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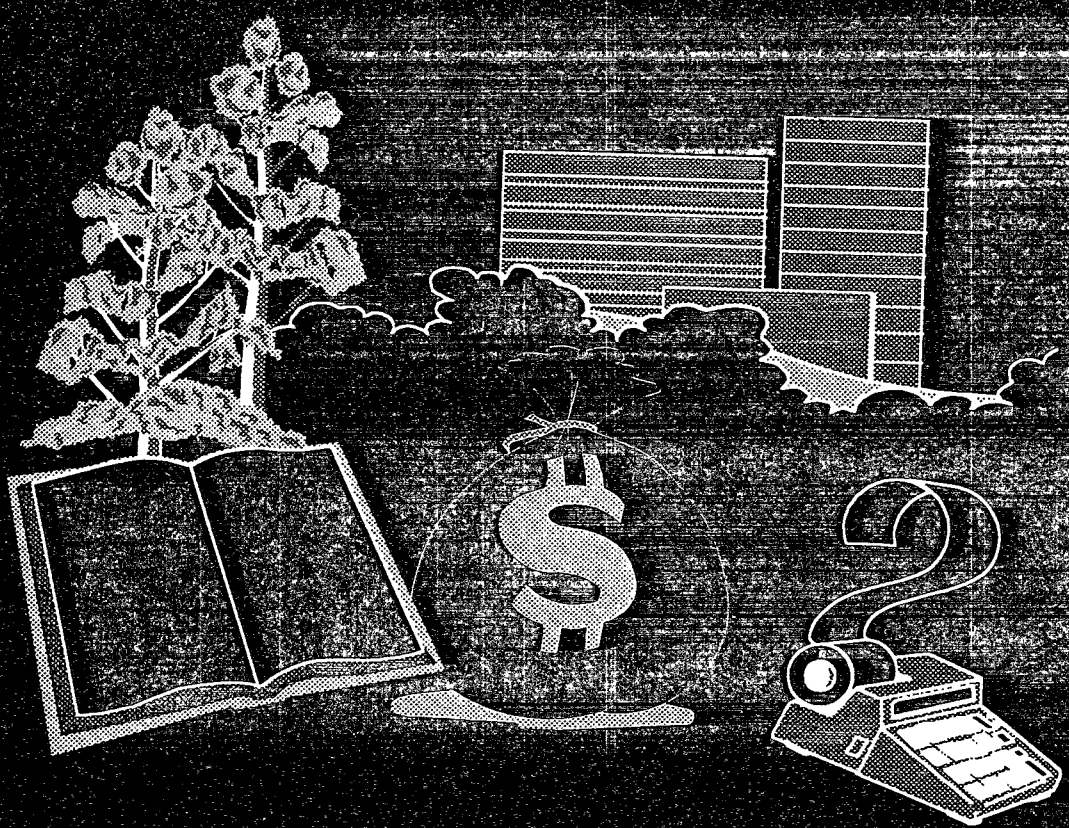
Environmental Accounting Case Studies:

GREEN ACCOUNTING AT AT&T



Disclaimer

This case study reports AT&T's developing position on "Green Accounting," as defined by AT&T as of July, 1995. AT&T defines Green Accounting to mean "identifying and measuring AT&T's costs of environmental materials and activities, and using this information for environmental management decisions."[1] The case study intentionally uses AT&T's language and definitions in explaining environmental accounting efforts underway there. The concepts, terms, and approach represent AT&T's view and not necessarily the position or views of the U.S. Environmental Protection Agency (EPA). The EPA is offering this case study as one of many possible approaches to environmental accounting. Readers may also want to consult *An Introduction to Environmental Accounting as a Business Management Tool: Key Concepts and Terms*, EPA 742-R-95-001 (June 1995) for more general information about environmental accounting.[2]

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[1] AT&T Environmental Accounting Glossary (1995).

[2] Copies can be obtained from the EPA's Pollution Prevention Information Clearinghouse at 202/260-1023.

Acknowledgements

The United States Environmental Protection Agency (EPA) wishes to acknowledge the cooperation and input of AT&T which generously allowed access to its people and materials for preparation of this case study. In particular, Jeannie Wood, Co-Chair of AT&T's Green Accounting Team repeatedly made time in her busy schedule to answer questions and share information. In addition, Barry Dambach (Co-Chair) and other members of the Green Accounting Team graciously agreed to review drafts of this document and provided helpful comments to EPA. EPA also appreciates the comments provided by Daryl Ditz of the World Resources Institute. EPA hopes the documentation of AT&T's experiences will help other companies begin to use environmental accounting and appreciates the cooperation of AT&T in telling its story.

This case study was prepared for the EPA's Environmental Accounting Project, which has been working with stakeholders for the past three years to encourage and motivate business to understand the full spectrum of environmental costs and incorporate these costs into decision-making.[3] As a product of this effort, EPA has commissioned case studies documenting

[3] In December 1993, a national workshop of experts drawn from business, professional groups, government, nonprofits, and academia produced an *Action Agenda* which identifies four overarching issue areas that require attention to advance environmental accounting: (1) better understanding of terms and concepts, (2) creation of internal and external management incentives, (3) education, guidance, and outreach, and (4) development and dissemination of analytical tools, methods, and systems. The purpose of this document is to help address the third recommendation, which includes the preparation and dissemination of case studies. The U.S. Chamber of Commerce, the Business Roundtable, the American Institute of Certified Public Accountants, the Institute of Management Accountants, AACE International (the Society of Total Cost Management), and the U.S. EPA co-sponsored the Workshop. For more information on the workshop, see *Stakeholders' Action Agenda: A Report of the Workshop on Accounting and Capital Budgeting for Environmental Costs, December 5-7, 1993*; EPA 742-R-94-003 (May 1994).

Acknowledgements (continued)

companies' efforts to address environmental accounting. For more information on EPA's activities in this area or for additional copies of the case studies, please contact the EPA's Pollution Prevention Information Clearinghouse at (202) 260-1023. Holly Elwood, Coordinator of EPA's Environmental Accounting Project, would like to hear about companies beginning to implement environmental accounting. She can be reached at 202/260-4362.

This case study was prepared by ICF Incorporated under EPA Contract No. 68-W2-0008, Work Assignments 82 and 109. The EPA Work Assignment Managers were Holly Elwood and Marty Spitzer. Carlos Lago served as the EPA Project Officer. The ICF principal author was Paul Bailey.

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Introducing
"GREEN ACCOUNTING"
in AT&T

1. Organization of Case Study

This case study describes the actions AT&T has taken and the issues it has encountered in applying environmental accounting, which AT&T refers to as "Green Accounting." The presentation is not chronological, but is organized as follows:

- Background. This section introduces AT&T, highlights its definition of Green Accounting, and presents a chronology of key events in its development of its Green Accounting approach.
- Why Did AT&T Decide to Address Green Accounting? This section discusses AT&T's management commitment to Green Accounting and its relationship to AT&T Design for the Environment (DfE) and quality programs.
- How Did AT&T Initiate Its Green Accounting Project? This section describes AT&T's use of a multi-functional team to develop Green Accounting.
- How Did AT&T's Green Accounting Team Gather Information? This section summarizes AT&T's fact-finding visits and literature review process.
- What Has AT&T Learned? This section presents the key findings of the Team's activities through June 1995.
- AT&T's Self Assessment Tool. This section describes the elements comprising AT&T's first environmental accounting tool.
- Looking ahead. This section addresses AT&T's evolving agenda for future Green Accounting activities.

Exhibit 1 on the following page lists some of AT&T's key accomplishments in Green Accounting, all of which are covered in this case study.

Exhibit 1: AT&T's Key Accomplishments in "Green Accounting"

- Senior management commitment to Green Accounting
- Established internal multi-functional team with global representation to develop Green Accounting concepts and tools
- Clearly defined "Green Accounting"
- Developed a literature review process and appointed subject matter "experts"
- Prepared a Green Accounting Glossary
- Developed a Green Accounting "self assessment" tool for AT&T facilities including a protocol, status survey, environmental activities dictionary, and data matrix
- Completed design reviews of Green Accounting "self assessment" tool at three facilities and revised tool accordingly
- Explored and articulated linkages between Green Accounting and other AT&T initiatives including Total Quality Management (TQM), Design for Environment (DfE), Pollution Prevention (P2), Activity-Based Costing and Management (ABC/M), supply line management, and product take-back programs

2. Background

This case study illustrates how AT&T, a major multinational high-technology company has begun to implement what it terms "Green Accounting." AT&T defines "Green Accounting" as follows:

> ***Environmental cost accounting (aka Green Accounting)***: Identifying and measuring the costs of environmental materials and activities and using this information for environmental management decisions. The purpose is to recognize and seek to mitigate the negative environmental effects of activities and systems.

AT&T recognized that some definitions of environmental accounting include both "private costs," which are the costs that impact a firm's bottom line, and "societal costs" (also termed "externalities") which is a term for impacts on society and the environment that currently are not reflected in a firm's bottom line. AT&T has focused to date solely on private costs, particularly

conventional and potentially hidden environmental costs. Eventually AT&T expects to address contingent costs and externalities.[4] Few companies outside of the utility sector in North America have moved to incorporate externalities into their accounting systems; however, AT&T does intend to go further and look at externalities in the future.

AT&T. Driven by its expressed desire to keep a healthy balance between business interests and environmental protection, AT&T has stated that the two interests are not necessarily inconsistent.[5] AT&T believes that investing in the environment has helped it decrease operational costs and avoid future liabilities. As a result, AT&T has set aggressive environmental goals. For example, in 1993 AT&T reached its goal of eliminating emissions of chlorofluorocarbons (CFCs) and other ozone-depleting substances from its manufacturing operations. AT&T achieved this goal two and a half years ahead of a worldwide ban by creating new manufacturing techniques that eliminated the use of the materials responsible for the emissions. AT&T has also achieved significant results by reducing waste, increasing recycling, and using recycled paper.

AT&T was created in 1984 under a court-ordered division of the Bell System's telecommunication business. The world's largest telecommunications company, AT&T employs over 300,000 people around the world, and its revenues exceeded $75 billion in 1994. AT&T's revenues are derived from telecommunications services, products, and systems; rentals and other services; and financial services and leasing. With the Company's recent mergers and acquisition of

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[4] For a discussion of these cost categories, see *An Introduction to Environmental Accounting as a Business Management Tool: Key Concepts and Terms*, EPA 742-R-95-001 (May 1995), pp. 7-17.

[5] AT&T 1993 [latest available] Annual Report, p. 19.

cellular service, cable, and entertainment companies, AT&T has positioned itself to be a major player in the nation's efforts to construct an "information superhighway" of communication links.

AT&T manufactures and purchases components and products to support its global information movement and management offerings, including microelectronics, switching, transmission, wireless, and satellite operating systems; fiber optics; voice, data, and video communications devices; and mainframes, videoconferencing systems, multimedia personal computers, automated teller machines, and other integrated business systems. AT&T Bell Laboratories and other AT&T research and development (R&D) units investigate new technologies and evaluate ways to make technology more useful to customers. AT&T recognizes that environmental aspects may be found in all of its business operations, such as equipment manufacturing and telecommunications services, its laboratories, and even its office buildings.

AT&T's manufacturing subsidiary, Western Electric, first issued a corporate environmental policy in 1973. Following divestiture and restructuring in 1984, AT&T issued a Policy for Environmental Protection that recommitted the company to the concepts of the original policy. AT&T's policy goes beyond regulatory compliance by committing the company to develop and use nonpolluting technologies, minimize wastes, increase recycling, design products and processes with environmental impacts as a critical factor, and raise all employees' awareness of environmental responsibilities. AT&T's recently updated policy embraces a life cycle approach[6] and the use of Design for Environment practices throughout the organization.[7]

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[6] AT&T defines life cycle analysis/assessment as "the review of the environmental impact of a product or process over its entire life cycle, including resource extraction, manufacture, packaging and transportation, use and recycling/disposal." *AT&T Environmental Accounting Glossary.*

[7] Barry F. Dambach and Braden R. Allenby, "Implementing Design for Environment at AT&T," *Total Quality Environmental Management* (Spring 1995).

This case study begins in February 1994 and documents the birth of the Green Accounting project at AT&T, the avenue through which environmental accounting is being introduced into the company. As of July 1995, the project has left its infancy, but is still in the growing, formative stage. See Exhibit 2.

Exhibit 2: Chronology of Green Accounting at AT&T

1993	•	AT&T creates new senior management position for Technology and Environment and organizes Design for Environment (DfE) Program
February 1994	•	Green Accounting Team assembled (as part of AT&T's DfE Program) to develop AT&T approach and tools for Green Accounting
December 1994	•	Design reviews of AT&T Green Accounting tools began
February 1995	•	Design reviews of AT&T Green Accounting tools completed and tools revised
April 1995	•	Field tests of Green Accounting tools began
September 1995	•	Field tests of Green Accounting tools to be completed
October 1995	•	Green Accounting tools to be presented to AT&T DfE Team

3. Why Did AT&T Decide to Address Green Accounting?

This section describes the factors, which include management commitment, support to related programs, and customer demands, that led AT&T to address Green Accounting.

3.1 Management Commitment

AT&T's senior management commissioned the Design for the Environment (DfE) program as part of AT&T's policy for environmental protection. The architects of AT&T's DfE program see economic considerations as a key component and have established a Green

Accounting Team to help implement DfE. The Green Accounting Team believes that Green Accounting can support the achievement of AT&T's environmental policies by:

- Supplying relevant cost data to understand and improve environmentally impactive processes, and drive desired behavior towards designing environmentally preferable products and services;
- Providing information to support the most cost-effective solutions to preventing and/or meeting environmental compliance needs; and
- Providing evidence of compliance with environmental standards (both regulatory and voluntary).

In this way, Green Accounting can help AT&T avoid potential environmental liabilities, reduce costs, and minimize its impact on the environment. Green Accounting has been described as "essential not only to give the environmental projects an equal chance of receiving needed resources, but also to get an accurate description of the true environmental costs associated with the manufacture of each product."[8] Providing management with environmental cost data facilitates making better environmental and business decisions.

3.2 Support to Related AT&T Initiatives

The prospects for adopting Green Accounting were enhanced by its relationship to several important programs and activities at AT&T, including Total Quality Management (TQM), Design for Environment (DfE), and Activity-Based Costing and Management (ABC/M). This section summarizes the relationships seen at AT&T between Green Accounting and each of these programs.

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[8] Barry F. Dambach and Braden R. Allenby, "Implementing Design for Environment at AT&T," *Total Quality Environmental Management* (Spring 1995).

Total Quality Management. Top management at AT&T has emphasized that its environmental goals are based on Total Quality Management (TQM) principles. AT&T employs the Cost of Quality (COQ) model, focusing priorities on prevention through source reduction first, followed by reuse, recycling, and treatment -- with disposal as the last option.[9] For example, AT&T views the reduction of waste as a means to reduce costs. Senior management has identified three major ways that improved environmental management strategies support TQM, noting that they enhance:

> "We base our environmental goals on Total Quality Management principles."
>
> – AT&T

(1) *Customer satisfaction* through improved relationships, which come as a result of meeting or exceeding environmental expectations;

(2) *Organizational effectiveness*, by involving everyone in sharing the mission to improve environmental quality; and

(3) *Company competitiveness*, because when a company addresses social concerns such as its impact on the environment, it significantly increases value for its customers.

AT&T views Green Accounting as a major component of Total Quality Environmental Management (TQEM). AT&T believes that "quality is a given in competition today" and that "environmental quality will be a given very soon."

Design for Environment. AT&T is a leading corporate proponent of Design for Environment (DfE), which calls for environmental considerations to be incorporated into product design from the outset. AT&T's commitment to DfE figures prominently in its vision statement:

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[9] These priorities were established to support EPA's environmental management hierarchy, which was codified by Congress in the Pollution Prevention Act of 1990.

> "AT&T's vision is to be recognized by customers, employees, shareowners and communities worldwide as a responsible company which fully integrates lifecycle environmental consequences into each of our business decisions and activities. Designing for the environment is a key in distinguishing our processes, products, and services."

This progressive vision is backed up by top level management commitment. In 1993, AT&T created a new post to develop the rules and tools needed to achieve its vision. Brad Allenby, named Research Vice-President for Technology and Environment, moved quickly to constitute a DfE Coordinating Team which identified a number of priority areas for subteams:

- green accounting
- product takeback
- supply line management
- life cycle analysis
- international environmental standards
- external relations
- energy

AT&T management developed a charter for each of these subteams. The DfE Team commissioned the Green Accounting subteam to address environmental attributes in accounting in order to support AT&T's environmental programs, especially DfE. The charter that was given by management to the Green Accounting Team was to (1) develop methods and tools, (2) identify environmental costs and related activities, and (3) implement this understanding throughout AT&T. AT&T views Green Accounting as an essential component of DfE programs intended to make AT&T's operations more environmentally responsible: "the full life-cycle environmental cost for a product ... will be used to drive the desired behaviors needed for DfE to be successful."[10]

> "Designing for the environment is a key in distinguishing our processes, products, and services."
>
> – AT&T Vision

[10] Barry F. Dambach and Braden R. Allenby, "Implementing Design for Environment at AT&T," *Total Quality Environmental Management* (Spring 1995).

Activity-Based Costing and Management. AT&T's DfE Team has made a commitment to the use of Activity-Based Costing (ABC) and Activity-Based Management (ABM). Viewing them as tools that support TQM, AT&T often refers to ABC/M or ABC/ABM.

AT&T sees ABC and ABM performing related but different functions. AT&T views ABC as a method for assigning relevant costs to products by identifying the *resources* consumed by *activities* performed for these products, which are termed "cost objects." (A telephone, computer, or ATM could be a cost object.) But AT&T believes that "tracking costs alone does not drive improvement." That is where AT&T sees ABM coming into play. From its process point of view, ABM seeks to determine what are the "cause drivers" of activities and their costs. AT&T believes that ABM can put the management focus on such areas as product or process design, supplier qualification, process performance (e.g., efficiency, waste), and product disposal alternatives, among others. Through ABC/ABM, AT&T's goals are to reduce or eliminate costs by dealing with their driving causes and to employ performance measures as indicators of AT&T's progress.

> "[A]ctivity based costing ... drives the costs to the cost drivers or root causes. Most environmental costs are still included in overhead accounts for the facility and are allocated using methods that may have been appropriate for labor-intensive operations but that will not be so in today's high tech electronics industry where labor is continually becoming a smaller portion of the total product cost."
>
> – Dambach & Allenby[10]

3.2 Customer Demands

> "When we address social concerns and reduce the need for environmental remediation, we significantly increase value for our customers."
>
> — AT&T

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[10] Ibid.

AT&T has recognized *customer expectations* as a driver for improving environmental performance in the context of DfE. For example,

- More and more customers are asking AT&T to identify and validate its reductions in use of targeted chemicals and materials (e.g., CFCs)
- Customers are asking AT&T to reduce packaging or recycle it
- Customers are asking AT&T to take back old products as part of sales contracts.

AT&T's position is that environmental management can improve customer satisfaction and relationships by meeting or exceeding environmental expectations. The Green Accounting Team has noted that the definition of "customer" in some cases may include not only the marketplace, but also society, shareholders, employees, the government, or even the environment (as "an abstract customer").

4. How Did AT&T Initiate Its Green Accounting Project?

This section describes AT&T's use of a multi-functional Team to foster Green Accounting. The section covers why AT&T chose a team approach, the Team's vision and charter, and how the Team has operated.

4.1 AT&T Chose a Team Approach

> "The issue isn't limited to one discipline, one industry, or one nation. The environment affects all of us, and it will take all of us to protect it."
>
> — AT&T Chairman and CEO Bob Allen

AT&T frequently uses teams as a part of its TQM approach to managing and improving its operations. Recognizing that Green Accounting must involve several traditionally separate

perspectives and functions (e.g., environmental, accounting, finance) as must DfE (e.g., environmental, process/product design, research and development, marketing), AT&T management saw a multi-functional team approach as the only viable option. To achieve its goal of integrating environmental concerns into business decisions, AT&T senior management has alerted its associates to expect changes in their roles and company processes as AT&T implements environmental initiatives such as Green Accounting and DfE. In particular, AT&T expects that associates who have roles in technical, purchasing, and financial processes must collaborate -- by understanding, communicating, and working with each other -- to consider the environmental and financial consequences of decisions. Similarly, AT&T believes that its cost accounting systems must change to allow a much clearer view of the true costs of producing products and providing services. In anticipation of these coming changes, a team approach to implementing Green Accounting would involve and ready its people for designing the corporation's future and initiating the necessary multi-functional dialogues.

4.2 Team Clearly Defined Its Vision and Charter

At its first meeting in February 1994, the Team reviewed the charter developed for it by AT&T senior management. The Team developed a vision statement relating Green Accounting to TQEM and highlighting AT&T's Pollution Prevention Policy, which is based on achieving and sustaining a healthy balance between business interests and environmental protection. The Team then decided to expand its charter to reflect its vision. Notably, the Team agreed that its purpose was not to *impose* environmental cost accounting, but to *facilitate* Green

Green Accounting Charter

Facilitate the integration of environmental considerations into management accounting systems, models, and practices throughout AT&T through communication, education and development of guidelines.

Emphasis is placed on using Activity Based approaches, principles and costing methodologies to support TQEM.

Accounting throughout AT&T by communication, education, and development of approaches and tools that can be used to foster accountability and better management processes for achieving environmental goals.

Using brainstorming techniques, the Team discussed "why does it make sense for AT&T to implement Green Accounting?" Conclusions included the following

- to control/improve process costs
- to trace costs to green activities
- for investment decisions/trade-offs
- to assess design impacts, now and in the future
- to prove compliance with environmental standards
- to respond to customers and other stakeholders
- to support *sustained* growth of profitability
- to make it easier to understand AT&T's impacts on the future.

The Green Accounting Team had a project and product-focus from early on. For example, the second meeting of the Team included group brainstorming on key projects and priorities. Continuously identifying specific products and tools crystallized for the Team a set of near-term objectives for orienting Team activities and defining the Team's purpose. The Team agreed that tools to assess environmental costs could guide AT&T activities and decisions to make a positive impact economically and environmentally.

4.3 Multi-Functional, Company-Wide Team

From the start, recruiting and maintaining the Team has been a priority. Initially, the Team was intended to be a multi-functional management Team with an environmental focus. The first meeting included nine members from various parts of the company representing functions such as:

- Finance/Policies
- Manufacturing/Production
- Information Systems
- Manufacturing Strategies
- Supply Line Management
- Design
- Manufacturing Engineering
- Technology and Environment

As the work progressed, the Team decided to add members who could represent product management (and the "voice of the customer"), logistics (e.g., transportation and packaging concerns), and finance from a plant perspective. New members were also added to facilitate coordination with other relevant AT&T activities and as replacements for departing members. In time, the multi-functional membership of the Green Accounting Team has expanded to include members representing AT&T facilities nationwide and overseas as well, to encompass global considerations. The result has been a lively, motivated group that has made significant progress in giving body to abstract concepts and translating those concepts into practical approaches. Team members have learned to work together and communicate in an evolving common language. As the focus of the Team changes over time, its members will likewise change.

5. How Did AT&T's Green Accounting Team Gather Information?

Much of the Team's first six months was spent in gathering and reviewing information. This learning program included literature reviews, fact-finding visits to diverse AT&T facilities, and focused efforts to understand how Green Accounting relates to other ongoing DfE efforts. This section describes these activities.

5.1 Literature Review Process

At the start, each Team member received a copy of *Accounting for the Environment* by Rob Gray as well as the February 1994 issue of IMA's *Management Accounting* magazine. These reference documents were soon joined by a flood of articles having some relevance to Green

Accounting. To deal with the volume of information systematically, Team members chose a team approach to filter the information through designated "subject matter experts." Each expert was to filter information for the Team by preparing a synopsis of each article and then e-mailing it to Team members with a recommendation on whether or not to read the article thoroughly. Resource materials were grouped into the following categories for assignment to Team members:

- Environmental Management Systems and waste minimization (as related to costs)
- Life Cycle Cost, business case, and cost/benefit models
- Design (to recycle/reuse/cost, including trade-off models)
- Recycling/takeback (European regulations)
- SEC requirements, corporate policies, and other companies' annual reports
- Accounting systems with environmental attributes, and bridges between accounting systems and environmental management systems
- Asset management and investments/dispositions
- Qualifying and requalifying suppliers for environmental reasons

As Team members ran across relevant reading material, they contacted the subject matter expert or copied the entire Team, based on whether the information merited full distribution. The objective was a more efficient, economical, and faster approach to information review and dissemination.

5.2 Information Collection Through Team Meetings

AT&T used Team meetings as opportunities to learn about different company operations, capabilities, and needs. For example:

- A meeting at the AT&T Atlanta Works fiberoptic cable manufacturing facility was enriched by a tour and presentations that provided an opportunity to explore how environmental costs are handled at that facility.

On the same trip, the Team met with Coca Cola, headquartered in Atlanta and perceived by the Team as a leader in life-cycle environmental assessment, which described its environmental program.

- A meeting in Colorado Springs allowed the Team to visit an AT&T microelectronics plant and be briefed on its environmental programs. The Team heard about some of the business benefits of pollution prevention. For example, past pollution prevention actions and community relations activities had created a favorable atmosphere for the community's acceptance of subsequent plans to expand wafer fabrication capacity in Fort Collins.

- A meeting in Scotland was the occasion to expand the global horizons of the Team, which heard about the environmental program at AT&T-Dundee (where ATMs are manufactured) as well as take-back programs in Europe. This meeting brought the Team together with two professors at University of Dundee who had co-authored the text *Accounting for the Environment*, used as a key reference by the Team. In the course of the meeting, the professors responded to questions about different aspects of green accounting.

- A meeting at AT&T-Paradyne (where network cards for laptops are made) in Florida was scheduled to dovetail with AT&T's Activity-Based Costing and Management (ABC/M) Conference. This allowed the Team to learn about the connection between Green Accounting and ABC/M.

- A meeting at AT&T-Merrimack Valley Works in Massachusetts gave the Team an opportunity to observe a pilot system developed for tracking chemical usage and waste generation and linking associated costs to products, using an average purchased cost of chemicals drawn from Accounts Payable. The system provided a model for allocating chemical costs to a process or product.

At the AT&T Merrimack Valley Works, the Green Accounting Team met with Merrimack Valley Work's Pollution Prevention Team, which made the following comments that directly spoke to the potential value of Green Accounting:

> "If we'd had Green Accounting and process cost information, we could have saved weeks [of effort]"
>
> "We'd like to know how much it costs to research the viability of alternative materials [to lead solder], the cost impact on materials purchases, and the time and cost spent on completing a toxics use reduction report."

> "More awareness and measurement of things like disposal costs ... would drive attention to where the costs are."

To support incorporating Green Accounting into AT&T's pollution prevention initiatives, the Green Accounting Team envisioned developing an environmental accounting assessment tool (see pp. 25-33) that site teams could use in determining the most helpful information and in setting priorities to meet environmental objectives.

Green Accounting Team meetings to date have facilitated active interchanges, helped the Team develop an understanding of the status of environmental accounting at AT&T, and demonstrated corporate commitment to DfE and Green Accounting.

5.3 Addressing Related DfE Issues

One important activity of the AT&T Green Accounting Team has been to relate its efforts to other relevant DfE initiatives underway at AT&T. The Green Accounting Team started by reviewing the charters of the other DfE subteams to determine their respective areas of expertise and emphasis. Based on this review, the Green Accounting Team decided to coordinate with other AT&T DfE teams, such as the Takeback Team, the Supply Line Management (SLM) Team, and the Life Cycle Analysis Team. Such coordination was seen as allowing Green Accounting Team members to learn what other relevant DfE groups were doing and to identify potential areas of linkage and coordination (e.g., where Green Accounting may figure into take-back programs, purchasing, and facilities and engineering functions). As a result, Green Accounting Team members with expertise in certain subject areas were selected to serve as liaisons to other DfE sub-teams when common topics of interest were identified.

Notable examples of such common topics include the Green Accounting Team's work with the SLM Team and with product takeback issues.

- A joint meeting with the DfE SLM Team focused on a Total Cost of Ownership (TCO) model, which takes the perspective of AT&T as the customer. The AT&T Green Accounting Team worked with the DfE SLM team on accounting aspects of activities such as qualifying and requalifying both suppliers and materials, with the ultimate goal of reducing defects and costs.

- The Green Accounting Team explored how its approach would apply to product takeback. The Team first sketched the takeback process in activity terms and then identified which activities (e.g., reverse distribution) would entail resource costs and which activities (e.g., reuse, resell) might entail financial benefits. The Team agreed that a trade-off analysis could assess whether benefits exceed costs in product takeback. The Team noted that a separate trade-off analysis also should be performed comparing the costs and quality of recycled or reused materials compared to new materials, including associated purchasing costs.

The Green Accounting Team is continuing to explore and articulate the relationships between Green Accounting and other DfE activities.

6. What Has AT&T Learned?

As Team members learned about Green Accounting and how it could be applied to AT&T's operations, the Green Accounting Team generated a number of findings and identified issues for later consideration. This section describes the key findings and issues the Team identified in its first nine months of activity.

Over the course of its meetings, the Team realized that the use of different management information systems at AT&T Business Units would pose an implementation quandary. In order to implement Green Accounting, a number of different information systems across AT&T could be employed, but there is no single cost accounting or environmental support system in common

across the corporation at this time. The Team also discovered that some business units had already implemented ABC for reporting product costs (i.e., inventory valuation for financial statements). The next logical step appeared to be using ABC/M for process costing to develop environmental performance reports and decision models for management purposes.

In its meetings, the Team reached some additional conclusions and articulated a variety of findings about applying Green Accounting at AT&T. The Team identified the following key points:

- AT&T should define its Green Accounting terms and establish a common language;
  - -- A glossary or dictionary of terms should be developed;
- Green Accounting at AT&T should be based on ABC/ABM principles;
  - -- ABC/ABM can provide a common-sense platform to apply Green Accounting; and
  - -- The essential ingredients are to identify desired behaviors and establish rewards and recognition.
- Baseline information is not available concerning the degree to which environmental costs are allocated to specific products;
  - -- Attention is already being paid to some environmental costs at AT&T;
  - -- Accounting treatments may vary when it comes to overhead costs (i.e., some costs may be allocated to products, general and administrative overhead (G&A), or research and development (R&D));
  - -- AT&T must set a baseline to help target opportunities.

The following sections describe the actions taken by the AT&T Team to define Green Accounting and establish a common language, base Green Accounting on ABC/ABM principles, and develop tools for assessing baseline performance and improvements.

6.1 Defining Green Accounting and Developing A Common Language

Defining Green Accounting. From the very first meeting on, the Team sought to define Green Accounting. The Team discussed the many applications of environmental accounting, including requirements for insurance and taxes, regulations, and external financial information. The Team agreed that Green Accounting should first focus on "true and relevant" costs[11] that appear in a facility's budget. At the kick-off meeting, members related Green Accounting to two basic accounting activities: (1) planning, such as predictive analysis weighing environmental impacts on the future (i.e., life cycle analysis, target costing), and (2) collecting and reporting data (such as gathering information to support decision analysis and reporting to SEC, EPA, etc.). For both activities, the Team believed that "excellent costing capabilities" were a prerequisite for effectively accounting for the environment (i.e., identifying costs that mirror operations). Using what Jeannie Wood, AT&T's Green Accounting Team Facilitator, terms "root cause thinking," the Team concluded that the best business focus for Green Accounting is the collection and use of information for internal management, because making better decisions will result in improved performance for external reporting.

As noted on page 2, the Team defined Green Accounting as follows:

> ***Environmental cost accounting (aka Green Accounting)***: Identifying and measuring the costs of environmental materials and activities and using this information for environmental management decisions. The purpose is to recognize and seek to mitigate the negative environmental effects of activities and systems.

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[11] AT&T also refers to these costs as "private costs" meaning those costs that affect the firm's bottom line and that the firm actually pays out. *AT&T Environmental Accounting Glossary.*

A recurring issue in environmental accounting is how to define and identify "environmental" costs.[12] The Team acknowledged the difficulty of distinguishing in some cases between environmental and health/safety materials and activities, but kept its focus on environmental issues. The Team recognized that environmental aspects would sometimes be inseparable from health and safety concerns. The Team also recognized that certain costs may be hidden and not attributed directly to environmental activity, such as production shutdowns caused by responding to emergency spills or retooling for environmental impact reduction. The Team started to address this issue by developing definitions of environmental activities, as described starting on page 27.

Establishing a Common Language: The Green Accounting Glossary. The Team took several actions to foster a common language to communicate about Green Accounting both within the Team as well as across AT&T. A key activity was the preparation of an *Environmental Accounting Glossary.*

The *Environmental Accounting Glossary* was an early project of the Team. It was designed to identify and clarify the definitions of key terms in an ABC/M context. The AT&T *Environmental Accounting Glossary* was based on the "Glossary of Activity-Based Management," which was published by Computer Aided Manufacturing-International (CAM-I) in 1991 and edited by Norm Raffish and Peter B.B. Turney. Other terms were incorporated from "Common Cents" written by Peter B.B. Turney. AT&T appended Green Accounting examples to many of these terms and added new terms specific to Green Accounting. The 12-page glossary covers such terms as:

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[12] See *An Introduction to Environmental Accounting as a Business Management Tool: Key Concepts and Terms*, EPA 742-R-95-001 (May 1995), pp. 7-12.

Absorption costing
Activity attribute
Activity-based cost system
Activity-based management
Activity cost pool
Activity driver
Benchmarking
Cost driver
Cost object
Cost of quality
Design for environment
Direct cost
Environmental cost accounting
Environmental management system
Externalities/external costs
Full cost accounting
Full cost environmental accounting
Full cost assessment
Full cost pricing
Green Accounting
Indirect costs
Investment management
Life cycle analysis
Life cycle costing
Logistics
Performance management
Performance measure
Pollution prevention
Private costs
Reduce, reuse, recycle
Resource driver
Supply chain cost
Sustainable resource development
Value-added activity
Value chain

The Glossary is a "living document" that is expected to evolve as AT&T further implements Green Accounting. The July 1995 version of the Glossary constitutes Attachment A of this case study.

In another effort at spreading awareness of Green Accounting and developing a common language throughout AT&T, the Team explored the possibility of adding a Green Accounting newsgroup to AT&T's news network or leveraging off the existing environmental newsgroup. The Team envisioned using this medium for communicating objectives, policies, vocabulary, model adaptations, and researching current capabilities and practices. To determine the level of interest in this initiative, the Team put a few paragraphs about its activities in the environmental newsgroup. The Team has been entering information into this newsgroup about conferences and forums relating to Green Accounting and is still evaluating the effectiveness of this activity.

6.2 Applying the ABC/ABM Approach to Green Accounting

The first meeting of the AT&T Green Accounting Team included viewing an AT&T conference video on ABC/ABM that contained a few references to environmental considerations. The Team agreed that good cost management is necessary for Green Accounting; thus, the

Team's orientation was on how ABC/ABM practices and principles could help AT&T achieve better environmental habits. For example, ABC/M could help measure the cost savings from reduced materials costs due to recycling and reuse. Through the course of its meetings, the Team reiterated the view that ABC/ABM provides an excellent vehicle to implement Green Accounting. The Team believed that ABC/ABM would help AT&T identify environmentally preferable activities and measure them against AT&T's objectives and strategies, thus "balancing the scorecard with several perspectives." In addition, the Team concluded that ABC/ABM provides an approach to understand and target areas of opportunity in current processes and in design considerations, including *design to environmental cost.*[13] Moreover, the Team came to believe that Green Accounting can provide an impetus to move forward with ABC/ABM because it demonstrates a practical and useful application of ABC/ABM.

The Team decided to recommend use of ABC/ABM principles to stimulate improvement of environmental results. The Team viewed ABC/ABM as an ideal platform for Green Accounting, concurring that AT&T can account for the environment effectively by incorporating environmental elements into ABC/ABM cost tracking and planning models as follows:

> "Where *Activity Based Costing (ABC)* captures cost elements in processes -- we need to add the environmental elements.
>
> Where *Activity Based Management (ABM)* uses data to make decisions -- we need to add environmental criteria to the decision models."

The Green Accounting Team took these principles to heart and used them as a touchstone for its work. The Team's vision is to see environmental elements added where ABC

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[13] Design to environmental cost refers to a concept of product design oriented toward environmental cost goals or constraints much like the terms design for disassembly and design for recyclability refer to concepts of product design which emphasize ease of disassembly and recycling, respectively, at the end of a product's useful life.

links costs to processes, and environmental criteria added to the decision models used in ABM. The Team sees ABC as a tool for identifying the true costs of products, and thereby providing an impetus for process improvement or reengineering that does not necessarily arise from traditional cost accounting systems, which do not highlight environmental costs.

> "When we look at total costs and their 'cause' drivers, two approaches can be considered: (1) attempt to reduce the cost or (2) reduce/eliminate the cause driver. The environmental preference is to eliminate the cause driver; doing this, we'll both avoid costs and avoid environmental waste/hazards."
>
> — AT&T Green Accounting Team

Activity-based management employs a set of specific concepts and terms such as "cost drivers" (i.e., factors or causes that influence the costs of an activity such as the amount of waste generated), "activity drivers" (e.g., regulatory compliance), activity "characteristics" or "attributes" (e.g., value-added, non-value-added, environmentally-preferable), "inputs" and "outputs" of activities (e.g., materials, products, wastes), and performance measures (e.g., percent of recycled context). The Team added some examples to the *AT&T Environmental Accounting Glossary* and conducted its own exercises to clarify the terminology.

In addition, at one point, the Team performed an exercise in defining inputs, outputs, and drivers for environmental activities. The inspiration for this exercise came from reviewing the format of an Activities Dictionary published by ICMS, Inc. While the Green Accounting Team's activity dictionary (described on pp. 27-29) listed activities, definitions, and general ideas of resources used in the activities, the ICMS dictionary employed a more involved format that included cost drivers, inputs, outputs, and other information. The exercise of labelling environmental activities with value-added or non-value-added characteristics proved to be difficult for the Green Accounting Team to complete at that time. The Team concluded that (1) there is

a need for clarifying the value-added nature of certain environmental activities (e.g., training), which may depend on who is viewed as the customer; (2) output measurements should be linked to corporate strategic environmental objectives; and (3) any pre-existing dictionary should be used with caution because of the need to tailor the language. Team members decided to try individually, based on their own areas of expertise, to define inputs, outputs, and drivers for each environmental activity, with the goal of pooling these efforts later into the Green Accounting environmental activities dictionary (see pages 27-29).

6.3 Developing Green Accounting Tools to Assess Baseline Performance and Foster Improvements

The Green Accounting Team found that although attention was being paid to some environmental costs at AT&T, good data were not readily available to assess the degree to which environmental costs were being identified and allocated to specific products. The Team found that, viewed as overhead, environmental activities' costs might be allocated to products generically or might be charged to research and development (R&D) or general and administrative (G&A) overhead. Among the major action items considered by the Team to develop baseline information were the following options:

(1) Survey AT&T plants to learn how they currently trace environmental costs and cost recoveries to products,

(2) Pilot implementation of Green Accounting for a product or plant with relatively high "green costs,"

(3) Develop a self-assessment tool that AT&T plants could use as an aid in establishing baselines and goals for improvement

After much discussion, the Team decided to implement the third option as a first step.

7. The AT&T Self Assessment Tool

A major product of the AT&T Green Accounting Team has been the development of a self-assessment tool. The tool is meant to be used by business unit or site Pollution Prevention Teams as a springboard for discussion and improvement (both immediate and continuous). It provides a platform or template that can be adapted for local considerations. In addition to the Green Accounting Glossary described above, the tool includes the following components:

- Status Survey
- Environmental Activities Dictionary
- Activities/Resources Matrix
- Protocol

Each of the tool's components is described in turn.

7.1 The Status Survey

The purposes of the survey are to raise awareness of potential weaknesses in existing decision processes and accounting systems and drive behavior in desirable directions. The survey was a product of the entire Green Accounting Team; for example, all Team members were asked to think up at least 5 questions to put into the survey. All members were responsible for reviewing, editing, and enhancing the survey. Team members pooled their questions and edited the results to generate a first draft of the survey. At a subsequent meeting of the Green Accounting Team, participants made considerable revisions to the survey. The Team crafted one portion of the survey to help users identify both (1) what cost information is available for a list of environmental activities and (2) how costs are classified (i.e., direct, product overhead, or G&A).

The survey was designed to draw attention to *how* decisions are made and what information is used, available, or needed; how costs are classified in accounting systems and

whether environmental elements and activities are reflected in product and process costing. In addition, the status survey includes a module of questions relating to post consumer product take-back. The following are some *selected* examples of questions from the survey:

AT&T Status Survey – Selected Questions	
Q	At what stage in the business case process is the environmental manager normally included in decisions on equipment and facilities acquisitions or divestitures? Early ___ Just before final decision ___ After final decision _____ Not generally included ___ At what stage should environmental considerations be introduced and weighed? _____ Are the financial impacts of environmental considerations included in the business case? Yes ___ No ___
Q	When production and materials handling processes are designed/reengineered (including tooling/equipment acquisitions), are financial estimates of tangible and intangible environmental costs/benefits included? (Examples: licenses, treatment, chemicals recovery, improved goodwill, reduced risk of fines and penalties, etc.) Yes ___ No ___ If so, what was included and how was it derived? What was the confidence level of the estimate? _____%
Q	Is product life cycle regularly considered during the design phase? Yes ___ No ___ Has life cycle analysis and related life cycle cost impact analysis been performed on any product(s)? If so, which product(s)? _____ Did the scope of the analysis include end of life recycling or disposal costs? Yes ___ No ___
Q	Are depreciation expenses and assets related to equipment acquired for environmental management easily segregated from other depreciation expenses or capital assets? Yes ___ No ___

A major focus of the survey was whether decisions about

- product design features
- production and handling processes
- sourcing and make vs. buy choices
- capital investments, or
- facility investments/divestments

consider environmental impacts and cost trade-offs, and if so, which costs are considered and how are they handled. This included frequently overlooked costs such as future costs, potential liabilities or contingent costs, and so-called "intangible" costs (and benefits) such as brand image and customer relations costs. The survey also posed questions about the *process* used to evaluate cost trade-offs for environmental impacts, including *when* environmental managers are consulted on decisions about equipment and facility acquisitions.

To assess the availability of cost data, the survey provided a listing of environmental activities and a table to note whether the costs of the activities were classified as direct product costs, product overhead, or G&A. To promote consistency, the Green Accounting Team developed definitions for the activities, which were collected in an "Environmental Activities Dictionary (ABC/M)."

7.2 Environmental Activities Dictionary (ABC/M)

The Green Accounting Team identified over two dozen environmental activities that could serve as *a starting point* for Green Accounting. Each activity was defined in a sentence or two, sometimes with explicit examples. The dictionary covered all the activities included in the activities/resources matrix (described on pages 29-31 below), presented in the same order, as well as over a dozen activities related to product take-back. *Selected examples* of environmental activities on AT&T's list include the following:

AT&T *Environmental Activities Dictionary* — Selected Entries

Obtaining permits: time and expenses for all involved in documenting and applying for environmental permits.

Operating and maintaining environmental/pollution control equipment: time and expense of operators and contractors to train, operate, and maintain equipment or equipment parts for specific environmental purposes; includes depreciation costs of equipment and tooling (i.e., wastewater treatment plant and air pollution control devices).

Environmental media testing (sampling and analysis): time and expense, including contractor's fees, for scientific testing of air, soil or water. This includes sample collection and analysis costs.

Training (environment-related): includes internal instructor time, materials, and room costs as well as participants' time and expenses in courses that are related to environmental and safety training; if external instructors are used, this activity cost includes fees.

Storing waste and hazardous materials: time and expense of personnel and space requirements for specialized storing of hazardous materials and other solid wastes pending use for production or disposal. This includes flammable liquids, compressed gases, etc.

Evaluating equipment for environmental projects: time and expense by environmental managers in evaluating equipment for purchase which has either the primary function of pollution prevention or will improve or replace current equipment which has an environmental impact.

Reengineering to meet environmental objectives: time and expense involved in redesigning a product or process or researching alternative materials and/or processes.

Qualifying/requalifying suppliers: time and expense by environmental and sourcing staff and other technical personnel involved in evaluating, interviewing, and monitoring suppliers as a result of a specific environmental reason; this includes suppliers for materials, supplies, services, and transportation. An example includes activities of requalifying suppliers of CFC solvent substitute material.

Developing (environmental) plans/strategies: time and expense involved in choosing, documenting, communicating, and deploying environmental strategic plans.

De-ionizing water for manufacturing: time and expense, including equipment costs, to de-ionize incoming water for a production process. While it may be a normal production cost, using this information may lead to reducing use and costs of processing this natural resource.

AT&T's list of environmental activities included activities required to comply with environmental regulations as well as activities not compelled by law (e.g., developing environmental strategies). Some activities, such as training, might include both required training and training provided voluntarily by AT&T to supplement legally required minimums. Some environmental activities overlap (or may constitute) production activities, such as evaluating process equipment that will reduce or prevent pollution, and process/product reengineering. Some activities (e.g., qualifying suppliers) may be performed by non-environmental staff. Notably, AT&T included the use of certain resources in the scope of its list of environmental activities; energy and water consumed directly in production are to be assigned to "other environmental activities." As noted above in the description of "de-ionizing water," AT&T believed this focus might lead to reducing use and costs of natural resources.

The Environmental Activities Dictionary included a short key definitions list covering the terms *activities*, *resources*, *liabilities*, *residues*, and *waste*. Several categories of resources were distinguished, consistent with the activities/resources matrix (described next).

7.3 The Activities/Resources Matrix

From the start, the Green Accounting Team aligned its approach with ABC/ABM principles. Toward this goal, the Team designed an activities/resources matrix, which lists over two dozen environmental *activities* (as defined in the AT&T Environmental Activities Dictionary) and provides several major *resource* categories, including labor, materials/supplies, services/ consulting fees, equipment depreciation, energy and other utilities, and other facilities. A separate companion matrix covers product take-back activities and resources. Exhibit 3 presents an illustrative excerpt.

Exhibit 3
Excerpt of AT&T Green Activity Matrix

	RESOURCE COSTS WITH ENVIRONMENTAL FOCUS						
Activities (as defined in Activities Dictionary)	**People**	**Materials/ Supplies**	**Services/ Consulting/ Fees**	**Equipment Depreciation**	**Energy and Utilities**	**Other Facilities**	**TOTALS**
training (environmentally related)							
obtaining permits							
monitoring/tracking regulatory requirements							
qualifying/requalifying suppliers & materials							
developing (environmental) plans/ strategies							
reengineering to meet environmental objectives							
operating & maintaining environmental equipment							
treating on-site waste							
recycling materials							
handling hazardous materials							
storing waste/hazardous materials							
disposing of waste/hazardous materials							

The user fills appropriate cells in the matrix with one of the following symbols:

$	Yes, the data are readily available
?	No, the data are not available, but are needed or desirable
X	No, the data, whether available or not, are not relevant

Users of the matrix can employ these results to identify what information is important. In this way, AT&T facilities can establish priorities for reconfiguring accounting systems to capture the desired information. AT&T noted that priorities would usually be determined by regulatory compliance requirements, best practices, Cost of Quality categories, and total activity cost.

The Team thought that once the cost data were developed, AT&T facilities could assess their relative performance by assigning activity costs to Cost of Quality (COQ) categories (i.e., prevention, appraisal, failure). The conceptual model is a total COQ of 30% of sales revenues (i.e., 5% for prevention, 10% for appraisal, and 15% for failure costs including non-compliance); and AT&T believes that by making greater investments in preventive measures, AT&T can reduce the overall COQ in half (i.e., to 15% of sales revenues). Thus, the Team invested some time in relating different, general environmental activities to the three segments of the COQ model as follows:

- Prevention
  - DfE
  - Advanced Manufacturing
  - Supply Line Management
  - Prevention training
  - Better tools and systems
  - Waste minimization
- Appraisal
  - Environmental testing, audits, analysis
  - Tracking performance
  - Risk analyses

- Failure
  - Residues and wastes
  - Remediation and litigation costs
  - Devalued assets
  - Lost sales and higher cost of capital due to impaired corporate image

Then, the Team conducted an exercise to apply its work directly to the COQ model. It took some examples of specific environmental activities and tried to map them to the elements of Cost of Quality. The Team reached the following conclusions:

- Some activities could easily be correlated to prevention (e.g., operations and maintenance (O&M) on environmental equipment) or failure costs
- Other activities (e.g., monitor and track regulations) were more ambiguous and usually ended up in the appraisal category
- Activities might need to be further subdivided; for example, some types of training might be more compliance than preventive in nature.

The Green Accounting Team tabled this effort in order to develop and test the assessment tool, with the intent of returning to this exercise. The Team learned from this exercise that it should provide examples of COQ activities as part of the assessment tool package to help AT&T facilities in determining priorities and assessing performance.

7.4 Protocol for Using the Tool

The Green Accounting assessment tool was intended to help AT&T business units optimize decisions and activities to meet a set of environmental objectives. The assessment tool reflects multiple perspectives, can be adapted to local situations, and incorporates Activity-Based Costing principles. The suggested protocol included the following:

- Employ a team approach in applying the tool to capture a "diversity of perspectives" (e.g., engineering, accounting, plant management)
- Begin with an awareness session to discuss the purposes of the exercise

- Review and understand the Key Definitions and Environmental Activities Dictionary before attempting the assessment
- Understand the current accounting system's capabilities, limitations, and potentials
- Come to a consensus on the answers to the survey's questions and the activity/resource matrix to identify targeted performance measurements and opportunities
- Use the answers to establish the baseline for improvement
- Agree on what areas should be emphasized for improvement
- After an appropriate period of time, conduct the assessment again to evaluate progress and affirm the next steps for improvement.

Because actual data reporting mechanisms were beyond its Charter, the Green Accounting Team did not require or request that the findings of the assessment be reported back. However, comments that would improve the survey or enlighten the Team were welcomed.

The Green Accounting Team suggested that after an AT&T facility completes the survey, logical follow-up actions for improvement could include: (1) establishing which environmental activities, because of perceived importance and relevance, will need to be captured, (2) assigning activities costs to Cost of Quality categories (prevention, appraisal, failure) to assess relative performance, (3) comparing activities costs to available benchmarks, (4) establishing policies and practices to include environmental elements in decision making and business case analysis, and (5) aligning desired objectives to compensation and rewards.

7.5 Design Reviews

In early 1995, AT&T completed the process of having three sites review the assessment tool. The purpose of the reviews was to evaluate the usefulness of the tool, not to assess the

resulting information. Initial feedback was generally positive, emphasizing the tool's success in highlighting key issues:

> "The approach goes to the 'heart of the matter' which is to understand environmental issues and impacts through raising awareness, getting people involved, and understanding what action needs to be taken."
>
> – Design Review Team #1

> "All questions increased awareness and indicated a need for change .... The review team seemed enthusiastic about the tool and the potential improvements it can achieve."
>
> – Design Review Team #2

> "Most questions increased awareness and indicated a need for change. Several improvements (e.g., consideration of costs of closure and contingencies, examples of intangible costs/benefits and liabilities) were suggested by the participants that are being incorporated into the tool."
>
> – Design Review Team #3

Although initial feedback from the reviews indicated that some survey questions could benefit from improvements in wording and sequencing, all the questions were viewed as relevant. As a result of the review, AT&T also added some new questions. The answers to several questions documented the need for (1) decision modeling tools and (2) improvements in decision processes to include environmental considerations. The Green Accounting Team representatives present at the reviews agreed that a site group applying the tool could quickly grasp its role and realize the importance of improving AT&T's capability to measure and improve environmental activities.

8. Looking Ahead

Next Steps for the Assessment Tool. Looking ahead past the design reviews of the assessment tool and the resulting enhancements to it, the Green Accounting Team outlined next steps for application of the assessment tool:

(1) Assist pilot locations to capture environmental activity cost data, select a trial product, and perform an evaluation of conventional costing for the product versus Green Accounting costing. Identify the differences and what business decisions would have changed.

(2) Develop guidelines for critical environmental activities and methods for assigning costs.

(3) Distribute the assessment package to all AT&T BU's with recommendations for its use

(4) Contact the CFO's office for its support in establishing the process and templates as guidelines for reporting to corporate management

In looking ahead, the Team also considered the issue of incentives: "It is essential to connect the activities with desired behaviors and rewards/recognition." The Green Accounting Team believed it had identified the activities. The next step, linking output measurements to behaviors and rewards, would require the involvement of the entire DfE Team and AT&T senior management.

Future Issues and Objectives for Green Accounting at AT&T. Given the limited amount of time since the Team was formed, it has covered quite a bit of ground. In the course of its work, the Team identified a number of other *issues* to address in the future, including the following:

- Determining whether future liabilities should be spread over product life in order to build reserves for environmental costs that are predictable;

- Developing a process for focusing (i.e., through interviews with process owners) on what is important in order to avoid being inundated with irrelevant data;
- Defining inputs, outputs, and drivers for environmental activities; and
- Relating environmental activities to Cost of Quality categories.

The AT&T Green Accounting Team has identified many areas throughout AT&T where Green Accounting can be successfully applied. Working with other AT&T groups, tying in with other environmental programs within the company, and supporting the use of Green Accounting in AT&T's management practices were cited as some of the Team's objectives. Specific *objectives* for future applications of Green Accounting include the following:

- Bring environmental cost considerations into the business case for any future plant start-ups and divestitures;
- Inject environmental considerations into standard business case process models used by AT&T organizations for business planning and management;
- Move environmental information and cost impacts into the hands of designers and tie in with the Green Index, which is an AT&T software tool being developed to assist designers in scoring the environmental attributes of a product and identifying areas for improvement;
- Introduce life cycle cost models that incorporate environmental considerations, eventually including "societal costs" or "externalities" and customer costs (e.g., product disposal). This would support the TQM concept of Total Cost of Ownership. These environmental attribute decision models will help AT&T define its business and environmental strategies; and
- Use Green Accounting to develop lists of corporate environmental metrics that can be used to measure and reward performance.

In light of this vision, as of July 1995, the Team faces a rich agenda of future projects in furthering AT&T's adoption of Green Accounting.

For additional information on AT&T's implementation of Green Accounting, contact

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Attachment A:
AT&T Green Accounting Glossary
(July, 1995)

Absorption costing. Also known as full absorption costing. A method of costing that assigns all or a portion of the manufacturing costs to products or other cost objects. The costs assigned include those that vary with the level of activity performed and also those that do not vary with the level of activity performed.

Activity. 1. The processes or procedures that cause work to be performed within an organization. 2. The aggregations of actions performed within an organization that are useful for purposes of Activity Based Costing (ABC).

Activity analysis. The identification and description of activities in an organization. Activity analysis involves determining what activities are done within a process, how many people perform the activities, how much time they spend performing the activities, what resources are required to perform the activities, what operational data best reflect the performance of the activities, and what value the activity has for the organization. Activity analysis is accomplished by means of interviews, questionnaires, observations, and reviews of physical records of work.

Activity attribute. A characteristic of individual activities. Attributes include cost drivers, cycle time, capacity, and performance measures. For example, a measure of the elapsed time required to complete an activity is an attribute. *In Green Accounting, the environmental impact of disposing of waste is an attribute of this activity.*

Activity-based costing (ABC). A methodology that measures the cost and performance of activities, resources, and cost objects. Resources are assigned to activities, then activities are assigned to cost objects based on their use. ABC recognizes the causal relationships of cost drivers to activities.

Activity-based cost (ABC) system. A system that maintains and processes financial and operating data on firm's resources, activities, cost objects, cost drivers, and activity performance measures. It also assigns cost to activities and cost objects. *In Green Accounting, this includes assignment of environmental attributes and categories, such as preventive, assessment and failure.*

Activity-based management (ABM). A discipline that focuses on the management of activities as the route to improving the value received by the customer and the profit achieved by providing this value. The discipline includes cost driver analysis, activity analysis, and performance measurement. Activity-based management draws on ABC as its major source of information. *In Green Accounting, this includes providing information to product*

Part of the glossary is based on the "Glossary of Activity-Based Management," which was published by Computer Aided Manufacturing-International (CAM-I) in 1991 edited by Norm Raffish and Peter B.B. Turney. Terms preceded by an asterisk have been added from "Common Cents" written by Peter B.B.Turney.
Definitions added by the AT&T Green Accounting Team are in italics.

designers, facility managers, environmental managers and process engineers in order to achieve desired performance metrics.

Activity cost pool. A grouping of all cost elements associated with an activity. *In Green Accounting, this includes all resources consumed in activities like environmental training, treating and disposing waste, special handling of hazardous materials, etc.*

Activity driver. 1. A measure of the frequency and intensity of the demands placed on activities by cost objects. 2. A measure of the use of an activity by the cost objects. An activity driver is used to assign costs to cost objects. It represents a line item on the bill of activities for a product or customer. An example is the number of part numbers, which is used to measure the consumption of material-related activities by each product, material type, or component. The number of customer orders measures the consumption of order-entry activities by each customer. Sometimes an activity driver is used as an indicator of the output of an activity, such as the number of purchase orders prepared by the purchasing activity. *In Green Accounting, this includes an activity driver such as regulatory compliance.*

Activity level. A description of how an activity is used by a cost object or other activity. Some activity levels describe the cost object that uses the activity and the nature of this use. These levels include activities that are traceable to the product (i.e., unit-level, batch-level, and product-level costs), to the customer (customer-level costs), to a market (market-level costs), to a distribution channel (channel-level costs), and to a project, such as an R&D project (project-level costs).

Air Pollution Control Devices. *Equipment connected to manufacturing process equipment to reduce, neutralize or minimize the toxicity or hazardous constituents of an air emission. These devices may generate additional waste streams that need to be handled in an environmentally sound manner. Examples include combustion units, bathhouses, electrostatic precipitators, filters, etc.*

Benchmarking. The process of comparing an organization's performance and procedures in a given area to that of the best companies, with the company's current practices compared with those of world-class operations. *In Green Accounting, this could include supplier packaging, recycling or product packaging management.*

Best practices. Also known as competitive benchmarking. A methodology that identifies an activity as the benchmark by which a similar activity will be judged. This methodology is used to assist in identifying a process or technique that can increase the effectiveness or efficiency of an activity. The source may be internal (e.g. taken from another part of the company) or external (e.g. taken from a competitor).

Bill of Activities. A listing of the activities required (and, optionally, the associated costs of the resources consumed) by a product or other cost object.

Capacity. The output capability of a company when it fully utilizes its bottleneck resources to create the maximum value for customers while generating the minimum waste.

Code of Federal Regulations (CFR) United States Compendium of Federal Regulations. *These are broken into titles for different areas of regulations. 40CFR covers the majority of regulations covering the handling, storing and disposition of solid wastes.*

***Conventional cost system.** Any of the older, traditional cost systems that use direct material and/or labor consumed as the primary means of apportioning overhead.

Cost assignment. The tracing or allocation of resources to activities (stage one) or cost objects (stage two).

Cost driver. Any factor that causes a change in the cost of an activity. For example, the quality of parts received by an activity (e.g. the percent that are defective) is a determining factor in the work required by that activity, because the quality of parts received affects the resources required to perform the activity. An activity may have multiple cost drivers associated with it. *In Green Accounting, the design of the product for disassembly or the packaging for disposal would be a cost driver.*

Cost object. Any customer, product, service, contract, project, or other work unit for which a separate cost measurement is desired. *In Green Accounting, environmental measures would not be considered a cost object, but an attribute. However, output of an environmental report for regulatory and stakeholder purposes would be considered a cost object.*

Cost of Capital (CoC). *The sum of the cost of debt and cost of equity expressed as a ratio to total debt and equity (total capital.)*

Cost of Quality (COQ). All the resources expended for appraisal costs, prevention costs, and both internal and external failure costs of activities and cost objects. *In Green Accounting, the COQ model can be applied to environmental COQ for objective setting and measuring. For example, recycling activities can significantly reduce disposal costs.*

Design for Environment (DfE). *The driver of environmental concerns, constraints and objectives into the design of products and processes. An engineering perspective in which the environmentally related characteristics of a product, process, or facility design are optimized.*

Direct cost. A cost that is traced directly to an activity or a cost object. For example, the material issued to a particular work order or the engineering time devoted to a specific product are direct costs to the work orders or products. *In Green Accounting, an example would be the use of chemicals in production of a single product. However, it would be indirect in the production of several products.*

Disposal. *The ultimate disposition of a product or process residual resulting in the material being placed in storage, a landfill or incinerator.*

Effluent. *Liquid residue resulting from a manufacturing process.*

Emissions. *Air or gaseous residue resulting from a manufacturing process.*

Energy. *The unit of power consumed by equipment or a product to perform an activity. Included is the transformation of gasoline, electricity, coal, natural gas, wind, solar, water movement, etc., consumed by the performance of the product or equipment.*

Environmental cost accounting (aka Green Accounting). *Tracking environmental materials and activities and using this information for environmental management decisions. The purpose is to recognize and seek to mitigate the negative environmental effects of activities and systems. Sometimes refers only to a firm's private costs while others include the full range of private and societal costs imposed throughout the life cycle of a product.*

Environmental management system (EMS). *Organizational policies and procedures enacted to ensure that all environmental issues are handled in a quality fashion that works to minimize the operations impact on the environment and comply with regulations.*

Externalities/External costs. *Social costs outside the scope of the producing entity, including costs from environmental activities from the moment of raw material extraction to receipt of parts and from loading for shipment to the customer to complete disposition of the product or parts of the product. The former includes examples like energy, residues, emissions, and waste in intermediate production. The latter includes examples like energy involved in product use, maintenance materials, return, disassembly, treatment, and disposal.*

Financial accounting. 1. The accounting for assets, liabilities, equities, revenues, and expenses as a basis for reports to external parties. 2. A methodology that focuses on reporting financial information primarily for use by owners, external organizations, and financial institutions. This methodology is constrained by rule-making bodies such as the Financial Accounting Standards Board (FASB), the Securities & Exchange Commission (SEC), and the American Institute of Certified Public Accountants (AICPA).

Forcing. The act of allocating the costs of a sustaining activity to a cost object even though that cost object may not clearly consume or causally relate to that activity. Allocating a plant-level activity (such as heating) to product units using an activity driver such as direct labor hours, for example, forces the cost of this activity to the product.

Full cost accounting. *See Environmental Cost Accounting. In traditional cost accounting, this may refer to allocating all direct and indirect historical costs to a product or product line.*

Full cost environmental accounting. *See Environmental Cost Accounting. Sometimes called Total Cost Accounting by environmental professionals.*

Full Cost Assessment aka Total Cost Assessment (TCA). *The process of integrating environmental costs into a capital budgeting analysis. It has been defined as the long-term, comprehensive financial analysis of the full range of internal (private) costs and savings of an investment.*

Full cost pricing. *Including environmental costs in the accounts of business, whose approximation will vary under different conditions in different times and places. For production, this includes the cost of production plus the cost of any environmental damage associated with it so that prices for raw materials and products properly reflect social costs. Without this quantification, resources will tend to be used inefficiently and environmental pollution will likely increase.*

Generally Accepted Accounting Principles (GAAP). *Refers to tenets, practices and principles that come from the Financial Accounting Standards Board (FASB), Accounting Principles Board (APB) and the American Institute of Certified Public Accounts (AICPA).*

Green Accounting. *See Environmental Cost Accounting. Usually used to be distinctive from the word "environment" used to mean surroundings, influences or circumstances.*

Hazardous Waste Management. *The handling, storing, treatment and disposition of hazardous waste which is defined by criteria regarding its potential impact on human health or the environment as established by local regulatory bodies.*

Indirect cost. The cost that is allocated (as opposed to being traced) to an activity or a cost object. For example, the costs of supervision or heat may be allocated to an activity on the basis of direct labor hours. *In Green Accounting, this includes allocating the cost of treating waste water to total units of output.*

Internal Rate of Return (IRR). *The interest rate that equates the present value of the expected future cash flows, or receipts, to the initial cost outlay.*

***Investment management**.** The use of ABC to manage capacity for maximum profitability and to direct capital spending to the most profitable improvement targets. *In Green Accounting, this includes pollution prevention and other equipment that minimizes the environmental impact and risk exposure while reducing cost.*

Life cycle. *The stages of a product, process, or package's life, beginning with raw materials acquisition, continuing through processing, materials manufacture, product fabrication, and use, and concluding with any of a variety of waste management options.*

Life cycle analysis (LCA) aka Life cycle assessment. *The review of the environmental impact of a product or process over its entire life cycle including resource extraction, manufacture, packaging and transportation, use and recycling/disposal.*

Life cycle costing (LCC). A costing concept that argues for including all the costs incurred for a product, from its inception to abandonment, as part of its product cost. *In Green Accounting, this includes cost of extraction, intermediate manufacturing, manufacturing, transportation, product recycling in take-back, disassembling, reverse distribution, restocking used material, disposing of waste, etc.*

Life cycle cost analysis/assessment (LCCA). *The costing aspect of life cycle assessment. It is a systematic process for evaluating the life cycle costs of a system by identifying life cycle cost items, assigning measures of value to those items, and evaluating options for reducing the total life cycle cost and optimizing the use of scarce resources. It includes all private and social costs identified with a product, process or activity throughout its lifetime. Similar to the quality concept Total Cost of Ownership.*

Logistics. The process of planning, implementing, and controlling the efficient, cost-effective flow and storage of raw materials, in-process inventory, finished goods, and related goods from the point of origin to the point of consumption for the purpose of conforming to customer requirements. *In Green Accounting, this can include packaging management, reverse distribution, recycling, etc.*

***Managerial accounting**.** Also known as Management accounting. An accounting methodology that emphasizes data for managerial decisions in contrast to cost accounting which emphasizes determination of inventory costs. It is the process of identifying, measuring,

accumulating, analyzing, preparing, interpreting and communicating financial information used by management to plan, evaluate, and control to assure appropriate use of and accountability for its resources.

Net Present Value (NPV) (discounted cash flow). The present value of the expected net cash flows of an investment, discounted at the cost of capital, less the initial cost outlay of the project.

Non-valued-added activity. *See also* Value-added activity. An activity that is considered not to contribute to customer value or to the organization's needs. The designation non-value-added reflects a belief that the activity can be redesigned, reduced, or eliminated without reducing the quantity, responsiveness, or quality of the output required by the customer or the organization.

Notice of Deficiency (NOD). Formal document from a regulatory inspection and enforcement agency identifying area(s) of non-conformance with regulatory requirement.

Packaging. Outside container or covering for a product, or component used to separate and protect these items during handling, storing and transporting. Includes items such as boxes, drums, bags, pallets, corrugated cardboard, shrink-wrap, bubble pack, polystyrene foam, etc.

***Performance management.** The use of ABC to improve profitability. It includes searching for low-cost product designs, identifying cost reduction opportunities, guiding efforts to improve quality, and measuring performance. *In Green Accounting, this includes reducing environmental impacts as well as improving profitability.*

Performance measure. A financial or non financial indicator of the work performed on and the results achieved from an activity, a process, or an organizational unit. An example of a performance measure of an activity is the number of defective parts per million. An example of a performance measure of an organizational unit is return on sales. *In Green Accounting, this includes reduction and elimination of certain chemicals and materials, increasing training and other preventive activities, and buying environmentally preferred materials and services.*

Performance measurement. A monitoring of absolute rate and trend rate at the operational, tactical, and strategic levels of business.

***Pollution Prevention.** See 3 R's. The reduction in the toxicity or quantity of residues generated during the manufacture of products. This focuses on measures taken to prevent or minimize the generation of wastes and includes: material substitution, product/process redesign or reformulation, reuse and recycling.*

***Post Consumer Product Takeback.** An alternative to disposal by the consumer, used products are sent to reclamation centers for disassembly to reuse the parts or send materials to be recycled or for product refurbishment for resale. More consumer awareness has increased the demand for takeback as part of the sales contract. Some countries, such as Germany and the Netherlands, are introducing legislation concerning packaging recycling and product takeback.*

Potentially Responsible Party (PRP). *An individual or company identified as potentially having involvement and financial responsibility for the cleanup of an abandoned hazardous waste site under the US Superfund program.*

Private costs. *Those costs that affect the firm's bottom line and that the firm actually pays out.*

Process. A series of activities that are linked to perform a specific objective. For example, the assembly of a television set or the paying of a bill or claim entails several linked activities.

Product life cycle. The period that starts with the initial product specification and ends with the withdrawal of the product from the marketplace. A product life cycle is characterized by certain defined stages, including research, development, introduction, maturity, decline, and abandonment.

Recoveries. *Quantity, quality, and income of materials reclaimed for reuse or reprocessing during recycling activities.*

Recycling--Closed loop. *A recycling system in which a particular mass of material is remanufactured into the same product (e.g., glass bottles into glass bottles).. Also known as "horizontal recycling."*

Recycling--Open loop. *A recycling system in which a product from one type of material is recycled into a different type of product (e.g., plastic bottles into fence posts). The product receiving recycled material itself may or may not be recycled. Also known as "cascade recycling.*

Reduce, Reuse, Recycle (3 R's). *Hierarchy of preference for pollution prevention activities from most preferable to least. Catch phrase for Pollution Prevention.*

Remediation. *Activities performed to clean-up or minimize the hazard associated with a contaminated site.*

Residues. *Any non-product item or material generated during the manufacturing process.*

Resource cost assignment. The process by which cost is attached to activities. This process requires the assignment of cost from general ledger accounts to activities using resource drivers. For example, the chart of accounts may list information services at a plant level. It then becomes necessary to trace (assuming that tracing is practical) or to allocate (when tracing is not practical) the cost of information services to the activities that benefit from the information services by means of appropriate resource drivers. It may be necessary to set up intermediate activity cost pools to accumulate related costs from various resources before the assignment can be made.

Resource driver. 1. A factor used to assign cost to activities. 2. A measure of the quantity of resources consumed by an activity. An example of a resource driver is the percentage of total square feet of space occupied by an activity. This factor is used to allocate a portion of the cost of operating the facilities to the activity. *In Green Accounting, the measure of time consumed by all personnel in researching past years of data for compliance reporting drives the cost to this activity.*

Return on Assets (ROA). *The ratio of net profit to total assets. See ROI.*

Return on Investment (ROI). *The ratio of net profit (after taxes) associated with total investment in the firm or project.*

Scrap--Home. *The waste produced within a fabricating plant, such as rejected material, trimmings, and shearings. Home scrap is recirculated within the fabricating plant and does not become external waste.*

Scrap--New (aka Prompt). *Waste produced by users of semifinished products (turnings, trimmings, etc.) This scrap must generally be returned to the materials processor if it is to be recycled.*

Scrap--Old (aka Postconsumer solid waste). *A material that has served its intended use and has become a part of the waste stream.*

Solid Waste Management. *The handling, storage treatment, and disposition of solid waste, solid waste includes solids, liquids and containerized gasses. Hazardous wastes are a subset of solid wastes.*

Storage. *Refers to the regulated activity of storing hazardous wastes prior to transporting, treatment, or disposal. There are specific requirements regarding storage areas, containers, and length of storage time.*

Supply chain cost. *A cost associated with an activity involved in operations as a component of order fulfillment. This includes receiving the order, purchasing materials, making the product, distributing the order and planning and adjusting capacity. In Green Accounting, any activity that contributes to an environmental impact in the supply chain would be an environmental cost within the supply chain.*

Supply chain management. 1. A management technique focusing on operations effectiveness. 2. A strategic management approach to organizing, integrating, and operating business activities.

Support cost. A cost of activities not directly associated with production. Examples are the costs of process engineering and purchasing.

Surrogate activity driver . An activity driver that is not descriptive of an activity, but that is closely correlated to the performance of the activity. The use of a surrogate activity driver should reduce measurement costs without significantly increasing the costing bias. The number of production runs, for example, is not descriptive of the material disbursing activity, but the number of production runs may be used as an activity driver if material disbursements coincide with production runs.

Sustainability. *"Treating the world as if we intended to stay." Used as a desirable yardstick by which to assess human actions, yet is difficult to apply a precise meaning and operationalize.*

Sustainable development. *"Development that meets the needs of the present without compromising the abilities of future generations to meet their own needs" (World Committee on Environment and Development, 1987.)*

Sustainable resource development. *To make sustainable the use of renewable natural resources (water, soils and forests) and conserve non-renewable natural resources through efficient use*

and careful planning. Application of the concept ranges from very broad to very strict and has been difficult to apply to establish goals.

Sustaining activity. An activity that benefits different parts of the organization (e.g., the company as a whole or a division, plant, or department), but not any specific cost object. Examples of such activities are preparation of financial statements, plant management, and the support of community programs.

Take-back. *Refers to regulated or voluntary programs being implemented worldwide where manufacturers are responsible to take-back products and/or product packaging from customers and handle it in an environmentally sound manner.*

Target cost. A cost calculated by subtracting a desired profit margin from an estimated (or a market-based) price to arrive at a desired production, engineering, or marketing cost. The target cost may not be the initial production cost, but instead the cost that is expected to be achieved during the mature production stage.

Target costing. A method used in the analysis of product and process design that involves estimating a target cost and designing the product to meet that cost (should be done throughout the life cycle).

Technology cost. A category of cost associated with the development, acquisition, implementation, and maintenance of technology assets. It can include costs such as the depreciation of research equipment, tooling amortization, maintenance, and software development.

Total Cost Assessment. *See Full Cost Assessment.*

Total quality management (TQM). A set of activities whose purpose is continuous process improvement, whose objective is total customer satisfaction, and whose core concepts include standardization, the efficient use of materials, the critical role of management, design specifications control, reduction of defect rates, SQC, and effective use of human resources.

Total quality environmental management (TQEM). *Total Quality Management applied to environmental management, having the same objectives with an environmental perspective. This includes Design for Environment, Hazardous Waste Management, Environmental Management, compliance programs, etc.*

Total Stakeholder Analysis (TSA). *A systematic cost/benefit analysis of the present and potential impact of a company's processes, products, services, and facilities on all of its stakeholders.*

Transporter. *Carrier of materials, of products by road, air, rail, or water. There are specific regulations applicable when transporting hazardous materials or waste.*

Treatment. *Procedures performed on a waste to change its physical and/or chemical characteristics to reduce the hazard associated with the waste.*

TSD Facility. *Treatment, Storage or Disposal Facility. Regulated facility for the treatment, storage, recycling, or disposal of hazardous wastes.*

Underground storage tank (UST). *Tank buried under the ground and used for storing hazardous materials or wastes. They are typically steel or fiberglass and require monitoring or secondary containment to prevent leaks from contaminating the environment.*

Unit cost. The cost associated with a single unit of the product, including direct costs, indirect costs, traced costs, and allocated costs.

Value-added activity. An activity that is judged to contribute to customer value or satisfy an organizational need. The attribute "value added" reflects a belief that the activity cannot be eliminated without reducing the quantity, responsiveness, or quality of output required by a customer or organization. *In Green Accounting, an example of a valued-added activity would be minimizing waste.*

Value chain. 1. A cost-reduction and process improvement tool that utilizes information collected about business processes and to identify candidates for improvement efforts. 2. Any linked set of value-creating activities, from basic raw materials through the ultimate end-use product or service delivered to the final consumers. 3. The set of activities required to design, procure, produce, market, distribute, and service a product or service. *In Green Accounting, the value chain is redefined to include take-back, disassembly and reuse and disposal of materials.*

Volatile organic compounds (VOC's). *Usually solvents. VOC emissions are linked to two of the world's major air pollution problems--photochemical smog and global warming.*

Waste Analysis Plan. *Regulatory requirements in US to have a quality process in place to ensure that all wastes are sampled and analyzed to verify their regulatory status (hazardous or non-hazardous). TSD facilities are also required to have a waste analysis plan to ensure that they are properly managing wastes that they receive.*

Waste Minimization. *The reduction in toxicity or quantity of waste generated from a facility.*

Special Terms

British Standards 7750 (BS7750). *Standards proposed by the British Standards Institute to establish a quality based environmental management system within a facility. The quality principles and elements are similar to these of ISO 9000.*

Certified Internal Auditor (CIA). *A professional who has achieved certification demonstrating knowledge and competency in independent appraisal activity within an organization for the review of operations as a service to management. It is a managerial control which functions by measuring and evaluating the effectiveness of other controls.*

Certified Management Accountant (CMA). *An accounting professional who has achieved certification demonstrating knowledge and competency in managerial accounting which emphasizes data (financial and non-financial) for managerial decisions. Sometimes combined with the term cost accounting which emphasizes determination of inventory costs. The term cost*

management tends to be used for inventory costing. With the introduction of process costing through Activity-based Costing, cost management encompasses both product and process costing.

Certified Public Accountant (CPA). *An accounting professional who has achieved certification demonstrating knowledge and competency in regulatory external financial reporting information, i.e. public trading, venture capitalists and tax reporting.*

Chemical Manufacturers' Association (CMA). *A consortium of chemical producers in North America, many of which are multinational companies, that began a cooperative program known as "Responsible Care" to improve the industry's health, safety, environmental quality performance, and communications with the public.*

Coalition for Environmentally Responsible Economies (CERES). *An organization established after the Exxon Valdez Oil Spill in Alaska, that put together the Valdez Principles for adoption by companies to demonstrate environmental responsibility.*

Eco-Management and Audit Scheme (EMAS). *A voluntary certification in the European Community to set up an environmental management system that covers all key areas of environmental impacts subject to independent verification. Upon completion of the audit, companies are allowed to use the EMAS logo, which signals they are an environmentally concerned company.*

Global Environmental Management Initiative (GEMI). *An industry supported organization founded in 1990 by the Business Roundtable (composed of 200 chief executives from many industries). GEMI promotes leadership in environmental management and applies TQM concepts.*

Green Index. *Software tool developed by the AT&T Engineering Research Center to assist designers in scoring the environmental attributes of a product and to identify and recommend areas for improvement.*

Green Seal. *A U.S.-based environmental organization that is developing environmental standards for products. Meeting the standards allows display of the "green seal" logo on the product package to promote the environmental "friendliness" of the product.*

International Organization for Standardization (ISO) 9000. *Internationally accepted standards for implementation of an auditable and certifiable Quality System for a facility's operations. The intent is to ensure a recognizable level of quality programs for suppliers.*

International Organization for Standardization (ISO) 14000. *Standards presently being developed for international use for implementation of a quality environmental management system for a facility based on the quality principles and elements of ISO 9000.*

Public Environmental Reporting Initiative (PERI). *Voluntary, non prescriptive guidelines developed for a systematic framework to organize environmental information to"improve, expand, and encourage environmental reporting to the public."*

Society of Environmental Toxicology and Chemistry (SETAC). *International organization that has been working to establish standards for implementing life cycle analysis.*

Society for the Promotion of LCA Development (SPOLD). *Consortium of industry, government, academia and environmental communities to achieve consensus on Life Cycle Analysis tools.*

Strategic Advisory Group on the Environment (SAGE). *Established by the U.N. Business Council for Sustainable Development to establish standards for eco-labeling, auditing, environmental management systems, environmental performance evaluation, life cycle analysis, and products.*

Valdez Principles. *Principles established by CERES that they want companies to adopt to increase their environmental performance. These include public reporting of environmental activities and including an environmental activist on Boards of Directors.*