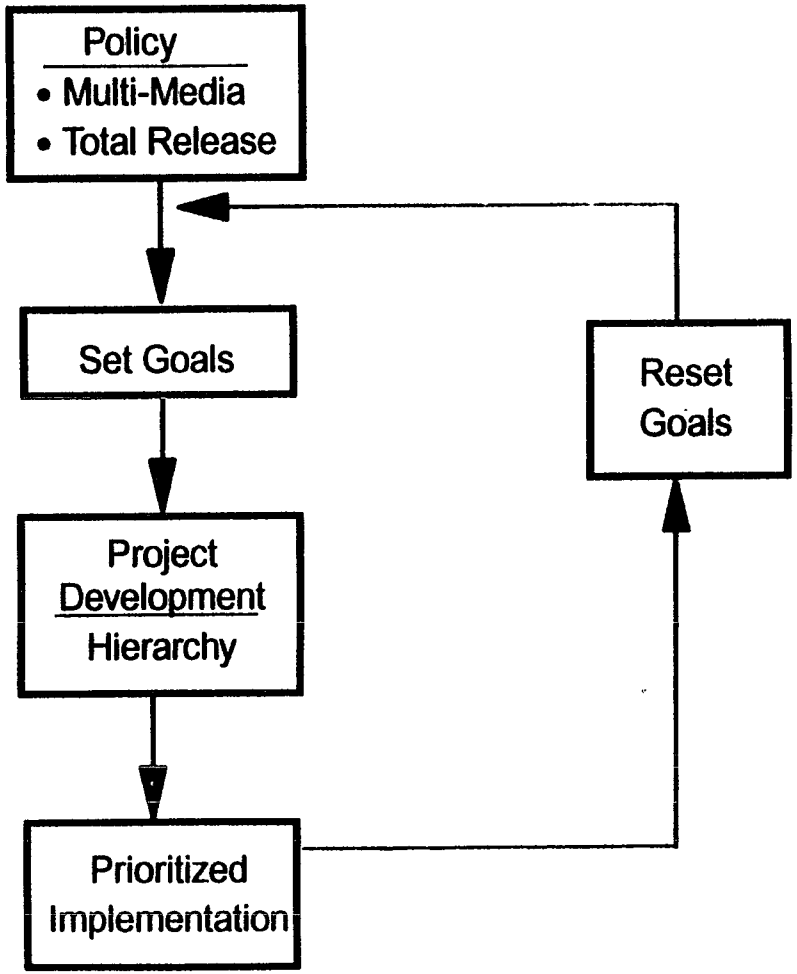
- Minimizing Impact On The Environment
- Reducing Risk To Public Health

Environmental Management

COMPLIANCE	POLLUTION PREVENTION
End - Of - Pipe	Source Reduction
Controls = Business Cost	Prevention = Business Investment
Escalating Compliance Costs	Cost Avoidance / Savings
Reactive, Deadline Oriented	Pro -Active, Enhanced Productivity
Prone To Failure	Recognition For Success

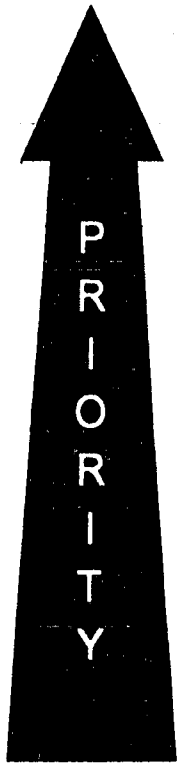
POLLUTION PREVENTION

PROCESS



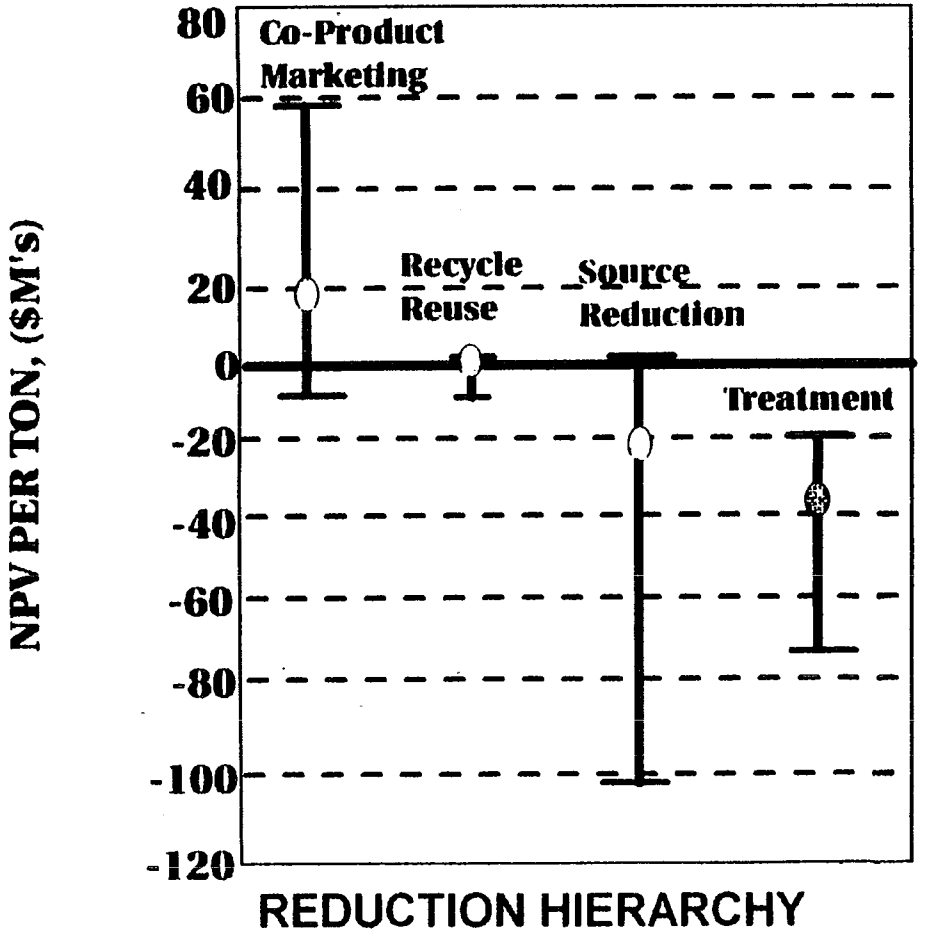
Book 3/EEQ\PP2\#4

Release Reduction Hierarchy



- Source Reduction
- Recycle/Reuse
  - Closed Loop Recycling
  - Co-Product Marketing
- Energy Recovery
- Treatment
- Disposal
- Release

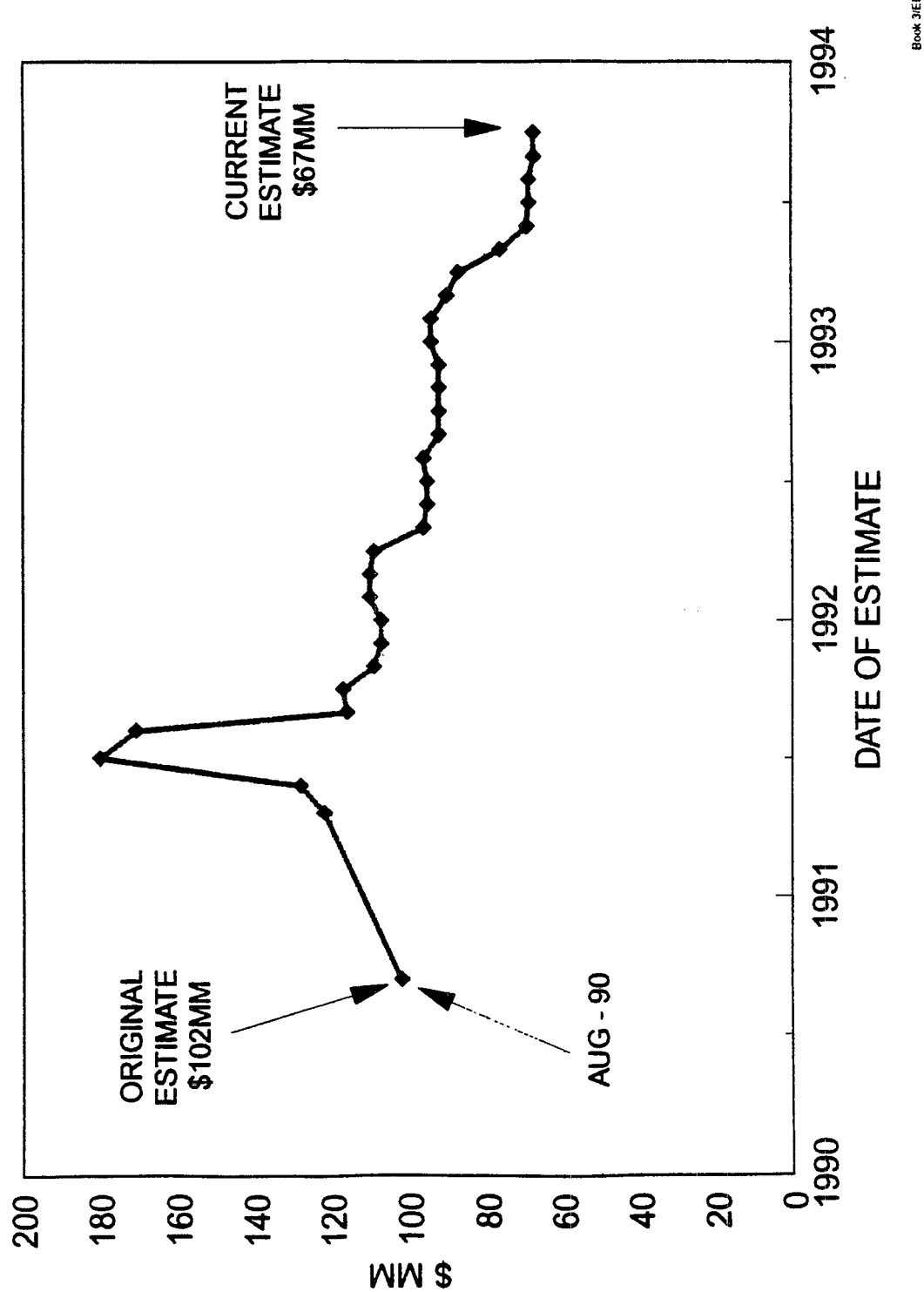
POLLUTION PREVENTION COSTS BY HIERARCHY



KEYS TO SUCCESS

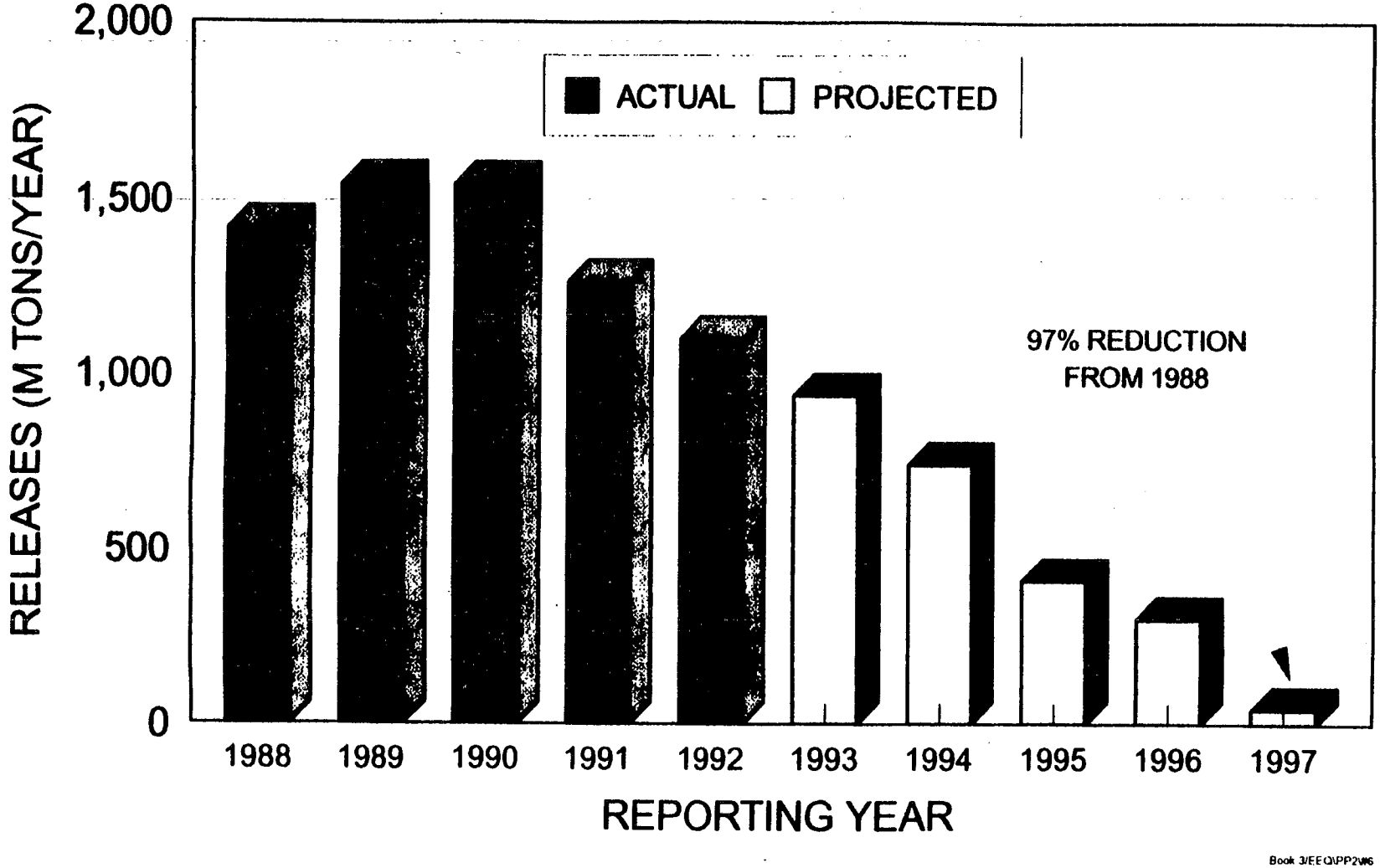
- Unwavering Executive Management Commitment
- Early Initiation Of Pollution Prevention Process
- Dedicated Technical Resources
  - Reduction Options Development
- Persistently Pursue Source Reduction, Recycle/Reuse Projects
- Approach Pollution Prevention Strategically
  - Integrate with Business Plans

POLLUTION PREVENTION SPENDING ESTIMATES



TOTAL RELEASES

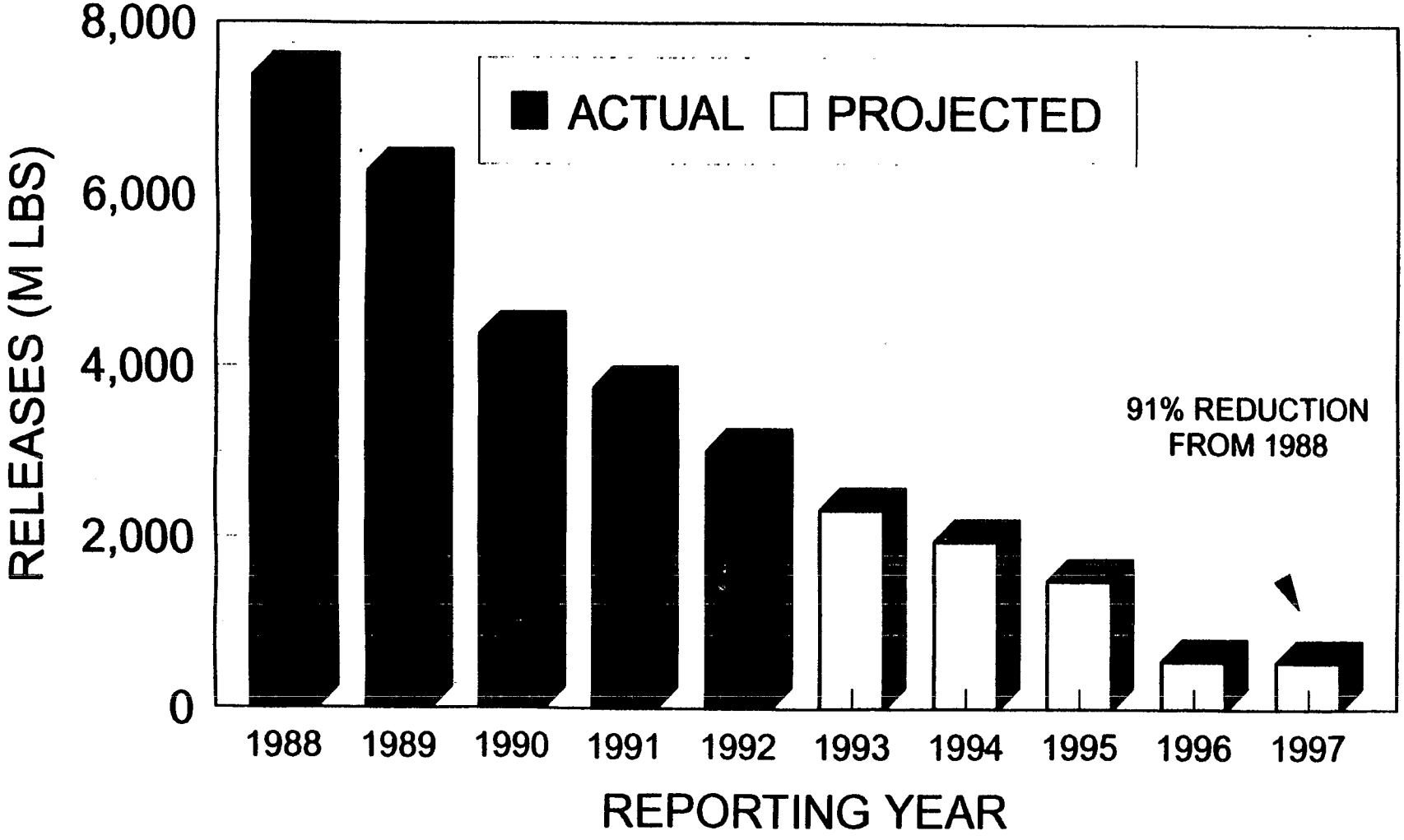
PREDICTED RESULTS FROM WARR PROJECTS



Book 3/EEQ\PP2\W6

SARA 313 RELEASES

PREDICTED RESULTS FROM WARR PROJECTS



CASE STUDY I: CIBA-GEIGY (15 pp.)

G.J. Muhlebach

December 6, 1993

CASE STUDY I
Controlling Environmental Costs

G.J. Muhlebach
Ciba-Geigy Corporation

Environmental costs are real, they are large and they impact all aspects of a corporation. However, they can be influenced, measured and controlled.

Environmental responsibility must have top management's commitment and must be part of everyone's job.

The best control method is source reduction, often called pollution prevention. Source reduction must be addressed at the product research and development stage. Training and awareness in the R&D function is a key. Source reduction is difficult and time consuming but it is rewarding, both financially and in public perception.

Waste treatment and disposal costs should not be treated as part of overhead. These costs are as much part of the product cost as the raw material, labor and equipment costs, etc. It is as important and necessary to measure and account for environmental costs as part of the product costs as it is to measure and account for the more traditional cost blocks. If cost accounting breaks the environmental costs down to the product level, they will be attributed to the right product and show the need for improvement and source control.

Direct environmental costs can be controlled by accurately measuring the various wastestreams at the source. This allows accounting of the actual environmental costs as part of the product's production cost which in turn leads to the identification of cost reduction opportunities. Transparency and fast feedback of measured factors used for cost accounting allow cost control on the production floor. Production personnel must have accurate cost information available in enough detail and in a form which is understandable and meaningful to them. Proper accounting of environmental costs is not an end in itself, it is a tool which helps in waste minimization and cost control.

Environmental accounting is an opportunity which helps us measure and document improvements in our environmental performance. It is an important step towards a better future.

CONTROLLING OF

ENVIRONMENTAL COSTS

G. J. MUHLEBACH
CIBA-GEIGY CORPORATION
ARDSLEY, NY

PRESENTED TO:

ACCOUNTING AND CAPITAL BUDGETING FOR ENVIRONMENTAL COSTS WORKSHOP

U.S. Chamber of Commerce
The Business Roundtable
Institute of Management Accountants
American Institute of Certified Public Accountants
AACE International (Association for Total Cost Management)
U.S. Environmental Protection Agency

DALLAS, TX

DECEMBER 6, 1993

Good Morning, Ladies and Gentlemen:

Environmental costs are a significant part of doing business. However, these costs are not just happening, as too many people too simplistically think. These costs can be measured and controlled. Assigning them to the operations which cause them, is the first step towards control.

Controlling costs is on everybody's mind; it's needed but it has to be well planned. Today, I want to talk to you on how environmental issues are impacting Ciba from the corporate offices, to research and development, to the production floor.

First, however, I would like to tell you a little about Ciba. We are the U.S. subsidiary of Ciba-Geigy Ltd., a Swiss chemical and pharmaceutical company. We develop, produce, and market a wide variety of specialty chemicals. Pharmaceuticals for treatment of cardiovascular diseases, hypertension, epilepsy and depression; agricultural chemicals for plant protection; dyes for textiles; chemicals for paper; additives for plastics and coatings; pigments for paints and plastics; resins and composites for aerospace and many other uses.

Our core business is specialty chemicals, which often means that we make small volume products for specific customer applications with strict quality specifications. Thus, most of our plants have batch operations. We handle large amounts of different raw materials used in many different products, and thus generate many different wastes which need to be costed and properly accounted for.

A few years ago, Ciba adopted and developed its Vision, which includes all the dimensions of its business. This Vision says that we will focus our activities on three identified goals: financial growth, social responsibility, and environmental responsibility.

Through our business activities, we wish to make a worthwhile contribution to the solution of global issues and the progress of mankind. Turning scientific discoveries into viable products for people to enhance our quality of life will always be a primary Ciba objective.

This includes a commitment to evaluate the benefits and risks of our activities and

products. We must approach our business objectives in a way that is not only financially rewarding but is also acceptable and responsible to society and to the environment.

Ciba is committed to protecting the environment at every location where we do business. We are determined to work with our costumers to help them to use our products in an environmentally responsible way. In our own operations, we will constantly strive to reduce waste at its source and use natural resources efficiently. Our overall goal is to affect the environment as little as possible as a result of our production processes.

Environmental responsibility is an integral part of our Vision. The costs for environmental protection are also an integral part of business and are an accepted part of doing business. In this presentation, I am not addressing intangibles such as trust, image and community relations with our close neighbors and with all our stakeholders, knowing full well how important they are.

A major part of business management is controlling and reducing costs. We all know, especially in the environmental area, that, in addition to the obvious direct

costs, there are significant hidden costs which often people are not aware of. These may involve environmental charges or problems in the raw materials we buy, the energy we use, or the disposal of our customers' products which contain our intermediates.

A relatively new approach for getting a handle on the hidden environmental issues is "Life Cycle Assessment." I will not get into this area since it is clearly a topic on its own.

I only want to touch on one aspect of life cycle assessment - that's environmental remediation. I don't think that there is any large company which has been in business for some time, and especially not a chemical company, that is not involved in some environmental remediation activities - whether it is under Superfund, RCRA, or other statutes.

In the context of cost accounting, remediation costs can be looked at as the deferred cost of actions that were taken in the past. Wastes do not go away. If they are not handled properly, whether on purpose or because technology was not available at a given time, they stay around and need to be treated later. That

means the costs do not go away either, they are simply deferred.

I know of a case where 20 years ago we saved between a nickel and a dime per pound by choosing the cheaper of two disposal alternatives. Today, we are remediating these wastes for over $200 per pound. A deferred cost? Yes. Economical? Hardly!!

The well known slogan of the Quality process, "Do it right the first time," applies here as well as anywhere.

Our environmental performance, mainly manifested and publicized in the documented and reported emissions from our facilities under the SARA Right-To-Know provisions, are monitored closely by us, by environmental groups and by the public. Therefore, our environmental performance has a strong influence on the public perception and image of our company. As mentioned before, it is very difficult to measure this cost and it will differ greatly from one organization to another.

This logically leads us to a basic approach -- the waste control concept. It's called the waste hierarchy. First, it says we want to avoid or minimize waste by using new methods of synthesis, state-of-the-art process technology and facilities. Second, we want to utilize waste products in other production processes, including the recycling of raw materials and solvents. Third, we want to use ecologically sound waste disposal methods and avoid processes which create waste disposal problems. Fourth, we will use land disposal only as a last resort.

The waste hierarchy shows that waste avoidance or reduction are the most important and foremost tools in controlling environmental costs. Waste is a very expensive proposition. To generate waste, we use up raw materials, process them to make a product which cannot be sold, but must be isolated, handled, treated and disposed of.

I remember very well when I worked in the production area, a process was given to us by the process development laboratories. The process had an excessive amount of waste, not only in volume but also in character. We refused to introduce this process into the production program, and low and behold, after a while our process development staff came up with a process which greatly reduced

not only the volume but also improved the character of the waste to be treated and disposed of.

A second example: In one of our plants, we are using large amounts of lime to neutralize waste acid. In addition to the acids which form a soluble calcium salt, we are also absorbing large amounts of carbon dioxide and producing calcium carbonate. For years, we disposed of this material as waste which took up valuable landfill space and cost us large sums of money. Based on the suggestion of one of our chemists who is an avid gardener, we started to look at using the calcium carbonate as a soil additive. After a long and sometimes arduous process, working together with the agricultural department of the state and the local farm extension, we came up with a new product with a long set of specifications. This product was developed through extensive experimentation in laboratories and greenhouses and later on experimental fields. It is now distributed through the agricultural extension service to local farmers. The farmers, who were used to buying lime to sweeten the soil, like the calcium carbonate we produce in the plant. After all, it is exactly the same thing and they get it for free, while we save large land disposal costs. A true win-win situation.

These examples point to important aspects of waste reduction and environmental cost control: They always have to be based on an accurate material balance and measurement of all the raw materials, solvents and auxiliary chemicals on the input side versus the product, all recycled materials and wastes on the output side.

Waste reduction and environmental cost control have to be addressed early in the game; this has to start at the research and development stage. The best waste control occurs in the laboratory on processes that have not yet reached the production facilities. It demonstrates the flawed approach of many of our legislators who would like to see mandated waste reduction quotas. It is relatively easy to introduce a poor process which has plenty of room for improvement. The results are large opportunities for waste reductions which look good in government statistics, but they reflect poor production management. The trick is to improve processes before they make it to the production floor. This is real pollution prevention, but it will never show up in any statistic.

It means that research and development personnel need to be trained in the requirements of waste minimization and cost control so that they have a solid understanding of what the company's overall environmental goals are. This

approach allows to holistically address up-stream waste reduction opportunities. It is the preferred, but often very time consuming approach, normally measured in years. In one concrete example, it took us over ten years to arrive at a viable new process which cuts wastes by 80% for organics, 85% for inorganics and 75% for water usage. Before we developed the final process, several promising approaches to reduce waste had to be abandoned because we found that they created unacceptable health or safety issues. Government regulations and controls often do not give us the necessary time for real waste reduction at the source through process improvements. This then necessarily leads to expensive "end-of-pipe" treatments which address one medium at the time. Pollution prevention is an ongoing process...it never ends.

In the meantime, however, waste is still being generated in current production operations. It needs to be handled, treated and disposed of. The costs for these activities must be accounted for and controlled. I would like to repeat here that environmental costs are a necessary part of doing business and that, just like any other cost of doing business, it makes good management sense to control and minimize these costs. I understand that some companies still carry waste treatment and disposal costs as a part of overhead. This is a mistake. These costs are as

much part of the product cost as the raw material, labor and equipment costs, etc. It is as important and necessary to measure and account for environmental costs as part of the product costs as it is to measure and account for the more traditional cost blocks. If cost accounting breaks the environmental costs down to the product level, they will be attributed to the right product and show the need for improvement and source control.

The keys to any cost control are a thorough knowledge of the chemical processes, an accurate material balance, measurement and fast feedback to the production floor. If the distribution of costs is based on measurement, it is accepted as fair. It can then be charged to the actual product which causes the cost to be incurred.

Accurate cost information cannot be the privilege of a chosen few. Production personnel must have this information available in enough detail and in a form that is understandable and meaningful to them. Proper accounting of environmental costs is not an end in itself, it is a tool which helps in waste minimization and cost control.

Feedback has to be fast because many cost improvements can be achieved by

paying close attention to details, e.g. turning off unneeded utilities, repairing leaking valves, etc. The faster the feedback, the better production teams can correlate the resulting costs to their daily actions, and the better they will find ways to control and minimize them. This will allow them to control their operations and environmental costs. Thus, the control of environmental costs can be measured vs. a standard. This measurement, in turn, becomes part of the teams' performance on which their incentives can be based.

The factors which are used to distribute and control environmental costs must be carefully chosen. The parameters used for solid waste are relatively easy to assign, at least most of the time. Actual charges are normally based on weight or volume, tons, or loads, etc. for treatment or disposal. These costs can be directly charged to the production unit and the specific processes.

For aqueous wastestreams and for air emissions, we can select from a variety of parameters. We need to remember that, whichever one we use, it will get special attention and will be the focus of reduction efforts. The local situation will determine the right factors. If operating costs are to be controlled, then an evaluation needs to be done to determine which technical factors cause the bulk of

the out-of-pocket costs.

An existing installation, whether it is a POTW (Publicly Owned Treatment Works) or an on-site waste treatment facility, may be performing at or above its engineering design. Using the critical factor as a base to distribute costs may result in unexpected reductions, possibly eliminating the need for a capital expansion.

A word of caution: the use of more than two or three parameters to allocate costs makes the program too difficult to administer and too difficult for the user to understand. It may appear fairer to the creator of the system, but it soon becomes counterproductive.

To summarize, environmental performance impacts all aspects of any corporation today. It starts at the top with a mission statement, it affects our company's image, how the public and customers see us and it must be reflected in all aspects of doing business.

If we want our companies to remain strong into the next century, we will have to learn to produce profitably in harmony with society and the environment. Environmental protection has to be made and accepted as an important part of everyone's job in your operation and mine.

Environmental accounting covers more than just dollars and cents. It includes the impact of our actions on our company's image and its public perception. It includes direct costs, which must be controlled, and it deals with costs avoided by waste minimization. Environmental accounting is an opportunity which helps measure and document the improvements in our environmental performance. It is an important step towards a better future.

CASE STUDY II: Ontario-Hydro (25 pp.)

Corinne Boone

December 6, 1993

FULL COST ACCOUNTING FOR DECISION-MAKING IN ONTARIO HYDRO

Prepared by:
David Dent, Team Leader, Financial Evaluations
and
Corinne Boone, Economist, Energy Services & Environment (Presenter)

Preliminary Presentation Outline

1. INTRODUCTION AND CONTEXT

- Ontario Hydro: Public Utility - Crown Corporation
  - Size: (23,000 MW winter peak)
  - 140 TWh energy generated and received
  - Revenue - 1992 = $7.8 billion

  General Mix:
  Hydro-electric - 27%, Fossil-fired - 20%, Nuclear - 50%, Non-utility generation purchases - 2%, Purchases from other utilities - 1%.

  Serve 311 Municipal electric utilities, 108 large industrial customers, 940,500 rural retail customers.

  New chairman, M Strong of Rio Conference

  Major challenges: rate pressure, non-utility generation, financial deterioration in recent years, declining load since 1990, 10,000 regular and non-regular employees gone in one year

  Recent restructuring to make more competitive, more customer oriented, investigation of privatization options

- Background to Task Force on Sustainable Energy Development
  - Purpose and relation to restructuring
  - Full Cost Accounting Working Group: Components, experiences, etc.
  - Recommendations and Status of report vis-a-vis Board approval
  - Implementation of Full Cost Accounting recommendations

2. FULL COST ACCOUNTING IN THE NEW HYDRO

- New Corporate Goal - recently approved

- Full Cost Accounting
  - what we mean by the term and its relationship to sustainable development.
  - the relationship of our definition to others?

- Full Cost Accounting and the Financial Management Planning and Control framework
  - objective-reduce business risk, help achieve objectives
  - three key components:
    - -- capital budgeting and financial evaluation
    - -- accounting and financial reporting
    - -- business planning, budgeting and reporting

3. FULL COST ACCOUNTING: CONCEPTS AND NEXT STEPS

- Capital Budgeting and Financial Evaluation: Recommended Multi-Criteria Framework where Full Cost Evaluations will be prepared along with cash flow analysis to and from Ontario Hydro. Full Cost Evaluations look at the total resource cost and benefits internal and external.
  - Discussion of next steps

- Accounting and Financial Statements: Aim is to prepare two sets of Financial Statement: traditional and one which incorporates external costs
  - Discussion of next steps

- Business Planning - relates to capital budgeting and financial evaluation but at strategic decision making level
  - Discussion of next steps

4. THE MONETIZATION OF EXTERNALITIES

- Definitions/concepts/overview of approaches/overview of experience in electricity sector

- Approach used by Ontario Hydro

- Where we are today: Status of monetization efforts at Ontario Hydro

- Issues we have faced

- Next Steps: Initiation of extensive externalities research program - related back to Full Cost Accounting Working Group report recommendations.

5. CONCLUSIONS

- Discussion of what we learned re: Full Cost Accounting

- Major challenges of implementation
  - business risks and opportunities
  - communication and culture change
  - incorporation of external costs (acceptance, uncertainty, etc.)

- Questions and Feedback

Full Cost Accounting for Decision-Making in Ontario Hydro

Presented at:
Workshop on Accounting and Capital Budgeting for Environmental Costs

Dallas, TX
December 6, 1993

Corinne Boone
Economist: Energy Services & Environment Group
Ontario Hydro, Toronto, ON, CANADA

Conventional Accounting

The Hardship of Accounting

"Never ask of money spent
Where the spender thinks it went
Nobody was ever meant
To remember or invent
What he did with every cent"

Robert Frost, 1936

Rationale for Full Cost Accounting:

"If we change the way we make decisions, we will change the decisions we make. Conversely, if we don't, we won't.

J. MacNeil
Task Force on Sustainable Energy Development

Background:

- 4th Largest Utility in World
  Largest in North America

- 22,000 MW (Winter Peak) - 68% Load Factor

- Revenue - 1992: $7.8 billion

Serve: >300 Municipal electric utilities
108 large industrial customers
1 million rural retail customers

- Negatively affected by recession:

  - 10,000 (approx.) MW Capacity surplus (1987 levels of demand)

  - No need forecasted until 2009

- **New Chair & Chief Executive Officer**

  Maurice F. Strong

- **Former Secretary-General of 1992 UNCED**

- **Former Under-Secretary-General of United Nations**

1992:

"

Given opportunity to Practice what he has been preaching!!

Hydro has just gone through major restructuring:

- "To make Ontario Hydro more accountable and business-like corporation and one closer to the customer.

- Operations and activities have been consolidated:

  - Electricity Business: Nuclear, Fossil, Hydraulic, Grid System, Business Integration

  - Energy Services & Environment Group: Energy Managment, Retail System, Customer Generation, Environment

  - Hydro Enterprises: Ontario Hydro International, Ontario Hydro Technologies

HYDRO'S MISSION

"to help Ontario become the most energy efficient and competitive economy in the world, and a leading example of sustainable development."

SUSTAINABLE DEVELOPMENT

Sustainable development is "development which meets the needs and aspirations of present generations without compromising the ability of future generations to meet their own needs."

- World Commission on Environment and Development

"Sustainable development allows a company to make progress on environmental goals at the same time as it makes progress on cost reduction, job creation and competitiveness."

- The Task Force Report

Why Now?

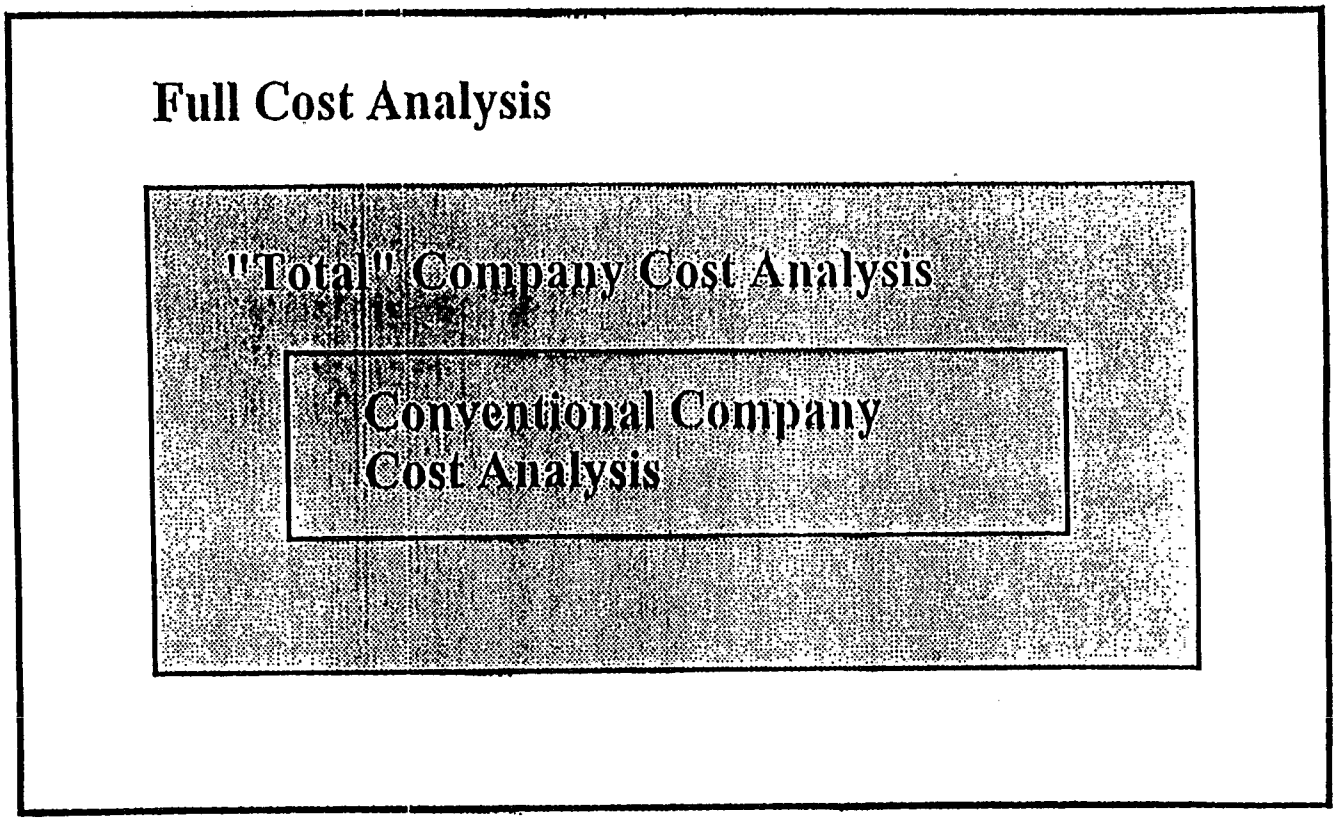
- **Restructuring - A Point of Departure**
- **Translate Mission into Practice**
- **International and Provincial Trends**
- **The SED Imperative**
- **SED - A Business Strategy for Competitive Advantage**

Team Four - Full Cost Accounting

Mandate:

- **Define Full Cost Accounting**
- **Develop a FCA Framework**
- **Provide estimates of external costs**
- **Examine potential applications of FCA and assess implications**

COST BOUNDARIES



Internal Cost Domain

External Cost Domain

Strategy Element: Adopt Full-cost Accounting

Team 4 Recommendations:

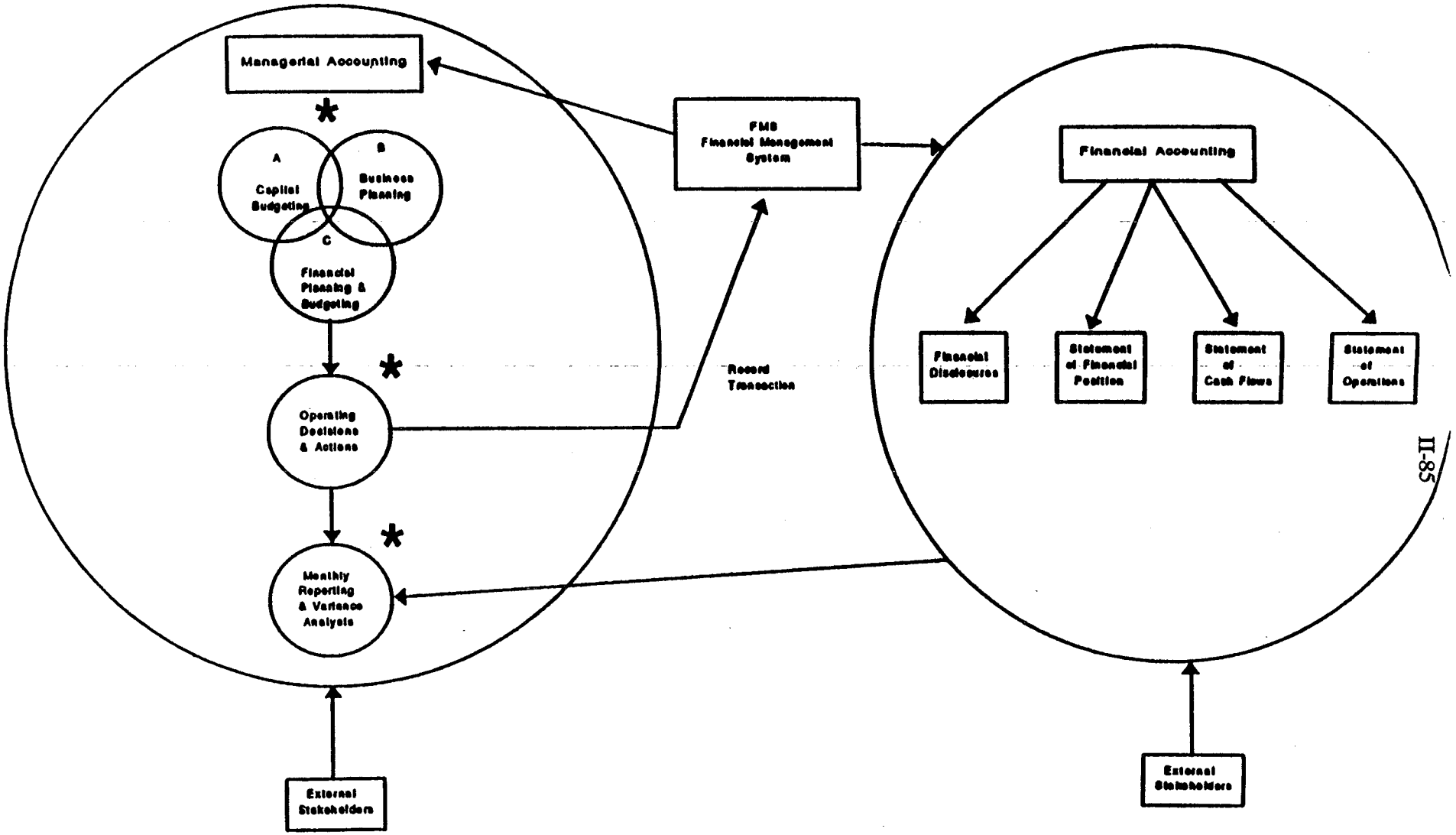
- **Modify Current Accounting System**
- **Augment the Financial Evaluation System**
- **Support a Research Program in FCA**
- **Take FCA Beyond Hydro**

Accounting: New Hydro

- Subdivided into separate businesses
- Each business now responsible for and accountable for their individual success
- Each business responsible for own financial statements

ONTARIO HYDRO'S ACCOUNTING FRAMEWORK

Exhibit 4.1



A Capital Budgeting: Involves capital envelopes for business and project decisions.

B Business Planning: Involves strategic long-term overall business planning for the corporation.

C Financial Planning and Budgeting: converts Business Plans to financial forecast figures. Involves corporate short-term forecast of Revenues and Costs, including required rate increases, borrowing levels, financial soundness and debt ratios.

* Decision point

Full Cost Accounting Recommendation No. 1:

Modify current accounting system to:

- **record, classify and allocate all internal expenditures and costs; and,**

- **record, classify and allocate the external costs and benefits**

associated with each Business Unit and major cost Centres within each Business Unit

Internal Full Cost Accounting

We're almost there:

- **Corporate Task Force on Change**
- **New Hydro**
- **Accountability**

Adjustments Needed for:

- **Subsidies, Taxes, Transfer Payments**

Accounting in 1994

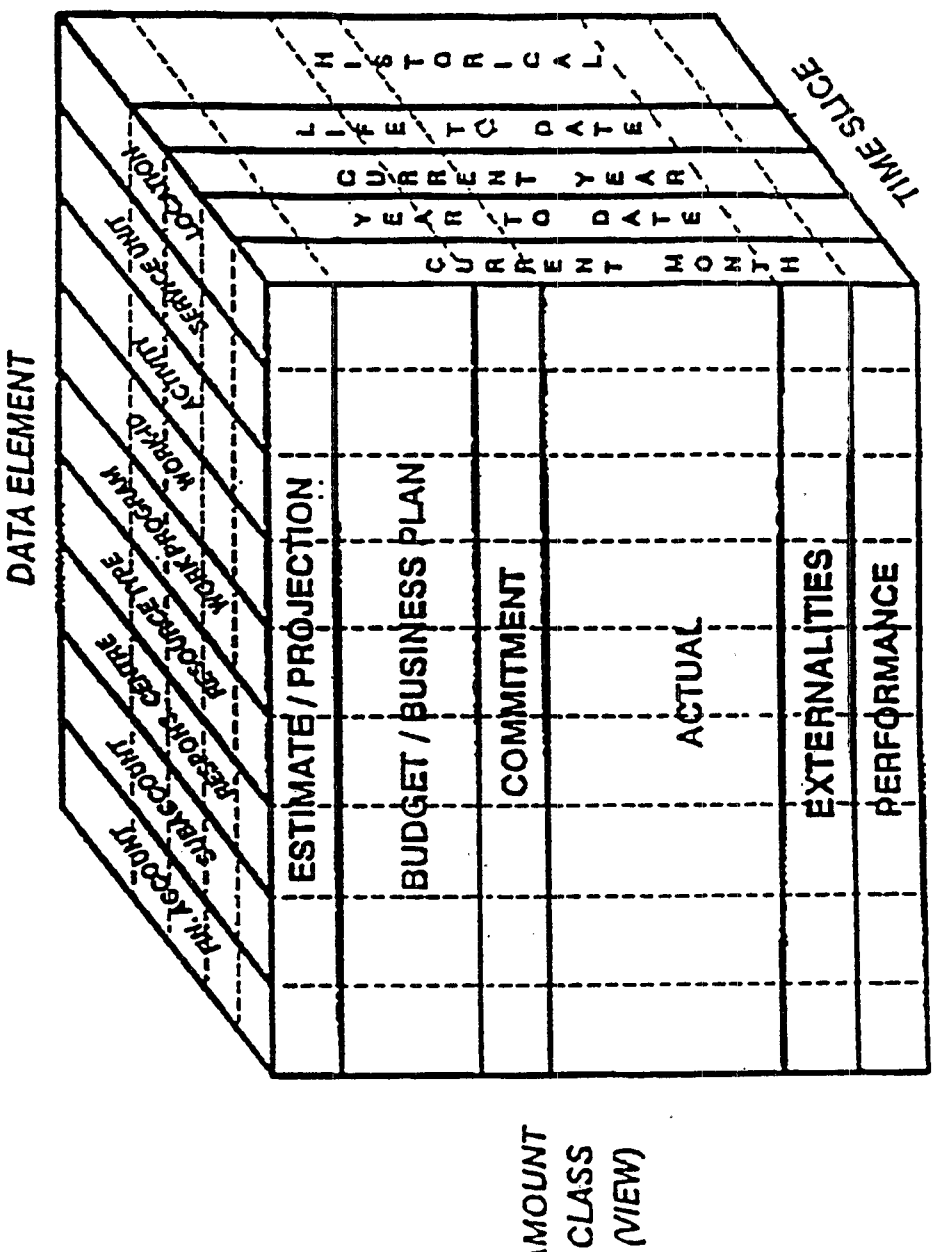
- Use current Corporate Ledger System to capture externalities that have been monetized
- Will require modifications to the Account Structure & Reporting Process
- Retain current practice for collecting"internal environmental costs" information (% of account basis), expand in 1995.

Accounting in 1995

- **Test & pilot Financial Management System in 1994**

- **Implement new Financial Management System (FMS) to capture externalities & internal environmental costs**

FMS
CODE BLOCK



Full Cost Accounting Recommendation No. 2: "THE KEY RECOMMENDATION"

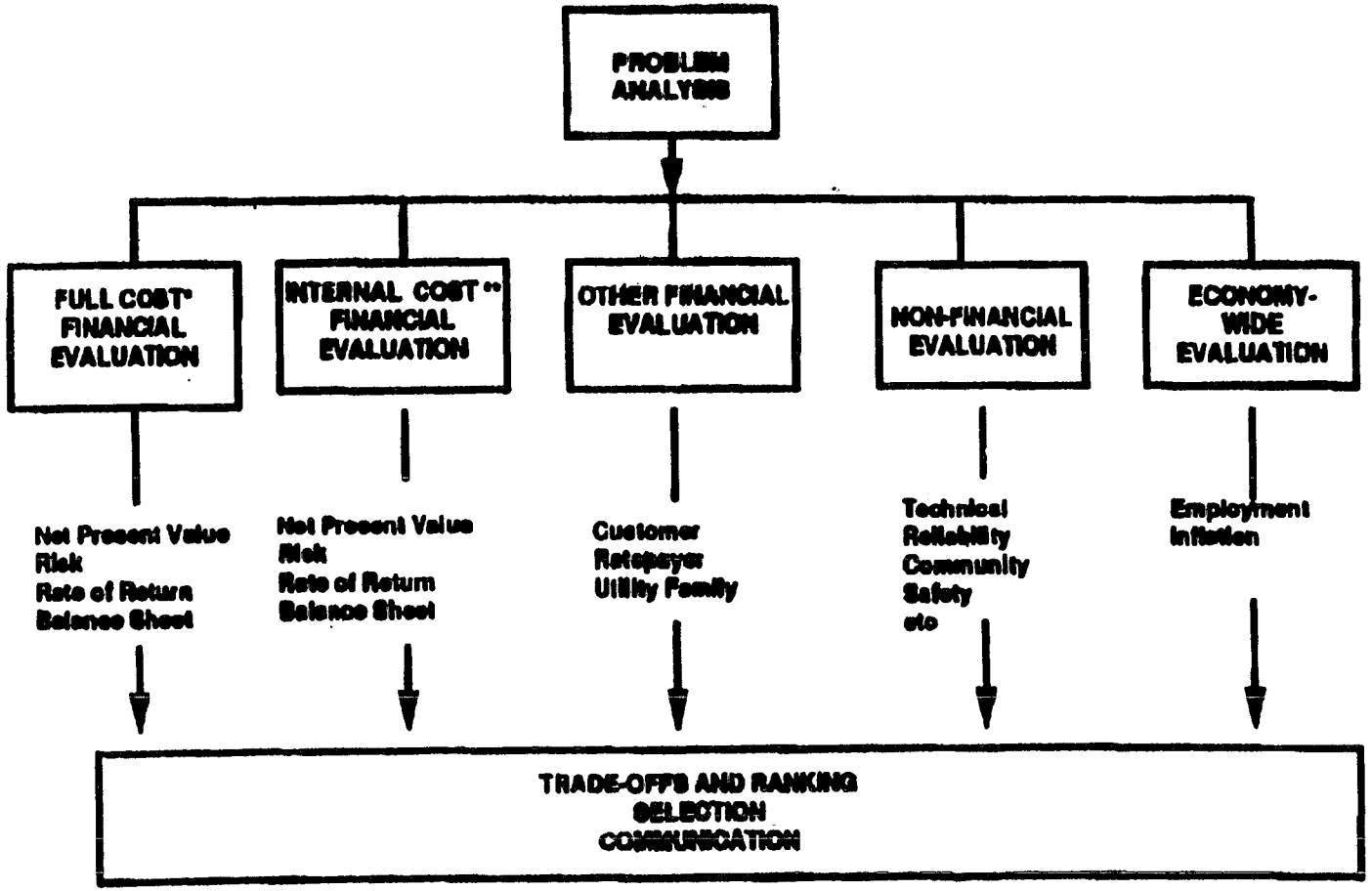
Augment current frameworks for financial evaluations and decisions, including capital budgeting to:

- **incorporate internal environmental, social and other private costs, including liability, subsidies and other contingency costs; and,**

- **incorporate external costs and benefits**

in the evaluation of projects

ONTARIO HYDRO'S PROPOSED MULTI-CRITERIA DECISION FRAMEWORK



* Full Cost Financial Evaluation assesses proposed expenditures from a social perspective. It quantifies the net impact of Ontario Hydro's expenditures on the broader publice.

**Internal Cost Financial Evaluation assesses proposed expenditures from the perspective of Ontario Hydro. It quantifies the future cash flows to and from Ontario Hydro.

Full Cost Accounting Recommendation No. 3:

Support an ongoing research program on full-cost accounting (externalities). Goal is to develop:

- **Ontario-specific databases and models which will include site/route-specific external impact information and external cost/benefit estimates for all demand/supply/transmission options available to meet the demand for electricity services in Ontario.**

Work Has Already Begun

- Preliminary estimates have been developed on site-specific basis for coal and nuclear stations.
- Study has been initiated to develop estimates of the external costs/benefits associated with Transmission & Distribution.
- Work coordinated by Environment Division. Research programs being scoped-out at Business Unit levels.
- Need to develop better estimates of external costs - this will be accomplished over time.

Full Cost Accounting Recommendation No. 4
Take FCA Beyond Hydro

- That's why I'm here!!
- Also are working/participating with external stakeholders
- Are designing FCA Workshop
- Are planning International FCA Conference

Conclusions

- We learned a lot!
- We also learned that there's a lot left to do!
- Need to promote changes to Accounting Procedures to incorporate external costs (ie., GAAP)
- Implementing and attaining Full Cost Accounting at Ontario will be a gradual process

CASE STUDY III: HYDE TOOLS (17 pp.)

Doug DeVries

December 6, 1993

POLLUTION PREVENTION IN A HAND TOOL MANUFACTURING PLANT

Douglas DeVries
Environmental Manager
Hyde Manufacturing Company
54 Eastford Road
Southbridge, MA 01550-1875
508-764-4344

The greatest pollution prevention device in the world is an active human mind. Active minds working together have made this firm what it is today, a 118 year old learning organization.

Mr. I. P. Hyde started making knives for the shoe industry about a mile from where our plant is located. He made knives for three days a week and peddled them two days a week. Mr. Hyde, a good Yankee business man, believed in using up, using over and making do. His one man shop could not afford to waste any resources.

Hyde Manufacturing Company is now a 305 member team doing about 30 processes to produce the finest putty knives, surface preparation tools and machine blades in the world. We face daily things Mr. Hyde could not have dreamed of such as; competing in a global marketplace, developing more new products per month than he did in a life time, OSHA, ADA, recycling programs, environmental programs and state and federal regulations that affect every aspect of our businesses and lives. Hyde has returned to the fundamentals of using up, using over, making do, not accepting or expecting waste from any of our manufacturing processes.

Hyde's environmental goal is zero discharge of hazardous material to all media (air, land, water) and production of the smallest amount of waste possible for this type operation. We will not introduce any new chemical hazard into our plants. These were goals established four years ago, after attending a meeting sponsored by the Massachusetts Department of Environmental Management's Office of Technical Assistance. During this meeting we met employees of the Robbins Company in Attleboro Massachusetts. They told their story of zero discharge, and what it had done for their company. Hyde became a member of the Blackstone Project, and began our journey of applying the principles of Total Quality Management to our environmental efforts.

How have we done?

Environmental program expenses for the last three years have exceeded $ 100,000.00. Savings or cost avoidance from environmental programs has exceeded $ 200,000.00.

The use of ozone depleting chemicals, long a mainstay of the metal working industry for cleaning, ended in late 1991, all equipment and chemicals were removed in early 1992, well ahead of all government required deadlines.

Water purchases have been reduced 82% from 27,000,000 gallons to 5,000,000 gallons per year with a savings of $ 29, 0000.00 and a reduction in sewer charges of $ 43,000.60.

New filtration and fluid handling methods have reduced discharge of grinding coolants form 40,000 gallons per year to 0 gallons during the last four years.

Waste paper recycling has reduced the material sent to the town landfill about 135 tons per year.

The use of clay absorbents stopped, they are replaced by corn cob grits, a biodegradable renewable resource with a high btu value which when disposed of can go to a resource recovery facility.

We installed air cooled air compressors to reduce water consumption, and supply supplement plant heat in the winter.

Dunnage for out going shipments has been changed from new newspaper to paper peanuts. These peanuts are 100% post consumer recycled paper. Pallets for out bound shipments are molded waste wood. Purchasing of these recycled products shows our commitment to recycling by becoming a consumer of recycled materials.

Part of the TQEM process sharing information with other businesses and the public. Hydes journey into TQEM might not have begun, had the OTA not provided a format for the free exchange of information on pollution prevention, and if Robbins had not shared their success story. Mr. Bradley and Mr. Clark of Robbins Co. should be congratulated for their pioneering spirit.

We hope that each person that hears the stories of Robbins and Hyde set out to prove the old adage that the student will out do the teacher.

Hyde is taking care of the environment and taking care of our business. It is good business to be environmentally sound, it is the only way to be in business. The foundations laid down by Mr. Hyde allowed us to succeed for the last 118 years, and now we are rebuilding those foundations to ensure the next 118 years of company growth.

HYDE MANUFACTURING CO., INC.

SOUTHBRIDGE, MA 01550-1875

FOUNDED BY I.P. HYDE 1875

1 MILE FROM PRESENT PLANT

FIRST PLANT ON THIS SITE 1916

PRESENT PLANT 1973

I.P. MADE PRODUCT 3 DAYS/WEEK

DELIVERED 2 DAYS/WEEK

KNOWN FOR HIGH QULAITY, LOW WASTE

USE UP, USE OVER, MAKE DO, WEAR OUT

HYDE MANUFACTURING CO., INC.

SOUTHBRIDGE, MA 01550-1875

ENVIRONMENTAL & MISSION STATEMENTS

TQM & TQEM 1989

"WE WILL APPLY OUR BELIEF IN RESPECTING AND PROTECTING THE ENVIRONMENT TO ALL PHASES OF THE BUSINESS PROCESS."

HYDE MANUFACTURING CO., INC.

SOUTHBRIDGE, MA 01550-1875

NO HYDE FAMILY IN THE BUSINESS

PRESENT OURSHIP FOR THREE GENERATIONS

FOURTH GENERATION IN THE BUSINESS NOW

FIFTH GENERATION GROWING UP IN TOWN

RESPECTED COMMUNITY MEMBERS

LONG TERM OVERVIEW OF BUSINESS

NO DISTANT STOCK HOLDERS

HYDE MANUFACTURING CO., INC.

SOUTHBRIDGE, MA 01550-1875

YANKEE INGENUITY

TO THE WORLD A YANKEE IS FROM USA

IN USA YANKEE IS FROM THE NORTH

FROM THE NORTH A YANKE IS FROM NEW ENGLAND

IN NEW ENGLAND A YANKEE IS FROM VERMONT

IN VERMONT YANKEE IS THE FELLOW THAT

EATS PIE FOR BREAKFAST

HYDE MANUFACTURING CO., INC.

SOUTHBRIDGE, MA 01550-1875

ENVIRONMENTAL PROGRAMS RETURN US TO

USE UP

USE OVER

MAKE DO

WEAR OUT

AND ADDS

ANY WASTE FROM THIS OPERATION

IS UNACCEPTABLE

HYDE MANUFACTURING CO., INC.

SOUTHBRIDGE, MA 01550-1875

1990 ESTABLISHED ENVIRONMENTAL GOAL OF:
ZERO DISCHARGE TO ALL MEDIA OF ANY
HAZARDOUS MATERIAL

ESTABLISHED ENVIRONMENTAL COST SYSTEM
ACTIVITY BASED COSTING
FULL LIFE CYCLE COSTING
ENVIRONMENTAL ENTERPRISE

HYDE MANUFACTURING CO., INC.

SOUTHBRIDGE, MA 01550-1875

WHAT HAVE WE ACCOMPLISHED IN 3 YEARS

PROJECTS HAVE COST $125,000

PROJECTS HAVE MADE $361,000

SOME PROJECTS WERE:

HYDE MANUFACTURING CO., INC.

ENVIRONMENTAL PROJECT REPORT

QUENCH OIL RECYCLING

INVESTMENT $ 10,000

SAVINGS $ 3,500/YEAR

HAZWASTE DISPOSAL

AVOIDENCE $ 66,400/YEAR

HYDE MANUFACTURING CO., INC.

ENVIRONMENTAL PROJECT REPORT

REPLACE KEROSENE CLEANER

INVESTMENT $ 20,000

SAVINGS $ 13,000/YEAR

HAZWASTE DISPOSAL

AVOIDENCE $ 7,000/YEAR

HYDE MANUFACTURING CO., INC.

ENVIRONMENTAL PROJECT REPORT

RECYCLE PLASTIC HANDLES

INVESTMENT $ NONE

SAVINGS $ 10,000/YEAR

HAZWASTE DISPOSAL

AVOIDENCE $ NONE

HYDE MANUFACTURING CO., INC.

ENVIRONMENTAL PROJECT REPORT

RECYCLE WHITE PAPER

INVESTMENT $ NONE

SAVINGS $ 960/YEAR

HAZWASTE DISPOSAL

AVOIDENCE $ NONE

INCOME $ 270

HYDE MANUFACTURING CO., INC.

ENVIRONMENTAL PROJECT REPORT

STRIP HEAT TREATING

WATER USE REDUCTION

INVESTMENT $ 10,000

WATER COST SAVINGS $ 4500/YEAR

SEWER COST SAVINGS $ 6500/YEAR

GALLONS OF WATER SAVED 3,360,000

HYDE MANUFACTURING CO., INC.

ENVIRONMENTAL PROJECT REPORT

ELEMINATE USE OF TCA

INVESTMENT $ NONE

PURCHASE SAVINGS $ 14,000

HAZWASTE DISPOSAL

AVIODENCE $ 14,000

HYDE MANUFACTURING CO., INC.

ENVIRONMENTAL PROJECT REPORT

RELIGHT PLANT

INVESTMENT $ 92,000

MA ELECTRIC REBATE $ 48,000

ELECTRIC ENERGY COST

REDUCTION $ 48,000/YEAR

HYDE MANUFACTURING CO., INC.

SOUTHBRIDGE, MA 01550-1875

DOING THE RIGHT THING
FOR BUSINESS
FOR THE ENVIRONMENT
MAKING HYDE MORE EFFECTIVE

BUSINESS AND THE ENVIRONMENT
MAKE GOOD SENSE

LUNCHEON KEYNOTE SPEAKER — "MEETING THE CHALLENGE" (14 pp.)

Richard Barth
President, Chairman, & CEO
Ciba-Geigy Corporation
December 6, 1993

RICHARD BARTH -- CIBA-GEIGY CORPORATION
"ACCOUNTING AND CAPITAL BUDGETING FOR ENVIRONMENTAL COSTS"
DALLAS, TEXAS -- DECEMBER 6, 1993

Thank you, Mark, for your introduction and kind words. I'm very pleased to be with all of you today and to take part in this important workshop.

I would like to commend you and Marty Spitzer of the EPA for organizing this two-day program and for spearheading the agency's efforts in a critical area related to pollution prevention. I also would like to commend the other sponsoring organizations -- the Business Roundtable, the U.S. Chamber of Commerce, the American Institute of CPA's, the Institute of Management Accountants and AACE International -- for their participation and support.

With today's workshop we all are taking a major step forward in discussing and wrestling with an emerging business issue -- the need for improved accounting and capital budgeting for environmental costs. While the EPA can take a leadership position by facilitating discussions and dialogue on this issue, in the end it's up to us in the business and financial community to transfer such discussions into our everyday planning and accounting practices.

I plan to discuss three major topics with you today.

First, the importance of improving environmental accounting and capital budgeting practices.

Second, how my company -- Ciba -- has been approaching these two areas.

And third, the effects of a potentially new IRS tax position

on environmental remediation expenditures, and the need for Superfund reform in order to better control long-term environmental cleanup costs.

I. Importance of Environmental Accounting and Capital Budgeting

As we all know, the costs of environmental protection are skyrocketing today in the United States and in many parts of the world. The EPA certainly understands that trend and wants to work with the private sector in addressing it. Today's workshop is a clear indication of the agency's willingness and interest.

We in the chemical industry appreciate the agency's new pollution prevention initiatives and its movement away from the traditional "command and control" approach to environmental protection. More and more today, companies such as Ciba are taking an integrated approach to determining environmental costs by seeking to balance their environmental and financial responsibilities.

Improved environmental accounting and capital budgeting practices will enable many companies to better measure their environmental performance and expenditure levels. Such practices also will provide greater financial incentives for pollution prevention and waste minimization efforts.

To gain a better understanding of managerial cost accounting systems, Daryl Ditz of the World Resources Institute has been carrying out a landmark project with a small sample of Fortune 100 companies. Ciba is pleased to be taking part in the WRI's study, along with Amoco Oil, Digital Equipment, S.C. Johnson, Dow

Chemical, DuPont and 3M. Rebecca Todd and Ajay Maindiratta, professors of accounting at New York University's business school, have provided valuable consulting expertise to this project.

The WRI study traces a variety of environmental costs throughout an organization and shows how they are communicated to management. We look forward to receiving the WRI's report in the spring of 1994 and to gaining further knowledge and insights from it.

From the WRI report and other future studies, we hope to learn how to more effectively integrate environmental expenditures into our overall research and development, manufacturing, distribution and waste disposal costs. That is to say, we seek to better define and quantify the total environmental costs of our operations and products -- from "cradle to grave."

In the long run, getting a better handle on full environmental costs also will create greater internal incentives to further reduce waste and encourage even more pollution prevention efforts.

Years ago the consumer benefited from less expensive chemical-based products because environmental costs were much lower for the manufacturer. Unfortunately, industry today cannot fully pass along the costs of environmental remediation related to its past manufacturing practices. I will have more to say more about Superfund and some needed changes in a few minutes.

II. Environmental Cost Accounting and Capital Budgeting At Ciba

I would now like to describe how we approach environmental cost accounting and capital budgeting at Ciba U.S. We have annual

sales of about $4.5 billion in 12 businesses -- led by pharmaceuticals, crop protection chemicals, and a wide range of industrial specialities for the automotive, aerospace, textile, electronic and other industries. We employ more than 15,000 people and have manufacturing facilities across the U.S. -- from New York to California.

As George Muhlebach mentioned this morning, a few years ago Ciba developed a "Vision 2000", which will guide our worldwide business into the next century. Consistent with the concept of sustainable development, Ciba's "Vision" seeks to balance our economic, social and environmental responsibilities, in order to ensure our prosperity today, tomorrow and beyond the year 2000.

In 1992 at Ciba U.S., the Corporate Governance Committee of the Board of Directors initiated a project to establish baseline expectations and procedures to be applied throughout the company in the health, safety and environmental areas.

With the full cooperation and participation of our divisions, corporate departments and plants, we developed an updated "Corporate Health, Safety and Environmental Policies and Procedures Manual," which has been distributed throughout Ciba U.S. All of our employees are required to take HS&E training classes based on those new policies. Through that training program, they have become more aware of their individual HS&E responsibilities and how they all can potentially affect the company's bottom-line.

In addition to our internal policies and procedures, Ciba is actively working with various outside organizations toward shaping

a more environmentally responsive industry. For example, Ciba and several hundred other business, government and non-government organizations have adopted the Environmental Principles for Sustainable Growth. The principles were developed by the International Chamber of Commerce in cooperation with the United Nations.

In the U.S. and many other countries, Ciba has signed on to Responsible Care -- the chemical industry's initiative to improve its performance in health, safety and environmental quality.

At Ciba U.S., our major manufacturing sites have been the most active in implementing Responsible Care, which is not surprising because the first four Codes of Management Practice deal largely with chemical manufacturing issues. Our Additives Division also has developed an outstanding program called AddCare, in which they have extended their Responsible Care dialogue to their customers, suppliers and communities. The division places special emphasis on the concept of product stewardship.

One of the greatest challenges of Responsible Care is to restore public confidence in the chemical industry by producing visible, tangible results. When it comes to results, I am proud that Ciba continues to be a leader.

Ciba has demonstrated a continued decline in emissions because pollution prevention, or source reduction, is our top environmental priority. From 1988 to 1992, Ciba U.S. reduced its SARA Title III emissions by 50 percent through a broad range of technical and waste minimization improvements.

Ciba also was one of the first companies to sign on to the EPA's voluntary Industrial Toxics Project, commonly known as the "33/50" program. We exceeded the agency's initial milestone of reducing the emissions of certain high-volume chemicals by 33 percent by 1992, and we are now working toward the second target -- a 50 percent reduction by 1995.

These and other environmental advancements led Fortune magazine last July to name Ciba as one of the 10 "most improved" U.S. companies from an environmental performance standpoint.

We strongly support the EPA's voluntary environmental initiatives, such as "33/50" and the "Green Lights" energy conservation program. Such approaches make very good sense from economic and environmental perspectives, and are directly related to the spirit and direction of today's workshop.

In the past few years, Ciba has focused on developing better management information systems for tracking its environmental activities, performance and expenditures. In 1990 we introduced a worldwide annual reporting system called SEEP -- short for Safety, Energy and Environmental Protection.

The worldwide SEEP report includes extensive quantitative data on safety, energy usage and environmental protection; a compilation of safety and environmental protection costs; and individual cases of significant safety, environmental and energy improvements or failures. All major Ciba production sites must compile annual SEEP returns, and the number of sites reporting has risen from 64 in 1990 to 82 in 1992.

SEEP has become an important management tool, enabling us to measure safety, energy conservation and environmental performance at the corporate level as well as the local level. Consequently, priorities can be established and site-specific targets can be set and progress measured. More important, the SEEP report helps us track the environmental return from capital investments.

In recent years at Ciba U.S., we have spent about $150 million annually on environmental expenditures in three main areas. They are: about $50 million per year on environmental capital investments at our plants, about $50 million per year on environmental remediation, and about $50 million per year on ongoing environmental operating expenditures, especially at our plants.

At Ciba U.S., capital investment proposals for environmental projects usually originate at the division or plant level, and then are submitted for corporate review. We use several key criteria for evaluating these proposals, such as how they will help Ciba meet permit compliance requirements, achieve waste minimization goals, conserve energy usage, reach resource recovery/recycling targets, and ultimately, what the financial payback is from such investments.

As a general rule, there is a very decent payback, especially when the alternative of not making such an investment is evaluated. The earlier Ciba makes such investments, the more competitive the company is, because those of our competitors who pursue no action, have higher operating costs. The SEEP report helps us make those

investment decisions because it tells us how many resources we are putting into new environmental, safety and energy systems, and what those systems are costing us from year to year.

The SEEP report and many other aspects of our environmental activities are described in Ciba's first worldwide Environmental Report, issued last September. Our report contains extensive quantitative data, distinguishing it from many other corporate environmental reports which contain a lot of text and pictures. Copies are available at this workshop, or afterwards, through George Muhlebach.

I'd now like to briefly share two examples of Ciba environmental investments and how they have paid off for us.

Optical brighteners for the detergent and paper industries are important products of Ciba's Chemicals Division. Unfortunately, for each pound of optical brightener produced, over two pounds each of sulfuric acid and iron sludge were generated. That meant having to treat and dispose of 15-20 million pounds of sulfuric acid and iron sludge each year.

A team of Swiss and American scientists developed a new manufacturing process for a key intermediate, which entirely eliminated sulfuric acid and iron sludge wastes, and raised product yield above 95 percent. That dramatic improvement helped make Ciba the lowest-cost manufacturer of that product in the U.S. and enabled us to compete effectively in domestic and export markets.

The second example comes from our site in Toms River, New Jersey, which achieved a 97 percent reduction in waste water

through a project called SWEAT -- Standardization Without Effluent at Toms River. Its success was recognized by the National Environmental Awards Council, which represents 28 leading environmental organizations.

Using high-tech reverse osmosis, ultra-filtration and a high-pressure water cleaning process, SWEAT recycles 99 percent of the water used to clean dye-mixing vessels for the Textile Products Division, and recaptures more than 200 pounds of dye each day. The SWEAT project required a $6 million investment, which will pay for itself in just a few years.

In addition to their obvious environmental and social benefits, both projects generate long-term environmental savings and help give Ciba a competitive advantage.

I'd like to emphasize that environmental accounting is an important issue to Ciba, as evidenced by the establishment of an accounting policy by our Executive Committee a few years ago. This policy has its basis in promulgated Generally Accepted Accounting Principles (GAAP), in particular, Financial Accounting Standard Number 5 ("Accounting for Contingencies"), Concepts of Probability and Estimability. Ronald DeMarchis, a member of our corporate accounting staff, is participating in this two-day workshop and will be available to discuss this accounting issue at more length with you.

We started establishing provision for environmental remediations in 1986. We have spent about $300 million on remediations since then, and we continue to make such provision in

accordance with this accounting standard. By addressing these liability issues early, we have been able to establish reserves, over time, which enable us to carry these costs on an annual basis, which does not distort our ongoing financial performance.

III. IRS Tax Deductibility Issue and Superfund Reform

Before closing, I would like to touch on two current issues related to accounting and capital budgeting for environmental costs. I raise them because both have potentially far-reaching effects on the environmental expenditures of Ciba and many other companies.

The first issue deals with tax deductibility of environmental cleanup costs. Two Technical Advice Memoranda (TAM's), recently issued by the Internal Revenue Service, have focused attention on the tax treatment of expenditures related to asbestos and environmental cleanups. In both cases, the IRS denied current tax deductions for such costs, and made the taxpayers involved capitalize and depreciate the costs over a future period of time, and, in the case of land remediation, no depreciation is allowed by this position.

Fortunately, the position taken in these two TAM's is not the IRS's last word on the subject. The IRS has agreed to reexamine the issue regarding environmental cleanups. However, even though these TAM's are only applicable to the two cases in question, they indicate the IRS' possible direction . . . and that's an ominous sign for the future.

Environmental remediation costs are not to be capitalized.

Remediation involves a wide variety of expenditures directed to restoring the real property to its original condition. A Superfund mandated remediation represents a determination, from an economic standpoint, that the condition of an asset has been impaired and, therefore, its value reduced.

The costs incurred in reaching that determination and the costs incurred in implementing a mandated corrective action, cannot return the asset to a value which exceeds its historic cost. Such property was generally not written down to reflect the amount of the environmental damage, and if such action were contemplated, I daresay such property would have negative value. In effect, that's what our environmental provisions are evidencing.

Prior law supports tax deductions for environmental remediation work. For example, the Tax Court has ruled that costs incurred by pit mining companies to restore the land to its previous condition were deductible as business expenses, on the rationale that the assets involved were not improved above their original, i.e. historical, value. We believe the same principles should be applied to environmental cleanups under Superfund or the Resource Conservation and Recovery Act (RCRA).

Furthermore, elimination of deductions for environmental restoration projects would be bad public policy because it would discourage settlements, delay cleanups and adversely affect thousands of companies, banks and insurance companies -- both large and small. To date, these parties have spent more than $20 billion on environmental remediation under Superfund alone.

The second issue has to do with reforming Superfund itself. Ciba believes that changes in the law are necessary to make Superfund more environmentally responsible and economically realistic. We support cost-effective cleanups that are protective of human health and the environment, and therefore advocate changes in four key areas.

First, we believe that improvements should be made in the process for determining remedy selection and cleanup standards. Remediation should mitigate real, direct risks posed to health and the environment -- and not imagined risks.

The draconian nature of remediation requirements which flow from such inappropriate risk characterizations has put industry and its insurance carriers at each other's throat. The joint and several liability standard, which I will cover in a minute, keeps us there by multiplying an already exaggerated financial exposure. The total litigation costs involved are staggering.

The present and future land use of a site also should be evaluated when selecting a cleanup remedy.

The importance of risk assessments should be addressed very early in the Superfund process. Even though risk assessments are an uncertain science, they should be the compass directing the engineering solutions implemented at Superfund sites across the country.

Second, we support the elimination of the overlap between Superfund and the Resource Convervation and Recovery Act (RCRA).

Third, we believe a system should be designed to more

equitably distribute cleanup liability. The current joint and several liability system should be changed so that each party pays its "fair share" of the cleanup costs, not potentially the entire amount.

Frequently, only a handful of Potentially Responsible Parties (PRP's) are identified for cleanup, even though many more have sent waste to a particular site. It's unfair that the identified PRP's then have to seek out other responsible parties for their portion of the cleanup costs, or have to pay a disproportionate share of the total cleanup in instances where such other parties have disappeared.

The common law principle of joint and several liability applies to tort-feasors. Ciba, and many other responsible companies, were not tort-feasors when they engaged in waste disposal practices which, at the time, were government permitted and, in many cases, state-of-the art. Thus, we should not shoulder responsibility for paying the cleanup of another's waste.

And fourth, we advocate the establishment of a cooperative, decision-making partnership which includes the community, relevant agencies and PRP's.

In its present form, Superfund often leads to the use of misdirected resources. Each year of delay for reform costs Ciba and other companies millions of dollars. I am concerned that addressing this issue will be delayed into the 1995 legislative year and that we will continue to misdirect remediation resources because of the inappropriateness of the legislation.

I would like to emphasize that my comments should not be interpreted as a criticism of the EPA, since the Superfund statute does not give the agency sufficient discretion and latitude. Moreover, Ciba has had good experience in working with the various EPA regions on specific Superfund sites.

Conclusion

In conclusion, we all recognize the need to improve and develop new approaches to accounting and capital investments for environmental costs. This workshop provides an excellent opportunity to discuss those issues . . . and to then move ahead with a "stakeholders action agenda."

By working together in this public and private sector partnership -- with members of the EPA, academia, industry and the financial community -- I'm confident that we will be successful in reaching new solutions to environmental accounting and investment issues.

I would be happy to answer any questions you may have. Thank you very much.

ATTACHMENT A

Biographies of Speakers:

- Richard Barth
- Dr. Ed Quick
- Dr. Allen White

ACCOUNTING AND CAPITAL BUDGETING FOR ENVIRONMENTAL COSTS
Speaker Biographical Information

Richard Barth

Richard Barth has served as president and chief executive officer of Ciba-Geigy Corporation since 1986, and as chairman of the board since 1990. He is also chairman of the corporate Finance, Compensation and Governance committees.

In 1993, Mr. Barth was appointed by President Bill Clinton to serve on the President's Council on Sustainable Development, which was established to reassert this country's commitment to global environmental leadership.

Mr. Barth began his career in 1957 as an associate with the New York law firm of Burke and Burke. In 1965, he joined the former Ciba Corporation as legal assistant to the executive vice president, serving in that capacity until 1968, when he was named secretary and general counsel. Following the merger of Ciba and Geigy, Mr. Barth became general counsel of the corporation. In 1974, he was named corporate secretary and, in 1975, he became a member of the board of directors. In 1979, his responsibilities were further broadened to include serving as chief financial officer and chairman of the board's Finance Committee. Mr. Barth also was a senior vice president of the corporation from 1980 until 1986.

Mr. Barth serves on the boards of numerous organizations. He is a member of the board of The Bank of New York; Bowater, Inc.; the Chemical Manufacturers Association; the Committee for Economic Development, and the Swiss-American Chamber of Commerce. Mr. Barth has been a regular member of The Conference Board since 1988.

He earned a B.A. degree from Wesleyan University in 1952, and a LL.B. degree from Columbia Law School in 1955. Mr. Barth was admitted to the New York Bar in 1958 and the New Jersey Bar in 1966.

Ciba-Geigy Corporation (Ciba), headquartered in Ardsley, New York, is a wholly-owned subsidiary of Ciba-Geigy Limited of Basel, Switzerland. Ciba is a leading developer and manufacturer of healthcare and agricultural products, and specialty chemicals for industry. Ciba is committed to sustainable development by balancing its social, economic and environmental responsibilities, in keeping with its "Vision 2000."

ACCOUNTING AND CAPITAL BUDGETING FOR ENVIRONMENTAL COSTS
Speaker Biographical Information

Dr. Ed Quick

Manager, Environmental, Health & Safety
Hoechst Celanese Corporation, Bishop Facility

1974	B.S., Chemistry, Lebanon Valley College
1979	Ph.D., Physical Chemistry, Iowa State University

BACKGROUND

Employed by Hoechst Celanese Corporation

- Over 5 years experience in the development and piloting of new chemical and polymer processes
- Greater than 6 years experience in managing production operations of:
  - -- Polyacetal Engineering Resin
  - -- Polyols
- Currently responsible for management of environmental, health and safety affairs at the Hoechst Celanese Corporation's Bishop, Texas Facility
  - -- Over 1,100 employees
  - -- Clean Industries 2000 site in the Clean Texas 2000 program
- Inclusive in responsibilities are:
  - -- Assuring strategic environmental management
  - -- Initiation of pro-active in-facility and community environmental programs
  - -- Development of an effective and minimum cost pollution prevention process

ACCOUNTING AND CAPITAL BUDGETING FOR ENVIRONMENTAL COSTS
Speaker Biographical Information

Allen L. White, Ph.D.

Dr. White is Director of the Risk Analysis Group at the Tellus Institute in Boston. Tellus, founded in 1976, is an international, non-profit environmental economics and policy research organization comprising 50 scientists, economists, engineers, and policy analysts.

Dr. White's current work focuses in four areas: pollution prevention economics, corporate environmental performance indicators, lifecycle analysis, and siting hazardous facilities. In 1990-1991, he managed projects for the U.S. EPA and the New Jersey Department of Environmental Protection and Energy concerned with Total Cost Assessment (TCA), an alternative approach to evaluating the profitability of corporate pollution prevention investments. He has lectured widely on managerial cost accounting and capital budgeting for pollution prevention in the U.S. and Europe.

In other recent projects, Dr. White has analyzed the organizational and performance aspects of environmental management at affiliates of three U.S. multinationals operating in Thailand and India; assessed the effectiveness of the pollution tracking system of a high technology U.S. multinational; and assisted in the development of a standardized corporate environmental performance report form in conjunction with a partnership of environmental organizations and U.S. firms. He currently is principal investigator of an EPA project which will survey 150 firms to determine current and best capital budgeting practices in relation to pollution prevention investments.

Dr. White has advised state agencies across the U.S. on waste management, pollution prevention, and environmental regulation, and consulted with the United Nations, the U.S. Agency for International Development, and the Organization for Economic Cooperation and Development (OECD).

III. Stakeholders' Action Agenda

How to Use This Chapter

This chapter summarizes and presents the Stakeholders' Action Agenda that resulted from the intensive two-day Workshop on management accounting and capital budgeting for environmental costs. The opinions and perspectives of experts from across the country form the basis of the agendas. The chapter has also been reprinted with minor modifications as a stand-alone EPA document Stakeholders' Action Agenda: A Report of the Workshop on Accounting and Capital Budgeting for Environmental Costs (May 1994) EPA #742-R-94-003.

This chapter is organized to help readers easily find topics of greatest interest. For example:

- Readers interested in a *summary* of the issues and actions in the agendas should turn to Section III.2.
- Readers interested in *specific recommendations* for stakeholders should see the summary of the Action Agendas in Section III.3 and the Agendas for each stakeholder group in Attachment A.

By organizing the chapter in this way, individuals and organizations interested in taking an active role can turn to their stakeholder agendas for direction and inspiration; they will also find there the issues and actions that other stakeholders see as relevant for them. All issues and actions are numbered according to which stakeholder group raised them, as explained in Attachment A. For readers desiring a more concise distillation of the results of the Workshop organized by issue areas, Section III.2 presents such a summary.

Overall, this chapter is organized as follows:

- Description of the process used to develop the Stakeholders' Action Agenda — Section III.1.
- Summary of the issues and related actions raised in the Workshop, presented in terms of four major themes — Section III.2.
- Summary of the 10 individual stakeholder action agendas that make up the overall Agenda, together with related commentary provided by the working groups responsible for developing each one — Section III.3.
- Items raised in the concluding plenary session of the Workshop — Section III.4.
- Next steps including an invitation to attendees and all other interested parties to make commitments — Section III.5.

and offers to help implement the Action Agenda and related activities

- Stakeholders' Action Agenda — Attachment A.
- Table of acronyms — Attachment B.

It is important to emphasize that the action agendas represent the opinions of Workshop participants and not necessarily consensus of opinion. In addition, the agendas do not necessarily represent either the positions of the six co-sponsors or the consensus of the Focus Group that guided this endeavor. Based on the comments received from participants, all of whom were provided a draft of this chapter to review, their opinions from the Workshop have been accurately and fairly presented. In addition, because commenters were split concerning the options for presenting the Action Agendas, this chapter presents them both by issue and by stakeholder group.

III.1 Development of Agendas

After general discussion of issues and needs on the first full day of the Workshop, Workshop participants reconvened in 10 working groups on the second day of the Workshop to develop action agendas for ten major stakeholder groups:

(1) Business Financial Staff
(2) Business Accounting Staffs
(3) Business Environmental Health and Safety Staffs
(4) Business Operations Staffs
(5) Accounting Associations
(6) Small Businesses
(7) Non-Accounting Professional Associations
(8) Management Consultants
(9) Education and Research Community
(10) Government Agencies

This numbering scheme is used to identify stakeholder Agendas in Attachment A.

Each working group had several members from the stakeholder group that was the focus of its agenda. For example, the working group that developed the industry accountants action agenda included industry accountants, and the group developing the government action agenda included government officials. To ensure breadth of vision, however, each working group also included participants drawn from other stakeholder groups. The groups were encouraged to consider the "customers" and "suppliers" of the stakeholder group that was its focus. The working groups were not limited to developing action agendas only for their assigned stakeholder groups but were free to address priority issues and necessary actions for all stakeholders.

Note, any recommendation by a working group member was included in the agendas. Therefore, the resulting action agendas do not necessarily represent the consensus of each working group, the entire Workshop, or the co-sponsors.

Working group members presented the agendas to the Workshop as a whole during the follow-up plenary session. After each proposed agenda was presented to the Workshop as a whole, discussion ensued. The follow-up plenary session allowed participants to point out "gaps" or issues missing from the proposed stakeholder agendas and to express any concerns. Because the agendas included many consistent and mutually-supportive recommendations, workshop participants as a whole appeared comfortable with the general tenor of the agendas. However, some of the recommendations elicited expressions of concern. For example, 2 out of the 9 government stakeholder agenda action items, those that recommended national pollution prevention planning requirements and green taxes, stimulated significant unease and expressions of concern by many participants. On the whole, there was far more agreement than disagreement.

The following section summarizes the issues and actions in terms of cross-cutting themes addressed in the action agendas. Section III.3 summarizes each stakeholder agenda in the order listed above and adds relevant commentary prepared by each working group.

III.2 Summary of The Issues and Related Actions

The first day of the Workshop, participants formed 10 working groups to explore key issues and needs related to accounting and capital budgeting for environmental costs. These issues and needs were revisited in Day 2's development of action agendas and were discussed in plenary sessions on both days. Commenters on the draft Action Agenda suggested that a summary of the issues and needs be included in the Proceedings. This summary is intended to respond to those suggestions.

The issues discussed in the Workshop and addressed in the action agendas can be grouped into four major themes:

(1) Terms, concepts, and roles

(2) Management incentives

(3) Education, guidance and outreach

(4) Analytic tools, methods, and systems

Each of these issue areas is discussed in turn; for a summary organized by stakeholder group, see Section III.3.

(1) Definition of terms, concepts, and roles.

Terms and Concepts

Because the concept of environmental accounting is new and unfamiliar to many, an important issue in the near term is to clarify what the concept means and what are the goals for its implementation. Participants recommended a number of the actions to clarify the concept of incorporating environmental costs into managerial accounting and capital budgeting. To foster

greater consideration of environmental costs in business decisions, participants recommended that answers be developed to such questions as: "What exactly does environmental accounting mean? What is its scope? What is the problem? Is there a clearly defined public policy? What is the linkage to pollution prevention and waste minimization? Are we asking the right questions?"

- For example, a recurring issue was how to define environmental costs: Is it an "environmental cost" when a company spends money to improve a process if there are any resulting environmental benefits, no matter how incidental? Costs and cost-savings related to end-of-pipe environmental controls are much easier to classify and determine than costs or cost savings of many pollution prevention actions, which may be integral parts of the production process itself. Similarly, relevant "indirect" and hidden "environmental" costs may be difficult to identify and estimate.

- Another example relates to both terms and concepts. Pollution can create costs for which the company is responsible -- these are termed private costs. Pollution can also create costs for which the company is not responsible -- these are often termed social costs or externalities. Do stakeholders understand this distinction? How should the two types of costs be handled?

In addition to differences of opinion about what costs ought to be considered by firms, there is also confusion about what people mean when they use terms such as life cycle costing, life cycle assessment, total cost accounting, full cost accounting, total cost assessment, and so on. Some participants define life cycle assessment (LCA) as focusing only on those impacts caused by activities within business borders, from acquisition of raw materials to disposal of a product or decommissioning of a system. Other participants see LCA as a broader tool concerned with environmental impacts further upstream and downstream from the business itself, including environmental damages caused by raw material extraction, transportation, processing, and so on.

Workshop participants expressed in several ways the perceived need for clarification of terms and concepts. Among the recommended actions are:

- identifying a common body of knowledge,
- sharing knowledge and experience,
- using cross-functional teams, including rotation of personnel, to develop common terms and concepts,
- holding workshops and conferences,
- increasing communications, and
- promoting, sponsoring, and conducting research.

Even where terms and concepts are assumed to be clearly defined, the Workshop discussions themselves offered constant evidence of the cross-disciplinary nature of the issue and the need to promote understanding of key terms and concepts across disciplines.

- For example, many of the engineers in the non-accounting professional associations working group emphasized the need for this group to develop

a better understanding of accounting concepts, methods, and metrics. The management consultants' action agenda includes several recommendations to address the need for a common body of knowledge including common environmental accounting language.

Roles

Because incorporating environmental costs into management accounting and capital budgeting is a relatively new approach and because many parties must be part of the solution, many participants saw a need to clarify the roles of key players. Who should take the lead in companies? What should associations do? How can management consultants help? What is government's role? Definition of roles appears to be as important an issue as clarification of terms and concepts.

With respect to roles, participants from the business sector focused on the importance of cross-functional teamwork and communication. The environmental accounting issue was recognized as transcending individual professional or functional expertise. The accounting associations action agenda highlights the issue of defining their roles, including such recommended actions as reviewing accounting codes of ethics to incorporate environmental concerns. Further, the action agenda for accounting associations recommended that they identify opportunities for improvement in tax and environmental policy to encourage pollution prevention. Similarly, the action agenda for non-accounting professional associations and societies included in its four major issues the need to define environmental accounting objectives and roles for professional associations. Recommended actions include the development of agendas for environmental accounting activities at state and local levels as well as inventorying association activities relating to environmental issues in accounting.

The academic community, on the other hand, saw two major roles for itself: research and curriculum development. They saw no need to clarify their roles further.

The government role was also an important topic of discussion, with many participants endorsing the catalytic and facilitation roles that federal and state government agencies can play, while expressing reservations about government regulation and standard-setting. The government stakeholder action agenda highlights another role government can play: it can serve as a model for how to apply environmental accounting principles to its own operations. The government working group recommended, for example, creating a standard for environmental cost accounting for large government contractors.

(2) Management incentives.

A second major theme of the recommended actions relates to internal and external incentives for action. This ranges from the need for greater attention to the topic, to identifying and creating reasons for addressing it (both internal and external to businesses), to the necessary conditions for progress.

Internal Incentives

Recommended internal incentives for business include tying the consideration of environmental costs to existing decisions on product mix, outsourcing, capital investments,

performance evaluation, promotion/compensation, product costing, and quality assurance. Doing so could involve incorporating environmental goals into business unit objectives, creating specific rewards for achieving such goals, and incorporating environmental concerns into everyone's job description, from top management to line workers.

Participants recognized that simply recommending such actions will not necessarily make them happen. Organizational and management commitment are keys to success. For example, participants made frequent calls for increased management commitment, cross-functional teams, and champions to "overcome inertia."

The business stakeholders' groups, comprised largely of company accounting, financial, environmental health and safety, and operations personnel, emphasized the importance of internal organizational incentives. They recommended actions to create incentives for middle and upper management as well as incentives applicable to all employees. Cross functional communication and teamwork were viewed as both issues and actions for implementing organizational incentives.

Other stakeholder groups recognized this issue as well. Representatives of accounting associations envisioned a role for their organizations in transforming prevailing mindsets from cost avoidance to revenue enhancement. Participants drawn from non-accounting professional associations and societies recommended a variety of actions that could promote organizational commitment to accounting and capital budgeting for environmental costs. For example, they recommended conducting benchmark studies of "best in class" companies that include environmental costs in their accounting and budgeting activities.

Demonstrating the added-value of knowing environmental costs is noted in several action agendas as a key activity for securing management commitment and aligning incentives. Showing successes -- defined largely as cost savings -- appears in most of the action agendas as a recommended activity. The non-accounting professional associations action agenda, for example, recommends development of a "world class" briefing on the issues and benefits of accounting for environmental costs and suggests that the EPA Administrator communicate with industry associations to promote organizational commitment.

External Incentives

Workshop participants identified a variety of potential external incentives, many of which can promote pollution prevention as well as environmental accounting. These include:

- Market-based environmental solutions such as pollution credits and emissions trading that require sound environmental cost information,
- Standardized environmental reporting of, for example, environmental cost information,
- "Safe Harbors" for disclosure of environmental liability estimates,
- Loans, investment tax credits, depreciation policies that could enhance the returns from environmental projects,
- Awards/recognition,

- Pollution prevention planning regulations with environmental accounting components, and
- Voluntary programs (e.g., Green Lights, 33/50, WasteWi$e, Design for the Environment).

The external incentives were viewed as important motivators for action. Business stakeholders tended to distinguish between positive external incentives and negative external incentives. Positive external incentives include market-based systems of pollution control and establishing level playing fields (e.g., reporting standards, Safe Harbors). The small business action agenda identifies several positive external incentives needed to encourage companies to remain in compliance or go beyond compliance. These include:

- loans,
- investment tax credits,
- depreciation policies,
- lender liability limits,
- consumer and community involvement, and
- recognition and publicity.

To address lack of incentives, the government action agenda recommends both positive incentives, such as partnerships and technical assistance programs, and negative incentives, such as taxes and regulations. Workshop participants reached no consensus about the latter suggestions.

(3) **Education, outreach, and guidance.**

A third major theme in the agendas for action is the development and dissemination of information through a variety of communications, outreach, and technical assistance channels. While incentives provide the motivation, information provides the know how. Case studies, success stories, clearinghouses, conferences, newsletters, bulletin boards, guidebooks, and training materials appear repeatedly in the action agendas. Workshop participants also viewed information dissemination as key to establishing incentives, such as top management commitment.

Stakeholder groups such as academia as well as trade and professional associations recommended that they can serve as major conduits for sharing information and as centers for developing case studies, guidance, and tools. Management consultants likewise saw themselves playing a significant role in education and technology transfer. The government's role in developing and continuing to support state technical and management assistance programs was seen as important in improving outreach.

Specific actions recommended in the action agendas include the following:

- Develop and deliver university and continuing professional education curricula,
- Disseminate success stories,

- Sponsor workshops to develop common environmental accounting language,
- Distribute training/technical assistance materials for small business,
- Develop topical conferences on accounting methodologies,
- Use association newsletters and magazines as media,
- Publicize electronic bulletin boards,
- Include management assistance in state pollution prevention Technical Assistance Programs,
- Conduct case studies and benchmarking to identify "Best Practices," and
- Publicize primers on pollution prevention.

Information dissemination needs can be grouped by intended audience. For example, to secure top management commitment in the business sector, participants recommended demonstrating the added-value of knowing environmental costs, showing successes, and developing a "world-class" briefing on the issues and benefits of accounting for environmental costs. The small business sector was identified as having a special need for guidance and technical assistance, including easy-to-read compendia of environmental regulations and user-friendly summaries of forthcoming regulations.

(4) Analytic tools, methods, and systems.

Participants saw the lack of necessary tools, methods, and systems as a fundamental issue. As noted above, there is a pressing need to disseminate information that can help motivate and provide know-how to account for environmental costs. However, there is an equally important need to *develop* (or modify existing) and *disseminate* analytic tools, methods, and systems. This fourth theme of the action agendas focuses on *developing* needed tools, methods, and systems. Examples include developing analytic tools and methods (e.g., models) for any of the following:

- estimating societal costs (externalities),
- estimating long-term environmental liabilities (non-externalities),
- creating flow charts of materials and activities that help identify waste reduction opportunities and serve as foundations for costing information,
- researching the relationship between pollution prevention and employee morale/productivity, and

- integrating environmental elements into existing management and accounting systems and capital budgeting processes.

Although this theme produced fewer action items compared to the three areas already discussed, recommended actions fall into the following four categories:

Systems

Participants saw a need for both information systems and what-might-be-termed implementation systems to incorporate environmental cost information into business decisions. A first suggested step was to determine information goals (e.g., toxics use reduction goals, profitability goals); then information system capabilities can be designed to support decisions and related to performance incentives. At the same time, participants identified a need to develop cross-disciplinary systems for performing organized reviews of materials flows and wastes, identifying cost drivers, exploring alternatives, setting targets, and tracking results. This can require the development of methods and metrics for measuring pollution prevention accomplishments and linking those results to information about costs and cost savings.

Liabilities

How to incorporate and recognize environmental liabilities in current operations and future decisions (apart from public reporting of liabilities) was an issue identified in different action agendas and plenary discussion. The business financial action agenda describes the need as how to incorporate long-term liability into profitability analysis of product lines and acquisitions. The business accounting group viewed liabilities as one of a group of "nonquantifiables" that they recommend for attention. Difficulties in distinguishing between liabilities due to past problems and liabilities arising in the future, and how to relate each to current decisions, pose issues recommended for further exploration.

Life Cycle Assessment and Costing.

A number of Workshop participants expressed interest in modifying existing life cycle assessment (LCA) methodologies to address environmental costs(life cycle costing, or LCC). Because as noted earlier, the term LCA sometimes refers to private costs and sometimes encompasses externalities (social costs), this recommendation seems to cover both approaches. Note, however, that the Workshop was intended to focus on private environmental costs of products and processes, not the full upstream and downstream externalities associated with business activity.

Externalities (Social Costs)

Although the Workshop was not intended to deal with externalities, the issue came up repeatedly, both in the action agendas and discussions. A number of participants viewed incorporating externalities as an important issue and recommended such actions as developing models to estimate societal costs and their probabilities. Other participants did not see this issue as germane or felt that such models were not feasible.

III.3 Summary of Action Agendas

Attachment A presents the action agendas developed by the 10 stakeholder groups in the order noted earlier. The agendas cover a broad range of issues from many perspectives and recommend a variety of next steps. The agendas include all of the issues and actions identified by the stakeholder working groups. This does not mean that every individual within each group necessarily agreed with every item; nor does it mean that the groups exhausted all possible issues and actions. Rather, the intent was to generate representative lists of important needs and recommended actions that stakeholders could adopt, adapt, and implement as they see fit.

The exhibits in Attachment A include:

(1) the issues and actions identified by the working group responsible for the particular stakeholder action agenda, as well as

(2) issues and actions deemed relevant to that stakeholder group by other working groups.

This section presents a summary of each of the individual stakeholder action agendas. For a discussion of the cross-cutting issues addressed in the agendas, see Section III.2.

Groups #1-4. Business Action Agendas

The business staff action agenda in Attachment A consolidates agendas developed by business financial, accounting, environmental health and safety, and operations stakeholders. Because the four business working groups identified needs common to the groups as well as unique needs, the four agendas have been consolidated under one heading, but retain the original integrity of the outputs from the four working groups.

As would be expected from different stakeholders within a business, certain issues, needs, and actions appear in more than one of the individual business stakeholder agendas:

- Incentives, for both management and employees,
- Cross-functional communications and teamwork,
- Tools for handling long-term liabilities and "externalities,"
- Sharing knowledge and experience,
- Defining information system needs,
- Determining best practices, and
- Clarifying terms and concepts.

Other items were identified in a single agenda; due to time limitations, none of the agendas should be viewed as exhaustive.

Group #1. Business Financial Staff. The first part of the Business Action Agenda presents the action agenda for financial staffs in the business community. The working group's premise was that financial information doesn't drive decisions but is one part of the decision-making process. The business financial staff's action agenda includes several research needs

relating to analytic tools and models, as well as curricula development. Internal and external incentives are also prominently featured.

Group #2. Business Accounting Staff. The second part of the Business Action Agenda shows the action agenda for accounting staffs in the business community. The business accounting staff working group emphasized the importance of overcoming inertia through management commitment, incentives, and information dissemination. The group identified a need to better define terminology (e.g., what are environmental costs) and identify a common body of knowledge.

Group #3. Business Environmental Health and Safety Staff. The third part of the Business Action Agenda displays the action agenda for environmental health and safety staffs in the business community. The environmental health and safety working group noted that, historically, environmental staffs were developed in response to compliance and/or Superfund issues, resulting in a narrow orientation. They recommended a broader or different perspective to focus on pollution prevention and the need to secure top management commitment for pollution prevention.

Group #4. Business Operations Staff. The last part of the Business Action Agenda comprises the action agenda for business operations staffs. The agenda focuses on internal incentives for both management and employees as well as research and evaluation of models and tools for providing environmental cost information to operations management. This group also highlighted the need for an organized system to accomplish waste reduction.

Group #5. Accounting Associations

Attachment A includes the action agenda for accounting associations, such as the following:

- Institute of Management Accountants (IMA),
- American Institute of Certified Public Accountants (AICPA),
- Financial Executives Institute (FEI),
- American Association of Accountants (AAA), and
- foreign counterpart organizations such as:
  - Canadian Institute of Chartered Accountants (CICA),
  - Chartered Association of Certified Accountants (CACA) (United Kingdom),
  - Chartered Institute of Management Accountants (CIMA) (United Kingdom),
  - Institute of Chartered Accountants of England and Wales (ICAEW), and

Society of Management Accountants of Canada (SMAC).

In addition to improving incentives and fostering more education and information sharing through conferences and continuing professional education, this group focused on specific actions for the accounting community such as incorporating environmental concerns into accounting codes of ethics and participating in standard-setting.

Group #6. Small Businesses

Attachment A shows the action agenda for the small business community. The working group looked at small businesses as units that need assistance due to lack of resources. The working group also took a larger perspective on environmental activities, beyond changes in accounting systems; it focused on "doing the right thing" for the environment in general. The recommended actions emphasize education, user-friendly guidance, and incentives. The group suggested that accounting and financial information should be part of a package of materials or assistance given to small business. Chambers of Commerce, Small Business Administration (SBA), Small Business Development Centers, government, and associations were all identified as potential sources of assistance.

Group #7. Non-Accounting Professional Associations and Societies

Attachment A presents the action agenda for non-accounting professional associations and societies. This stakeholder group can include such associations as the following:

AACE International (the Association for Total Cost Management),
Air & Waste Management Association (AWMA),
American Academy of Environmental Engineers (AAEE),
American Association of Engineering Societies (AAES),
American Institute of Chemical Engineers (AIChE),
American Institute of Plant Engineers (AIPE),
American Production Inventory Control Society (APICS),
American Society of Heating, Refrigeration, & Air Conditioning Engineers (ASHRAE),
American Society of Mechanical Engineers (ASME),
Institute of Electrical and Electronics Engineers (IEEE),
Institute of Industrial Engineers (IIE),
Project Management Association (PMA), and
Society of Logistics Engineers (SOLE)

This working group emphasized better understanding of terms and concepts, education and information dissemination activities, and focused research into models and systems; it explicitly identified a need to define objectives and roles for professional associations.

Group #8. Management Consultants

Attachment A contains the action agenda for management consultants, whose roles include the following:

- providing outside expertise to help customers solve problems,
- providing training and education,
- facilitating the free flow of information, and
- pollinating new ideas.

The action agenda stressed the need to clearly define public policy goals (e.g., through a written mission statement), to develop a common body of knowledge and language, and to foster education and outreach.

Group #9. Education and Research Community

Attachment A lists the action agenda for the education/research community (termed "academia"). The working group reported two main goals of education/research:

(1) Finding the truth, training better business managers, asking for better information, and publishing research results; and

(2) Broader "systems" thinking, and preparing and empowering students to influence the pace and degree of corporate change.

This group viewed business, government agencies, and trade associations as sources of both funding and data; academic research and curriculum development would be conducted by universities and research institutes.

Group #10. Government Agencies

Attachment A displays the action agenda of government stakeholders such as the EPA, Department of Commerce, Departments of Energy & Defense, Office of Management & Budget, the Congress, and state and regional counterpart organizations, notably State and regional pollution prevention technical assistance programs. The working group defined the challenge as getting government stakeholders to promote environmental cost accounting, and was based on the assumption that government can have a positive impact on companies' behavior. The action agenda emphasized incentives, resources, and outreach. The group also viewed environmental cost data as a potentially useful input for evaluating the effectiveness of regulations. Many participants in the Workshop endorsed the catalytic and facilitation roles that federal and state government agencies can play.

III.4 Additional Items Raised in Follow-Up Plenary Session

The presentation of the action agendas (see Attachment A) by the individual working groups stimulated much discussion in the plenary session. The specific points raised in the plenary session often underscored issues and actions included in the agendas. For example, participants reiterated the needs for:

- Corporate managers to change their philosophy to bring "green accounting" to mainstream corporate America,
- The private sector to take the initiative to make it happen, and
- Stakeholders to use a larger vision to motivate action

Participants also discussed several related issues and actions, without reaching overall consensus. Many of these are described below.

Costs. The plenary session comments addressed the costs of undertaking new accounting initiatives and the difficulty of optimizing the tradeoff between costs and benefits. Participants suggested that the newness of this topic makes it difficult to determine if environmental cost accounting is itself worth its cost. Participants discussed retrospective analysis of implemented projects as an approach to this issue, including the benefits and difficulties of such *post-facto* evaluations. Participants also discussed providing internships to work on these issues.

Data. Not much data for environmental cost benchmarking appears to currently be available. A number of companies are still endeavoring to identify environmental costs.

Future Liabilities. Workshop participants suggested that future liabilities be estimated and allocated to current operations, but also remarked that to improve decision-making in companies requires good management accounting systems, not solely environmental cost accounting systems. Further, there was some discussion of how to allocate to current operations the costs of future liabilities.

Life Cycle Costing. Participants recommended that existing life cycle cost models currently in wide use in the defense sector be evaluated for modification to highlight environmental costs. Several Workshop participants are actively engaged in life cycle costing and described relevant projects. In general, these life cycle costing projects focus from materials acquisition through disposal or decommissioning. They do not usually integrate a broader life cycle perspective where environmental costs of activities upstream from acquisition are also included.

Internalizing Externalities and Social Values. An issue raised during the Workshop was the desirability of expanding the basic internal business scorecard that drives all business decisions to incorporate environmental effects. Net profit to stockholders may not sufficiently recognize effects on workers, customers, neighbors, communities, and society.

External Reporting. Participants pointed to public reporting and the Public Environmental Reporting Initiative (PERI) guidelines as worthy of attention, while acknowledging that the Workshop was not intended to address financial/environmental reporting issues. External reporting was described as a powerful tool for highlighting environmental impacts. On the one hand, it can assure managers that the consequences of their decisions to allow or prevent pollution will be publicly disclosed and that, in many cases, they will be held responsible by senior management and colleagues in the company, stockholders, and the public. On the other hand, public reporting can empower citizen, community, public interest, and environmental groups with information needed to effectively engage business in addressing pollution.

Other Stakeholders. Workshop participants also suggested some additional stakeholder organizations to involve:

- Small Business Development Centers (SBDC), funded by the U.S. Small Business Administration, were described as an excellent vehicle to accomplish actions recommended for the small business community. The Association of SBDCs (ASBDC) has a national network that could be a useful way of educating and motivating SBDCs.

- The defense community has developed and used forward-looking cost models to assess such factors as reliability, support equipment, maintenance, and so on. Such models could be modified to demonstrate the life cycle cost of environmental decisions.

Concerns. Finally, several concerns were voiced. Many participants were leery of more government regulation, believing that to be an impediment to progress. The Financial Accounting Standards Board (FASB) model, where industry self-regulates, was viewed as preferable to the government's involvement in standard-setting for accounting. Other concerns included the view that accounting systems are not the problem because such systems can be flexible; rather, the focus should be on management. Concerns were raised about too narrow a definition of environmental costs, to the exclusion of environmental externalities, and, conversely, whether too broad a definition is desirable.

Workshop participants were told that they would have an opportunity to review and comment on the report of the Workshop prior to the publication of proceedings. All participants were sent a draft version of this Chapter III, and were contacted about comments. Comments received were compiled and incorporated in this chapter.

III.5 Next Steps

For more than a year, major stakeholder organizations have been working to develop an Action Agenda that would lead to improved management accounting and capital budgeting for environmental costs. This Stakeholders' Action Agenda, a compilation of ideas and recommendations, is the culmination of that effort. It is now time to begin implementing the many good ideas captured in the Agenda.

Everyone should see in the Agenda specific actions that they can pursue in the near, medium and long-term time frames. EPA is currently reviewing its options for implementing the Government Action Agenda and will make its efforts public.

Implementing the Action Agendas

As a facilitator, EPA is committed to helping stakeholders implement this Action Agenda and share information. If you and your organization would like to participate in implementing one or more recommendations in the Agenda, undertake any other activities to promote improved accounting and capital budgeting, or inform colleagues about available resources and publications, EPA will be pleased to communicate this information. The Agency is also interested in exploring cooperative efforts to implement the Agenda. Whether you represent a company, academia,

government, an advocacy group, a professional or trade organization, or any other organization, all of the Workshop co-sponsors and attendees encourage you to get involved.

If you are currently implementing or plan to implement any facet of the Action Agenda, please complete EPA's revised Accounting Network membership form. The Agency will be using the Network forms for tracking commitments to implement the Action Agenda and collecting resource information. Additional Network forms may be obtained from EPA's Pollution Prevention Information Clearinghouse (PPIC). Contact the PPIC at (202) 260-1023 or write:

PPIC
U.S. EPA Headquarters Library
401 M Street, S.W. (3404)
Washington, D.C. 20460
FAX (202) 260-0178

If you are interested in discussing cooperative efforts to implement the Agenda, please contact Dr. Martin A. Spitzer or Holly Elwood in EPA's Office of Pollution Prevention and Toxics at:

U.S. Environmental Protection Agency
Pollution Prevention Division (7409)
401 M Street, S.W.
Washington, D.C. 20460
(202) 260-4164

For information about EPA's Design for the Environment, Management Accounting and Capital Budgeting for Environmental Costs Program, to join EPA's environmental accounting Network, or to learn about available resources on management accounting and capital budgeting for environmental costs, please contact PPIC at the above address.

ATTACHMENT A

STAKEHOLDERS' ACTION AGENDA

HOW TO USE ATTACHMENT A

The overall Stakeholders' Action Agenda is comprised of ten mini stakeholder action agendas. The agendas were developed by ten separate working groups. Attachment A presents these action agendas. Note that the four business stakeholders agendas have been grouped together under the heading of Business Action Agendas. The individual agendas appear in the following order:

1-4. Business Action Agendas
   1. Business Financial
   2. Business Accounting
   3. Business Environmental Safety and Health
   4. Business Operations

5. Accounting Associations Action Agenda
6. Small Business Action Agenda
7. Non-Accounting Professional Associations Action Agenda
8. Management Consultants Action Agenda
9. Education and Research Community Action Agenda
10. Government Agencies Action Agenda

The Action Agendas include:

(1) the issues and actions identified by the working group responsible for the particular stakeholder action agenda, as well as

(2) issues and actions deemed relevant to that stakeholder group by other working groups.

Each recommendation in the action agendas is numbered according to the stakeholder group that developed it, in the order it was presented to the plenary session. Where an item has been appended to a stakeholder agenda by another group, it retains the identifying number of the originating group. For example, all recommendations developed by the Accounting Associations work group (Group 5) start with the number "5;" because their recommendation 5.3.A (Continuing professional education) applied also to academia (Group 9), it is also appended to Group 9's action agenda but retains the "5.3.A" identifier. Recommendations by one group for actions by another highlight that success depends on collaboration and teamwork.

This does not mean that every individual within each group necessarily agreed with every item; nor does it mean that the groups exhausted all possible issues and actions. Rather, the intent was to generate representative lists of important needs and recommended actions that stakeholders could adopt, adapt, and implement. Occasional blank spaces in the agendas, particularly in recommended time frames, indicate that a working group ran short of time.

Issue	Actions	Who Else to Involve	Time Frame
1. BUSINESS FINANCIAL STAFF: WORKSHOP ACTION AGENDA			
1.1 Are we asking the right questions about environmental impacts and their effects on cashflow estimates and business decisions?	1.1.A Develop appropriate models	Academia, professional associations, continuing education programs, consultants	Near- to medium-term
	1.1.B Include in business management curricula	Academia	Near- to long-term
	1.1.C Look at best practices through case studies and benchmarking	Industry groups, government agencies and EPA clearinghouse	Near-term
1.2 Incentives need to be developed to incorporate environmental factors	1.2.A Develop market-based solutions such as tax credits, emissions trading, pollution credits	EPA and State agencies	Long-term
	1.2.B Tie to existing internal systems (promotion, quality systems)	Champions in top management	Ongoing
1.3 How to Build-In Cost of Externalities (Social Costs)	1.3.A Develop models to estimate societal costs and probabilities	Academia	
	1.3.B Formalize means of consideration in firms	Companies' financial staffs	Near-term
1.4 How to incorporate long-term liability into profitability analysis of product lines, acquisitions, etc.	1.4.A Perform long-term liability assessments	Financial, legal, insurance, environmental health and safety, and technical staff, plus actuaries as needed	
	1.4.B Take actions to minimize liabilities	Individual businesses	
1.5 Different assumptions about future risk held by government and industry	1.5.A Reconcile different assumptions through Risk Arbitration Board	Neutral parties	

Issue	Actions	Who Else to Involve	Time Frame
2. BUSINESS ACCOUNTING STAFF: WORKSHOP ACTION AGENDA			
2.1 Overcome Inertia (Management Commitment and Incentives)	2.1.A Demonstrate value-added of knowing environmental costs (e.g., show environmental cost savings = profits) 2.1.B Show successes (cost savings) 2.1.C Establish incentives for controlling environmental costs	Company management Also a role for industry trade associations	Near- to medium-term
2.2 Communications and Teamwork	2.2.A Foster regular cross-functional communication 2.2.B Develop strategy groups 2.2.C Use education and training to "knock down walls"	Company management, operations, engineering, R&D, EH&S, finance, legal, and accounting	Ongoing and near- to medium-term
2.3 Identify cost drivers	2.3.A Define environmental costs	Professional associations (e.g., IMA, AAA, AIChE)	Near-term (0-2 yrs) and ongoing
	2.3.B Use cross-functional teams to examine technologies, processes, and regulations	Company management, operations, engineering, R&D, EH&S, financing, legal, accounting, trade and professional associations, academia	Near-term (0-2 yrs) and ongoing
2.4 Information systems (data must be meaningful, flexible, timely, and readily available)	2.4.A Determine decision support information needs	Company management, operations, engineering, R&D, EH&S, finance, legal, and accounting	Near-term (0-2 yrs) and ongoing
	2.4.B Define system capabilities and data requirements to support – decisions – performance incentives		Medium-term (3-5 yrs) and ongoing

Issue	Actions	Who Else to Involve	Time Frame
2. BUSINESS ACCOUNTING STAFF: WORKSHOP ACTION AGENDA (continued)			
2.5 Best Practices	2.5.A Identify key learnings (common body of knowledge) 2.5.B Share knowledge and experience	Trade and professional associations, company management	Medium- to long-term
2.6 Nonquantifiables (externalities, liability, contingencies, future risk)	2.6.A Determine appropriate next steps (if any)	Academia, management consultants, trade and professional associations	Medium- to long-term
3. BUSINESS ENVIRONMENTAL HEALTH & SAFETY STAFF: WORKSHOP ACTION AGENDA			
3.1 Performance Measurement	3.1.A Build incentives 3.1.B Reduce disincentives 3.1.C Develop goals and measures	Top management, government	Near-term (0-2 yrs)
3.2 Identify and Track Costs	3.2.A Track costs – cost savings of doing it right the first time (cost of quality) – costs saved through compliance 3.2.B Record 3.2.C Deal with issues	Accounting staff	Near-term
3.3 Cross-Functional Communication	3.3.A Stockholders vs. stakeholders 3.3.B Build understanding 3.3.C Training 3.3.D Rotation of personnel 3.3.E Focus Teams 3.3.F Communication	Management, consultants, academia	Medium-term (2-4 yrs)

Issue	Actions	Who Else to Involve	Time Frame
3. BUSINESS ENVIRONMENTAL HEALTH & SAFETY STAFF: WORKSHOP ACTION AGENDA (continued)			
3.4 Process Understanding	3.4.A Determine decision support information needs for making trade-off choices	Government, academia	Medium-term
3.5 Process Tracking	3.5.A Methods of tracking and reporting – Develop Models ~ Business School Models ~ Best Practices Models	Government, academia	Medium-term
3.6 Process Change	3.6.A Determine appropriate next steps (if any)		
3.7 Competitive disincentive/ disclosure liability	3.7.A Establish level playing field 3.7.B Promote proactive environmental actions as value-added to ~ stockholders ~ customers ~ employees 3.7.C Standardize environmental annual reports (e.g., report negatives)		
3.8 Tools	3.8.A Identify tools that are being used or that could be used	Accounting associations, professional associations	
	3.8.B Express tools in language of the user		
	3.8.C Collect and disseminate information		

Issue	Actions	Who Else to Involve	Time Frame
4. BUSINESS OPERATIONS STAFF: WORKSHOP ACTION AGENDA			
4.1 Incentives for operations management (middle management) Performance Measurement	4.1.A Provide specific internal incentives for middle and upper management, such as – specific rewards for achieving environmental goals – include environmental goals in business unit goals	Senior management	Medium-term
	4.1.B Provide incentives for all employees, such as – employee suggestion program – information about what works (e.g., newsletters)	Senior/middle management	
4.2 Process and tools to provide environmental cost information to operations management	4.2.A Compile case studies and models	EPA	Near- to mid-term (< 2 yrs)
	4.2.B Identify strengths and weaknesses of existing models	Companies and academia	
	4.2.C Evaluate and implement	Companies	
4.3 Perform organized review of materials flows and wastes and explore alternatives	4.3.A Set goal to reduce waste 4.3.B Establish mechanism to measure performance and accomplish goal 4.3.C Study work processes (e.g., flowcharts) to identify waste reduction opportunities 4.3.D Benchmark with other plants/ organizations	Plant managers and staff	Ongoing

Issue	Actions	Who Else to Involve	Time Frame
5.1 Role of Accounting Association	5.1.A Review codes of ethics to incorporate environmental concerns	IMA, AICPA, FEI, AAA, CACA (UK), CICA (Canada), CIMA (UK), ICAEW (Int'l), SMAC (Canada)	Long-term
	5.1.B Identify opportunities for improvement in tax/ environmental policy to encourage P2	Same	Medium-term
	5.1.C Facilitate communication and networking among domestic and international accounting associations	Same	Short- to medium-term
	5.1.D Selective participation in standard-setting activities (ISO, ANSI, CSA, etc.)	Same, plus Cost Accounting Standards Board (CASB)	
5.2 Obtain top management commitment	5.2.A Transform mind-set from cost avoidance to revenue enhancement 5.2.B Incorporate environmental concerns into everyone's job description 5.2.C Develop general standards and guidelines	FEI, IMA, AICPA, AAA, CACA (UK), CICA (Canada), CIMA (UK), ICAEW (Int'l), SMAC (Canada), CASB	Short-term
5.3 Communications	5.3.A Continuing education – developing courses – case studies – research – longitudinal studies – writing – speaking	AICPA, IMA, Academia	Near-term

Issue	Actions	Who Else to Involve	Time Frame
5.3 Communications (continued)	5.3.B Information sharing – newsletters – journals – examples of successes		Near- to medium-term
	5.3.C Interface with Academic Community – formal journals more receptive to environmental articles – exchange of information with accounting associations to be translated into the practice community	AAA, AICPA, IMA, and international accounting organizations	Near- to medium-term
1.1 Are we asking the right questions about environmental impacts and their effects on cashflow estimates and business decisions?	1.1.A Develop appropriate models	Academia, professional associations, continuing education programs, consultants	Short- to medium-term
2.3 Identify cost drivers	2.3.A Define environmental costs	Professional associations (e.g., IMA, AAA, AIChE)	Near-term (0-2 yrs) and ongoing
2.5 Best Practices	2.5.A Identify key learnings (common body of knowledge) 2.5.B Share knowledge and experience	Trade and professional associations, company management	Medium- to long-term
2.6 Nonquantifiables (externalities, liability, contingencies, future risk)	2.6.A Determine appropriate next steps (if any)	Academia, management consultants, trade and professional associations	Medium- to long-term

Issue	Actions	Who Else to Involve	Time Frame
3.8 Tools	3.8.A Identify tools that are being used or that could be used	Accounting associations, professional associations	
	3.8.B Express tools in language of the user		
	3.8.C Collect and disseminate information		
7.2 Develop education/information initiatives among government and industry	7.2.C Survey association membership about needs and successes with including environmental costs in decisions	Associations	Near-term (0-2 yrs)
7.4 Define environmental accounting objectives and roles for professional associations	7.4.A Develop and publicize an inventory of association activities relating to environmental issues in accounting	EPA to facilitate, associations	Near-term (0-2 yrs)
	7.4.B Develop own agendas for environmental accounting (including activities at state and local levels)	Associations	Near-term (0-2 yrs)
	7.4.C Utilize networks for disseminating information and advertising pertinent events		

Issue	Actions	Who Else to Involve	Time Frame
8.1 Clearly defined public policy including – industry goals – pollution prevention/market-based compliance – consistency among regulatory bodies	8.1.A Facilitate interaction among government agencies, professional associations, industry/trade associations 8.1.B Create a consensus on public policy and goals 8.1.C Write a mission statement	EPA, DOE, DoD, OMB, IRS, professional associations, trade associations	Near-term and ongoing.
8.2 Need a common body of knowledge including – language – standards – methodologies	8.2.A Hold workshop to develop common environmental accounting language 8.2.B Develop, consolidate, and publicize electronic bulletin board	Professional associations, academia, EPA	Near-term
	8.2.C Standards-setting agencies should involve cross-section of stakeholders	Industry associations, professional associations, academia	Naer-term and ongoing
9.1 Research	9.1.A Identify barriers to obtaining cost data	Universities, research organizations, trade associations, government agencies, industry, consultants	Near-term
9.2 Curriculum development and delivery	9.2.A Establish networks and clearinghouses of educators/ users of TCA 9.2.B Write and contribute problems, case studies, and chapters illustrating TCA	Universities, other educational institutions, associations, government agencies, consultants industry associations, professional associations, academia	Long-term

Issue	Actions	Who Else to Involve	Time Frame
9.2 Curriculum development and delivery (continued)	9.2.C Write up research results and incorporate in curriculum materials 9.2.D Market materials to educators/ associations		

Issue	Actions	Who Else to Involve	Time Frame
6.1 Encourage businesses to act through partnerships to stay in compliance and go beyond compliance	6.1.A Readable compliance guide	EPA/States	Near-term
	6.1.B Create awareness of technical assistance for compliance	Chamber of Commerce, SBA, SBDCs, NIST, trade associations	Ongoing and near-term
	6.1.C Future Regulations guidebook	EPA/States	Medium-term
	6.1.D Educate small business about the benefits of waste minimization and pollution prevention	Business associations (e.g., Massachusetts Association of Businesses) and Small Business Development Centers (SBDC)	1-1 ½ years to develop a standard program
	6.1.E Create references such as bulletin boards		
	6.1.F Expand awareness of technical options/solutions		
	6.1.G Develop curriculum including "Train the Trainer" package(s)	Chamber of Commerce, NIST, SBA, SBDC	Near-term (1-2 yrs)
	6.1.H Develop trust - Outreach - Trust building - Sales programs	EPA, SBA, Chamber of Commerce, business and professional associations, SBDC	1-2 years and ongoing
6.2 Incentives	6.2.A Loans 6.2.B Investment tax credits 6.2.C Depreciation policies 6.2.D Limit lender liability 6.2.E Involve consumers	SBA, banks, IRS, states, SBDC, SCORE, economic development organizations, news media, chambers of commerce	Medium-term (1-3 yrs)

Issue	Actions	Who Else to Involve	Time Frame
6.2 Incentives (continued)	6.2.F Inform and involve community 6.2.G Recognize "good" companies 6.2.H Publicize individual contributions		

7. NON-ACCOUNTING PROFESSIONAL AND TRADE ASSOCIATIONS: WORKSHOP ACTION AGENDA

Issue	Actions	Who Else to Involve	Time Frame
7.1 Promote organizational commitment to accounting and capital budgeting for environmental costs	7.1.A EPA Administrator to communicate to management of industry associations	EPA	Near-term (0-2 yrs)
	7.1.B Develop a world class briefing on the issues and benefits of accounting for environmental costs	EPA	Near-term (0-2 yrs)
	7.1.C Conduct benchmark studies of "best in class" companies which include environmental costs in their accounting and budgeting activities		Near-term (0-2 yrs)
7.2 Develop education/information initiatives among government and industry	7.2.A Develop and disseminate success stories	Government	Near-term (0-2 yrs)
	7.2.B Develop topical conferences for associations		Ongoing
	7.2.C Survey association membership about needs and successes with including environmental costs in decisions	Associations	Near-term (0-2 yrs)
	7.2.D Utilize association newsletters and magazines to promote information transfer		Near-term and ongoing
	7.2.E Write summaries of conclusions and action items for association publications to promote workshop ideas	Workshop attendees	Very near-term (0-1 yr)

7. NON-ACCOUNTING PROFESSIONAL AND TRADE ASSOCIATIONS: WORKSHOP ACTION AGENDA (continued)

Issue	Actions	Who Else to Involve	Time Frame
7.2 Develop education/information initiatives among government and industry (continued)	7.2.F Prepare training/technical assistance modules for small businesses (building on existing information)		Medium-term (2-5 yrs)
	7.2.G Share widely information on systematic approaches (e.g., ABC accounting, life cycle costing) for identification and compilation of environmental costs		Near-term (0-2 yrs)
	7.2.H Develop partnerships with Manufacturing Technology Centers (MTC) and Small Business Development Centers (SBDC)		
	7.2.I Develop primers on pollution prevention	Associations	
7.3 Develop better understanding and application of accounting methods and metrics	7.3.A Survey literature and public information about current methods and metrics 7.3.B Promote understanding of cross-discipline terms		Near-term (0-2 yrs)
	7.3.C Develop a clear understanding of environmental costs (including hidden costs)	AACE Int'l, academia	
	7.3.D Research capital budget payback models for inclusion of environmental costs/benefits	Academia	

7. NON-ACCOUNTING PROFESSIONAL AND TRADE ASSOCIATIONS: WORKSHOP ACTION AGENDA (continued)

Issue	Actions	Who Else to Involve	Time Frame
7.3 Develop better understanding and application of accounting methods and metrics (continued)	7.3.E Develop cross-disciplinary, systematic approach to economic evaluation of environmental projects, including how to identify and collect cost information	AACE Int'l, IIE	Near-term (0-2 yrs)
7.4 Define environmental accounting objectives and roles for professional associations	7.4.A Develop and publicize an inventory of association activities relating to environmental issues in accounting	EPA to facilitate, associations	Near-term (0-2 yrs)
	7.4.B Develop own agendas for environmental accounting (including activities at state and local levels)	Associations	Near-term (0-2 yrs)
	7.4.C Utilize networks for disseminating information and advertising pertinent events	All parties	Near-term (0-2 yrs)
1.1 Are we asking the right questions about environmental impacts and their effects on cashflow estimates and business decisions?	1.1.A Develop appropriate models	Academia, professional associations, continuing education programs, consultants	Near- to medium-term
	1.1.C Look at best practices through case studies and benchmarking	Industry groups, government agencies, EPA clearinghouse	
2.1 Overcome Inertia (Management Commitment and Incentives)	2.1.A Demonstrate value-added of knowing environmental costs (e.g., show environmental cost savings = profits) 2.1.B Show successes (cost savings)	Company management Also a role for industry trade associations	Near- to medium-term

7. NON-ACCOUNTING PROFESSIONAL AND TRADE ASSOCIATIONS: WORKSHOP ACTION AGENDA (continued)

Issue	Actions	Who Else to Involve	Time Frame
2.3 Identify cost drivers	2.3.A Define environmental costs	Professional associations (e.g., IMA, AAA, AIChe)	Near-term (0-2 yrs) and ongoing
	2.3.B Use cross-functional teams to examine technologies, processes, and regulations	Company management, operations, engineering, R&D, EH&S, finance, legal, accounting, trade and professional associations, academia	Near-term (0-2 yrs) and ongoing
2.5 Best Practices	2.5.A Identify key learnings (common body of knowledge) 2.5.B Share knowledge and experience	Trade and professional associations, company management	Medium- to long-term
2.6 Nonquantifiables (externalities, liability, contingencies, future risk)	2.6.A Determine appropriate next steps (if any)	Academia, management consultants, trade and professional associations	Medium- to long-term
3.8 Tools	3.8.A Identify tools that are being used or that could be used	Accounting associations, professional associations	
	3.8.B Express tools in language of the user		
	3.8.C Collect and disseminate information		
6.1 Encourage businesses to act through partnerships to stay in compliance and go beyond compliance	6.1.B Create awareness of technical assistance for compliance	Chamber of Commerce, SBA, NIST, trade associations	Near-term and ongoing
	6.1.D Explain why to do waste minimization and pollution prevention	Business associations (e.g., Massachusetts Association of Businesses)	1-1 ½ years to develop a standard program

7. NON-ACCOUNTING PROFESSIONAL AND TRADE ASSOCIATIONS: WORKSHOP ACTION AGENDA (continued)

Issue	Actions	Who Else to Involve	Time Frame
6.1 Encourage businesses to act through partnerships to stay in compliance and go beyond compliance (continued)	6.1.E Create references such as bulletin boards		
	6.1.F Expand awareness of technical options/solutions		
	6.1.G Develop curriculum including "Train the Trainer" package(s)	Chamber of Commerce, NIST, SBA	Near-term (1-2 yrs)
	6.1.H Develop trust – Outreach – Trust building – Sales programs	EPA, SBA, Chamber of Commerce, business and professional associations, SBDC	1-2 years and ongoing
8.1 Clearly defined public policy including – industry goals – pollution prevention/market-based compliance – consistency among regulatory bodies	8.1.A Facilitate interaction among government agencies, professional associations, industry/trade associations 8.1.B Create a consensus on public policy and goals 8.1.C Write a mission statement	EPA, DOE, DoD, OMB, IRS, professional associations, trade associations	Near-term and ongoing
8.2 Need a common body of knowledge including – language – standards – methodologies	8.2.A Hold workshop to develop common environmental accounting language 8.2.B Develop and publicize electronic bulletin board	Professional associations, academia	Near-term

7. NON-ACCOUNTING PROFESSIONAL AND TRADE ASSOCIATIONS: WORKSHOP ACTION AGENDA (continued)

Issue	Actions	Who Else to Involve	Time Frame
8.2 Need a common body of knowledge including – language – standards – methodologies (continued)	8.2.C Standards-setting agencies should involve cross-section of stakeholders	Industry associations, professional associations, academia	Near-term and ongoing
	8.2.D Host workshops to develop accounting methodologies	American Institute of Pollution Prevention, academia, EPA	Medium-term
9.1 Research	9.1.A Identify barriers to obtaining cost data	Universities, research organizations, trade associations, government agencies, industry, consultants	Near-term
9.2 Curriculum development and delivery	9.2.A Establish networks and clearinghouses of educators/ users of TCA	Universities, other educational institutions, associations, government agencies, consultants	Long-term
	9.2.B Write and contribute problems, case studies, and chapters illustrating TCA	Industry associations, professional associations, academia	
	9.2.C Write up research results and incorporate in curriculum materials		
	9.2.D Market materials to educators/ associations		
10.3 Lack of incentives	10.3 Set up partnership to administer an awards program (e.g., Baldrige Awards)	EPA, DOC, and industry (e.g., Chamber of Commerce)	Medium-term

Issue	Actions	Who Else to Involve	Time Frame
8.1 Clearly defined public policy including – industry goals – pollution prevention/market-based compliance – consistency among regulatory bodies	8.1.A Facilitate interaction among government agencies, professional associations, industry/trade associations 8.1.B Create a consensus on public policy and goals 8.1.C Write a mission statement	EPA, DOE, DoD, OMB, IRS, professional associations, trade associations	Near-term and ongoing
8.2 Need a common body of knowledge including – language – standards – methodologies	8.2.A Hold workshop to develop common environmental accounting language 8.2.B Develop, consolidate, and publicize electronic bulletin board	Professional associations, academia	Near-term
	8.2.C Standards-setting agencies should involve cross-section of stakeholders	Industry associations, professional associations, academia	Near-term and ongoing
	8.2.D Host workshops to develop accounting methodologies	American Institute of Pollution Prevention, academia, EPA	Medium-term
8.3 Improve access to common data, both industry and government data	8.3.A Expand the scope and distribution of existing data – Electronic bulletin boards – Newsletters with successes/failures – Libraries/guidance documents	EPA Clearinghouse	Near-term
1.1 Are we asking the right questions about environmental impacts and their effects on cashflow estimates and business decisions?	1.1.A Develop appropriate models	Academia, professional associations, continuing education programs, consultants	Near- to medium-term

Issue	Actions	Who Else to Involve	Time Frame
2.6 Nonquantifiables (externalities, liability, contingencies, future risk)	2.6.A Determine appropriate next steps (if any)	Academia, management consultants, trade and professional associations	Medium- to long-term
3.3 Cross-Functional Communication	3.3.A Stockholders vs. stakeholders 3.3.B Build understanding 3.3.C Training 3.3.D Rotation of personnel 3.3.E Focus Teams 3.3.F Communication	Management, consultants, academia	Medium-term (2-4 yrs)
9.1 Research	9.1.A Identify barriers to obtaining cost data	Universities, research organizations, trade associations, government agencies, industry, consultants	Near-term
9.2 Curriculum development and delivery	9.2.A Establish networks and clearinghouses of educators/ users of TCA 9.2.B Write and contribute problems, case studies, and chapters illustrating TCA 9.2.C Write up research results and incorporate in curriculum materials 9.2.D Market materials to educators/ associations	Universities, other educational institutions, government agencies, consultants, industry associations, professional associations, academia	Long-term

Issue	Actions	Who Else to Involve	Time Frame
9.1 Research	9.1.A Identify barriers to obtaining cost data	Universities, research organizations, trade associations, government agencies, industry, consultants	Near-term
	9.1.B Use TCA data to explore relationships between pollution prevention and business indicators, including morale and productivity	Universities, industry, research organizations	
	9.1.C Research on green marketing, such as - willingness-to-pay - sales of waste product	Universities, industry (as sellers and consumers), consumers (as subjects)	
	9.1.D Study how much pollution prevention will be implemented using TCA	Universities, government agencies	Medium-term
	9.1.E Improve TCA methodologies for estimating future costs/benefits	Universities, industry, research organizations, government agencies	Medium-term
9.2 Curriculum development and delivery	9.2.A Establish networks and clearinghouses of educators/ users of TCA 9.2.B Write and contribute problems, case studies, and chapters illustrating TCA 9.2.C Write up research results and incorporate in curriculum materials 9.2.D Market materials to educators/ associations	Universities, other educational institutions, government agencies, consultants, industry associations, professional associations, academia	Long-term

Issue	Actions	Who Else to Involve	Time Frame
1.1 Are we asking the right questions about environmental impacts and their effects on cashflow estimates and business decisions?	1.1.A Develop appropriate models	Academia, professional associations, continuing education programs, consultants	Near- to medium-term
	1.1.B Include in business management curricula	Academia	
1.3 How to Build-In Cost of Externalities (Social Costs)	1.3.A Develop models to estimate societal costs and probabilities	Academia	
2.3 Identify cost drivers	2.3.B Use cross-functional teams to examine technologies, processes, and regulations	Company management, operations, engineering, R&D, EH&S, finance, legal, accounting, trade and professional associations, academia	Near-term (0-2 yrs) and ongoing
2.6 Nonquantifiables (externalities, liability, contingencies, future risk)	2.6.A Determine appropriate next steps (if any)	Academia, management consultants, trade and professional associations	Medium- to long-term
3.3 Cross-Functional Communication	3.3.A Stockholders vs. stakeholders 3.3.B Build understanding 3.3.C Training 3.3.D Rotation of personnel 3.3.E Focus Teams 3.3.F Communication	Management, consultants, academia	Medium-term (2-4 yrs)

Issue	Actions	Who Else to Involve	Time Frame
3.4 Process Understanding	3.4.A Determine decision support information needs for making trade-off choices	Government, academia	Medium-term
3.5 Process Tracking	3.5.A Methods of tracking and reporting – Develop Models ~ Business School Models ~ Best Practices Models	Government, academia	Medium-term
4.2 Process and tools to provide environmental cost information to operations management	4.2.B Identify strengths and weaknesses of existing models	Companies and academia	Short- to mid-term (< 2 yrs)
5.3 Communications	5.3.A Continuing education – developing courses – case studies – research – longitudinal studies – writing – speaking	AICPA, IMA, academia	Near-term
7.3 Develop better understanding and application of accounting methods and metrics	7.3.C Develop a clear understanding of environmental costs (including hidden costs)	AACE Int'l, academia	
	7.3.D Research capital budget payback models for inclusion of environmental costs/benefits	Academia	

Issue	Actions	Who Else to Involve	Time Frame
8.2 Need a common body of knowledge including – language – standards – methodologies	8.2.A Hold workshop to develop common environmental accounting language	Professional associations, academia	Near-term
	8.2.B Develop and publicize electronic bulletin board		
	8.2.C Standards-setting agencies should involve cross-section of stakeholders	Industry associations, professional associations, academia	Near-term
	8.2.D Host workshops to develop accounting methodologies	American Institute of Pollution Prevention, academia, EPA	Medium-term

Issue	Actions	Who Else to Involve	Time Frame
10.1 Lack of models	10.1.A Create a standard for environmental cost accounting for larger government contractors, including – identification – measurement – allocation	EPA, OMB, CASB, DCAA	Near-term
10.2 Lack of expertise	10.2.A Provide support to state TAPs to expand services to include management assistance – funding – clearinghouse (PPIC) – evaluation of existing programs	EPA	Medium-term
10.3 Lack of incentives	10.3.A Set up partnership to administer an awards program (e.g., Baldridge Awards)	EPA, DOC, and industry (e.g., Chamber of Commerce)	Medium-term
	10.3.B Enact national pollution prevention facility planning law to promote process-level facility analysis, including environmental cost accounting	EPA, environmental groups, other stakeholders	Medium- to long-term
	10.3.C Establish voluntary "Green Accounting Program" analogous to "Green Lights" and 33/50	EPA	Medium-term

Issue	Actions	Who Else to Involve	Time Frame
10.4 Regulatory burden	10.4.A Evaluate effectiveness of environmental regulation based on costs to businesses and benefits to society; use environmental cost accounting systems at companies to develop data	EPA	Medium-term
10.5 Fear of liability assessment	10.5.A Establish "Safe Harbor" program for estimating liabilities without penalty for financial disclosure	EPA, SEC, Congress	Long-term
10.6 Lack of coordination	10.6.A Continue EPA's facilitation role	EPA	Near-term
10.7 Lack of visibility/credibility	10.7.A Publish high level report on environmental cost accounting – establish state-of-the-art – vision for future	Blue Ribbon Panel including CEOs, CFOs, and top government administrators	Near- to medium-term
10.8 Lack of funding	10.8.A Propose "green taxes" as both a funding mechanism and a behavioral change incentive – Identify benefits, what to tax, and how	Environmental agencies, state legislators	Medium-term
10.9 Insufficient outreach	10.9.A Develop/continue state technical and management assistance programs	EPA and states, intergovernmental organizations, National Roundtable	Ongoing
1.1 Are we asking the right questions about environmental impacts and their effects on cashflow estimates and business decisions?	1.1.C Look at best practices through case studies and benchmarking	Industry groups, government agencies, EPA clearinghouse	

Issue	Actions	Who Else to Involve	Time Frame
1.2 Incentives need to be developed to incorporate environmental factors	1.2.A Develop market-based solutions such as tax credits, emissions trading, pollution credits	EPA and State agencies	Long-term
3.1 Performance Measurement	3.1.A Build incentives	Top management, government	Near-term (0-2 yrs)
	3.1.B Reduce disincentives		
	3.1.C Develop goals and measures		
3.4 Process Understanding	3.4.A Determine decision support information needs for making trade-off choices	Government, academia	Medium-term
3.5 Process Tracking	3.5.A Methods of tracking and reporting - Develop Models ~ Business School Models ~ Best Practices Models	Government, academia	Medium-term
4.2 Process and tools to provide environmental cost information to operations management	4.2.A Compile case studies and models	EPA	Near- to medium-term (< 2 yrs)
6.1 Encourage businesses to act through partnerships to stay in compliance and go beyond compliance	6.1.A Readable compliance guide	EPA/States	Near-term
	6.1.B Create awareness of technical assistance for compliance	Chamber of Commerce, SBA, NIST, trade associations	Near-term and ongoing
	6.1.C Future Regulations guidebook	EPA/States	Medium-term

Issue	Actions	Who Else to Involve	Time Frame
6.1 Encourage businesses to act through partnerships to stay in compliance and go beyond compliance (continued)	6.1.G Develop curriculum including "Train the Trainer" package(s)	Chamber of Commerce, NIST, SBA	Near-term (1-2 yrs)
	6.1.H Develop trust – Outreach – Trust building – Sales programs	EPA, SBA, Chamber of Commerce, business and professional associations	1-2 years and ongoing
7.1 Promote organizational commitment to accounting and capital budgeting for environmental costs	7.1.A EPA Administrator to communicate to management of industry associations	EPA	Near-term (0-2 yrs)
	7.1.B Develop a world class briefing on the issues and benefits of accounting for environmental costs	EPA	Near-term (0-2 yrs)
7.2 Develop education/information initiatives among government and industry	7.2.A Develop and disseminate success stories	Government	Near-term (0-2 yrs)
7.4 Define environmental accounting objectives and roles for professional associations	7.4.A Develop and publicize an inventory of association activities relating to environmental issues in accounting	EPA to facilitate, associations	Near-term (0-2 yrs)
8.1 Clearly defined public policy including – industry goals – pollution prevention/market-based compliance – consistency among regulatory bodies	8.1.A Facilitate interaction among government agencies, professional associations, industry/trade associations 8.1.B Create a consensus on public policy and goals 8.1.C Write a mission statement	EPA, DOE, DoD, OMB, IRS, professional associations, trade associations	Near-term and ongoing

Issue	Actions	Who Else to Involve	Time Frame
8.2 Need a common body of knowledge including – language – standards – methodologies	8.2.D Host workshops to develop accounting methodologies	American Institute of Pollution Prevention, academia, EPA	Medium-term
8.3 Improve access to common data, both industry and government data	8.3.A Expand the scope and distribution of existing data – Electronic bulletin boards – Newsletters with successes/ failures – Libraries/guidance documents	EPA Clearinghouse	Near-term
9.1 Research	9.1.A Identify barriers to obtaining cost data	Universities, research organizations, trade associations, government agencies, industry, consultants	Near-term
	9.1.D Study how much pollution prevention will be implemented using TCA	Universities, government agencies	Medium-term
	9.1.E Improve TCA methodologies for estimating future costs/benefits	Universities, industry, research organizations, government agencies	Medium-term
9.2 Curriculum development and delivery	9.2.A Establish networks and clearinghouses of educators/ users of TCA 9.2.B Write and contribute problems, case studies, and chapters illustrating TCA	Universities, other educational institutions, government agencies, consultants, industry associations, professional associations, academia	Long-term

Issue	Actions	Who Else to Involve	Time Frame
9.2 Curriculum development and delivery (continued)	9.2.C Write up research results and incorporate in curriculum materials 9.2.D Market materials to educators/ associations		

ATTACHMENT B

TABLE OF ACRONYMS

AAA	American Association of Accountants
AACE International	The Association for Total Cost Management
AAES	American Association of Engineering Societies
AAEE	American Academy of Environmental Engineers
AIChE	American Institute of Chemical Engineers
AICPA	American Institute of Certified Public Accountants
AIPE	American Institute of Plant Engineers
AIPP	American Institute of Pollution Prevention
APICS	American Production Inventory Control Society
ASBDC	Association of Small Business Development Centers
ASHRAE	American Society of Heating, Refrigeration, & Air Conditioning Engineers
ASME	American Society of Mechanical Engineers
AWMA	Air & Waste Management Association
CACA	Chartered Association of Certified Accountants
CASB	Cost Accounting Standards Board
CICA	Canadian Institute of Chartered Accountants
CIMA	Chartered Institute of Management Accountants
DOC	Department of Commerce
DoD	Department of Defense
DOE	Department of Energy
EPA	Environmental Protection Agency

ATTACHMENT B (continued)

TABLE OF ACRONYMS

FEI	Financial Executives Institute
ICAEW	Institute of Chartered Accountants of England and Wales
IEEE	Institute of Electrical and Electronics Engineers
IIE	Institute of Industrial Engineers
IMA	Institute of Management Accountants
IRS	Internal Revenue Service
LCA	Life Cycle Analysis
LCC	Life Cycle Costing
MTC	Manufacturing Technology Center
NIST	National Institute of Standards and Technology
OMB	Office of Management and Budget
PMA	Project Management Association
PPIC	Pollution Prevention Information Clearinghouse
SBA	Small Business Administration
SBDC	Small Business Development Center
SCORE	Service Corps of Retired Executives
SEC	Securities and Exchange Commission
SMAC	Society of Management Accountants of Canada
SOLE	Society of Logistics Engineers
TAP	Technical Assistance Program (state-run)
TCA	Total Cost Assessment or Total Cost Accounting

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APPENDIX II: EVALUATION SUMMARY

The following information is based upon the receipt of evaluation forms from 46 of the 81 attendees:

	Unsatisfied	Poor	Fair	Good	Very Good	Excellent	Not Rated
Overall Quality	0	0	1	23	2	19	1
Schedule/Agenda	0	1	1	26	1	15	2
Content	0	0	0	30	2	14	0
Plenary Speakers	0	0	1	19	3	20	3
Breakouts (Monday)	0	2.5	2	22	0	17.5	2
Breakouts (Tuesday)	0	2.5	3	26	0	10.5	4
Materials	0	5	2	30.5	1	6.5	1
Audio Visual	0	3	3	30	0	6	4
Meeting Rooms	1	4.5	4	22	0	13.5	1
Food	0	2	7	30	0	7	0
Accommodations	0	1	4	32	0	6	3
Location	2	4.5	3	29.5	0	6	1
Registration	0	0	1	21.0	1	23	0
TOTALS	3	26	32	341	10	164	22

In future conferences:

	More	Less	Same	Not Rated
Breakouts	13	4	26	3
Speakers	12	4	27	3
Question & Answer Periods	15	3	24	4
Informal Networking	33	0	11	2
TOTALS	75	11	88	12

APPENDIX III:
ACTION AGENDA WORKSHOP ATTENDEES' BULLETIN BOARD

At the end of the Workshop attendees were asked to write down what areas of the Action Agenda they would be most interested in helping to implement and what services they could offer to others. The attendees responses follow.

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Areas of Involvement

- Development of Models to incorporate into the capital allocation process
  - Incorporate external/societal costs
- Different Assumptions about future risk
  - Govt (methodologies)
  - Industry
- How to incorporate long-term liability
  - assessment
  - reporting

"Goal"

To develop an action agenda for the business/finance stakeholder group that will foster improved accounting and capital budgeting for Environmental Cost/Investment

- Defining data requirements

Phil Barnes
USC
SBDC
State: South Carolina-Small Business Development Centers
National: Association of Small Business Development Centers. (ASBDC)

I am a member of the SBDC network, listed above, of South Carolina. There are SBDC's located in each state.

I am currently establishing a Pollution Prevention Program at the SC-SBDC. Since our regional offices are located at Universities, USC, Clemson, Winthrop, and SC State, we have resources through University expertise. We also network with other state agencies in order to assist Small Business.

The SBDC has the ability to assist in research development and dissemination of information (training) of new methods (tools) for Small Business.

Interested in:

1. serving on committees
2. promoting/marketing of TCA/Environmental Accounting methods, etc.

3. Developing/researching companies/developing case studies
4. Being the Hub for developing TCA network in SC for Small Business
5. Assisting in providing information to the ASBDC for dissemination to their State's SBDC Network.

Beth Beloff

What I am Willing to Do

Develop the Methodology for Environmental Cost Accounting with our ICEM/University of Houston team.

Steve Boden

Areas of Involvement - Not All!

1. External reporting of Environmental Performance to Stakeholders
2. Defining inventory or Environmental Costs
3. Income Tax Regulations that impact all Environmental Expenditures
4. Development of Incentives for Management - Environmental Leadership Programs
5. Training material for TCA/Improved Mgmt. Acctg.

Germain Boer

What I can do: Provide input on cost reporting and cost analysis systems

What my University can do: Provide research resources. We have an economist who is studying environmental issues who can work with me on accounting and economic issues.

Corinne Boone
Ontario Hydro

1. Business Accounting Group
   - Communications & Teamwork
   - Non-Quantifiable
   - Externalities-Have done a significant amount of work in this area
   - Liabilities
2. Key definitions & terms (development of) we have done some work in this area
3. Appraisal of Costs & Benefits to society
4. Would also like to share information as we at Ontario Hydro continue with our process of implementing Full Cost Accounting on Decision-making
5. Developing Incentives/Management i.e. How do you build environmental cost issues into Performance contracts? (we are doing some work in this area as pat of the Sustainable Development Task Force work)

Donald J. Cass

* Environmental Cost Analysis
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Dan Davenport
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Currently developing seminar on Pollution Prevention would like to create dialog with EPA.

Willing to assist in idea of forward looking cost models. Would like to run follow on article in SOLE Newsletter.

Kathleen D. Dines
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(Corporate Office-Staff Accountant)

I am responsible for coordinating the efforts of Accounting (Financial & Cost), Environmental (Radiation & P2 groups), legal (Superfund/litigation), and our production locations (incurring costs). To ensure our company's various management has the necessary data to measure our progress in the area - to facilitate individually & via interaction with focus groups (i.e. P2 team). We've had success in developing formal processes for remediation/superfund/and management goals. We are in the process of formalizing/summarizing P2 programs. We benefit in that our management (& CEO) support already exists, and are working to bridge the gap between their philosophy & the actual efforts which exist on the production floor.

Our program is good for a big company; smaller companies would need to tailor, of course. I've learned marvelous things from this workshop-we had a good & lots of interaction. Any "seminar" atmosphere definitely is improved with interaction. I have a millon ideas & new concepts to take back with me, and would love to help you in the global efforts if possible.

Melinda Dower

NJ Department of Environmental Protection
Office of Pollution Prevention

What I'm Willing to Do

I can work on regulatory reform efforts. I'm not sure what else I can do--if the group wants to test some ideas/accounting practices on businesses, we can offer NJ facilities to volunteer. (We work closely with lots of helpful facilities willing to offer advice)

Ralph Estes

I would like to volunteer to work on setting up a Working Group on Environmental Disclosure.

John Morrow
American Institute of CPA's

** Communicate/coordinate w/International counterparts

** Participate in std. setting arena (ANSI, ISO)

** Promote commitment of top mgmt.
cost avoidance vs. revenue enhancements

** Publish success stories etc.

George Nagle
Bristol-Myers Squibb

We would be interested in working on a team (with EPA) to develop a mechanism for sharing case studies (success stories) from business.

Randy Price
DuPont
The Business Rondtable (BRT)

Once issues are identified I will pursue options at BRT.

Frank Pucciano

1. Institute of Industrial Engineers (IIE) & Personal --will work on identifying or developing a "tool kit"for identifying Pollution/Waste options, cost components of Pollution/Waste & technologies for gathering & quantifying cost associated with Pollution/Waste.

Henry Rej
Arthur D. Little, Inc.

<u>What I can Do:</u>

- Provide at least one input (our approach) to LCA, as part of the common body of knowledge
- Share experiences with companies who have made the link between env. costing and sustainable competitive advance
- Facilitate/Coordinate an informal newsletter to share success stories, methodologies, problems, concerns, ideas for standards, etc.
- General experience and problems we have incurred doing P2 assessments for a government agency
- Willing to participate in future working groups or committees in environmental accounting--particularly cap budgeting/investment decision methods
- Can share training material from the seminar we offer in env. comp. strategy

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Bill Russell
Coopers & Lybrand

- Willing to work on all programs combining both my technical (chemical engineering/environmental consulting) and financial (MBA. C&L relationship) capabilities.

Groups: C&L Firm Wide Resources
Institute of Hazardous Materials Management (IHMM)
Env. Audit Roundtable
AIChE
AICPA/EITF
Electric Generators Association

Would like to work on any task force which would be developing models for estimating costs or standards for reporting costs and environmental information systems.

Added: International Benchmarking type follow-up Coopers has many international environmental practices which could be tapped.

David Sheilds

What I'm Willing to Do

(1) Work with any groups in helping to establish and test environmental cost accounting for decision-making. Prefer private sector work over government. (regulation-oriented work)

(2) Help identify and disseminate academic research on environmental cost accounting

What Associations I'm Involved with Might be Willing to Do

Have discussed the possibility of a special issue of *Journal of Accounting on Public Policy* (University of Maryland) on environmental accounting with Steve Loeb, co-editor. I am on their editorial board.

Linda B. Specht

I will volunteer to assist in the preparation of case studies/teaching notes to accompany case studies & can serve as a liaison to the North American Case Research Association. I am currently track chair of the Acct/Finance track. These cases would also be appropriate for the small business/strategic management tracks.

Richard W. Stevens
Intelog, Inc.

- Participate in Training Requirements Definition
- Participate in Life Cycle Costing Requirements Definition, etc.

Mike Thibault
DCAA

Interest

1. Information Network Analysis (e.g. what info is out there and how can it best be obtained/retrieved)
2. Accounting practitioner's round table (who is working the issues, what are the issues, and how can these issues best be researched/resolved between Govt and Industry)
3. Coordination among Government Agencies over Policies/regulations and experiences

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Rebecca Todd
Internet address: (RTODD@RND.STERN. --NYU.EDU)

Background

1. 1991 -- WRI Environmental Management Accounting Project
   Objective: Case studies to develop recommendations for managerial accounting system enhancements to better support managerial decision-making needs
2. 1978 -- Research on Needs-Driven Information System and analysis improvements
3. Contribution (currently ongoing)
   (1) Research and Development of generalized "best practices" revisions to managerial information systems
   (2) Publication of findings in top accounting and finance journals (both practitioner and academic)
   (3) Teaching - seminars for:
   - academics
   - executives
   - engineers
   - accountants
   - analysts
   - etc.