Environmental Accounting: An Analysis of Environmental Liabilities

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Environmental Accounting:
An Assessment of Environmental Liabilities

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by
Mark James Evans
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Environmental Accounting: An Analysis of Environmental Liabilities

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# Environmental Accounting: An Introduction

**An Overview**

Our Mother Earth: a popular phrase reminding us where we receive the nourishment to sustain life. We reap the benefits from the plethora of lands, waters, and the atmosphere contained in this giant ecosystem we call our own. We dominate and attempt to control almost all facets of the planet as a means of improving our quality of life. Millions of acres have been planted and treated with synthetic chemicals in hopes of multiplying our yields. We construct huge dams altering the natural waterways in order to harness hydroelectric power. Factories, which supply us with everything from cars to clothes, depend on an almost endless supply of energy and often create byproducts in the form of emissions and non-burnable waste. It is in basic practices such as these; extracting fuel from the Earth, converting raw materials into finished goods, and feeding our population that we have disturbed the planet.

Often, advances in technology allow us greater access to our environmental resources. Unfortunately, these advances are often accompanied by detrimental side-effects as we strip resources from the environment faster and in greater volumes than in the past. We are, in effect, manipulating the environment in exponentially greater quantities than ever before. For example, the highly publicized oil tanker *Exxon Valdez* struck a reef in Alaska's Prince William Sound on March 24, 1989. The collision caused 11 million gallons of crude oil to be spilled into the waters. Although this incident received considerable national attention, thousands of less-publicized environmental disasters have been caused by our daily interaction with the planet. This claim is supported by the fact that America has run up an
estimated industrial waste bill of $700 billion to clean up approximately 29 thousand contaminated sites. Hundreds of billions will have to be spent to keep our water drinkable, our air breathable, and the planet suitable for human habitation (13 Silverstein). These frightening figures are often overlooked as companies race to out-do their competitors at any cost.

Locally, some people are being forced to face environmental concerns in a disagreeable fashion. One hundred-six Minnesota companies have received legal notices from the Environmental Protection Agency (EPA) naming them defendants in what has been called "The most fractious 'superfund' cleanup in Minnesota" (Kaszuba A1). Individual companies are being fined from $8 to $20 thousand for dumping hazardous garbage in the Oak Grove Landfill dating back as far as 1967. These fines affect the economic stability of some of the companies involved as well as their eventual ability to remain in business.

As environmental issues such as the Exxon Valdez oil spill and the dumping at the Oak Grove Landfill continue to grow in frequency and magnitude, all sectors of the economy must face the pending implications and prepare to adapt to them. Occupations and professions of all varieties are being forced to evaluate the effect of increasing environmental concerns on their livelihoods and businesses. Although seemingly distant from environmental issues, the accountant is not immune and must also adapt the practice to changing social environmental ideology.

Present Accounting Procedures

Current accounting methods are unable to appropriately represent the problematic environmental concerns we face today. The inadequacy of these procedures can be illustrated by returning to the Exxon Valdez oil spill.
Canadian Chartered Accountant Daniel Rubenstein discusses this issue in his article "There's No Accounting for the Exxon Valdez." Rubenstein focuses on the responsibilities of the Exxon accountants in handling estimated cleanup costs of over $1.25 billion according to The Wall Street Journal (only a portion of which was covered by insurance). Rubenstein writes, "Exxon's accounting staff must have racked their brains - and their disclosure files - to find some precedent for spreading the cleanup costs..." (41). The result was to report income of $160 million (13 cents per share) for the second quarter of 1989. This amount was insignificant compared to the second quarter earnings of $1.2 billion dollars (90 cents per share) the previous year. The drastic drop in income resulted from the incident itself and an accounting profession that was unable to realistically report the economic situation of Exxon.

Hazardous waste and the oil spill both represent a type of environmental liability faced by many companies in the twentieth century. Liabilities are defined as probable future sacrifices of economic benefits arising from present obligations of a particular entity to transfer assets or provide services to other entities in the future as a result of past transactions or events (Mosich 19). It is these environmental liabilities that I feel are being inadequately reported by accountants. Environmental liabilities also come under the more general category of Loss Contingencies which can include incidence of personal injury, remediation (clean-up costs), and violation of environmental laws and regulations. Loss contingencies are defined in Section C59.101 of the Accounting Standards Current Text as:

An existing condition, situation, or set of circumstances involving uncertainty as to possible loss to an enterprise that will ultimately be resolved when one or more future events occur or fail to occur. Resolution of the uncertainty may confirm the impairment of an asset or the incurrence of a liability.
Two problems arise from this definition. One, the definition itself is very broad and the fact that there are no more specific procedures for accounting for environmental liabilities causes ambiguity. Two, the combination of having to determine both the dollar value and the probability of a loss deters many firms from recording the contingency as a liability.

Accountants must adapt the definitions and procedures to better manage environmental matters so that they remain an integral part of a business's environmental activities. The challenge is illustrated by a statement from a United Nations publication:

Numerous surveys indicate that corporate managers are becoming more aware of the environment as an issue. Ninety per cent of corporations surveyed agreed with the statement "The environmental challenge is one of the central issues of the 21st century". The environment was ranked as the number one challenge facing businesses by 650 industry and governmental leaders.

These statistics show that there may be an increasing awareness of environmental issues, but a procedure for handling them has not yet been formulated or nationally accepted. As the environment plays a greater role in financial decisions, accountants must provide decision makers with relevant and reliable information regarding a company's environmental operations.

**Accountant's Purpose and Responsibilities**

The accountant's responsibility to society, the goal of accounting, and how these issues have been affected by changing environmental issues must be discussed and understood before critiquing the way in which accountants report environmental matters.

At the core of accounting is the necessity to provide useful information to individuals, businesses, and other stakeholders so they may make informed
decisions. In order for information to be useful, it must meet the criteria of relevancy and reliability. The inter-relation of these two qualities can best be understood visually (See Appendix I).

Relevant information, one of the two components of decision usefulness, is characterized by its pertinence to decision makers. As illustrated in the appendix, relevant information is timely and has either predictive value or feedback value (also known as forecasting or historical value). Relevant information allows decision makers to evaluate the past, present and expectations about the future (Mosich 15). For example, managers need relevant information about cash inflows and outflows to evaluate liquidity and the company's ability to meet current costs and expenses.

The second element required from financial information is that it must be reliable. The reliability principle states that information must be dependable or, in other words, free from error and bias. Reliable information must also be verifiable and valid such as an estimate of the economic life of an asset made by a unbiased Certified Public Accountant (CPA). This estimate can be considered reliable if other accountants would come to the same conclusion regarding the asset's useful life.

As suggested by Appendix I, both principles (relevance and reliability) need to include the components of comparability and consistency. Comparable information allows a decision maker to judge a financial entity against another financial entity--a very significant factor for stakeholders, especially investors. For instance, before making an informed investment decision, an investor may compare the cash flows of two companies to determine if they may have difficulty meeting short-term obligations.

Consistent financial information allows the decision maker to evaluate entities over a period of years, and can be illustrated using inventories as an
example. Inventories consist of a company's materials, supplies, goods in process, and finished goods. These categories are used by all companies and allow decision makers to compare inventories from year to year within the entity and between entities in the same industry.

The two principles of relevance and reliability along with their components of comparability and consistency are the cornerstones of the accounting profession. Accountants, based on these elements, have developed a framework or set of guidelines for the profession to abide by, namely Generally Accepted Accounting Principles (GAAP).

Formulated by The Securities and Exchange Commission (SEC) and The Financial Accounting Standards Board (FASB), GAAP are the rules accountants must follow. GAAP define accounting terminology (including contingent liabilities and assets) and dictate how financial information should be reported. Preparers, auditors, decision makers, and other readers know that GAAP must be used by all companies and they can interpret financial information in compliance with these principles. GAAP therefore allow accountants to provide information that is mutually understood and accepted in the business community.

Because all companies registered with the SEC are required to submit financial statements audited by a CPA, decision makers can be assured that the principles of GAAP have been observed. This ability to report and attest to a company's financial data gives accountants their niche in business. Decision makers can rely on the data's relevance and reliability to pass judgment on an entity's strengths and weaknesses. If accountants fail to apply the principles consistently, stakeholders would be comparing the proverbial apples and oranges in terms of public companies.
As stated earlier, the GAAP which direct the reporting of environmental issues are not adequately portraying the basic principles of accounting. As a result, environmental issues, as reported in financial statements, are not reliable or relevant. Companies of all sizes and sorts may be accounting for environmental concerns under GAAP, but in a different manner than their competitors. This lack of consistency is caused by the ambiguities of environmental GAAP.

Analyzing what environmental liabilities are and why current accounting principles are failing is my objective. And, in doing so, I hope to discover possible suggestions or improvements for environmental liability accounting.
#2 The Sources of Environmental Liabilities

The accountant, as well as the general public, must understand the circumstances and situations that develop into environmental liabilities. An article from the November 1991 edition of The CPA Letter gives examples of many "red flags" that individuals should look for in determining if an entity's risk of exposure to environmental liabilities is high. Those "red flags" include

1. Participation in a real estate transaction or corporate merger
2. The purchase of land at price much lower than market price (Perhaps a bargain due to environmental risk)
3. Aborted transactions that involved the company as a seller of real property
4. Piecemeal sale of assets while retaining property
5. The purchase of increased insurance coverage against environmental liabilities.

In addition to these red flags there are laws and regulations passed by federal, state, and local governments that often give rise to environmental liabilities. These statutes include The Clean Air Act, The Safe Drinking Water Act, The Resource Conservation Recovery Act, and The Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA).

CERCLA, also known as the superfund statute, and its amendments have defined a wide range of potentially responsible parties (PRPs) in the clean-up of hazardous sites. "This law [CERCLA] allows the EPA to locate hazardous waste sites and force the responsible firm to clean up the site or, alternatively, to do the clean up itself and require the owners to pay the costs incurred" (G. Newell, Kreuze, and S. Newell). The EPA is now required to notify the SEC of new companies named as PRPs; a sign of the interrelationship beginning to form between environmental agencies and the business world.
A number of PRPs are considered liable for hazardous waste cleanup under CERCLA. Those parties include

1. The current owner or operator of a contaminated site.
2. Any previous owner or operator during the disposal of hazardous materials.
3. The generators of the disposed hazardous waste.
4. Anyone who transported the material to the facility. (Zuber and Berry 43)

Emission standards and the removal of chemicals from waste materials before disposal also come under legal guidelines that define environmental liabilities. Companies must comply with regulations to avoid fines and other monetary penalties. This issue of accounting for environmental regulations has been labeled "The Burden of Compliance" (Newell 48). The increasing concern for the environment has caused numerous changes in legislation and toughened the rules for some businesses. As these laws become more rigid, companies are forced to update their present filtering processes or design new systems for compliance.

Silverstein notes the wide range of industries (affected by potential environmental liabilities) that are struggling to comply with regulations. A condensed list includes (58-61)

Steel Making—huge fines for failing to report dangerous toxic emissions.
Computers—Xerox fined $4 million for chemical leak settlement.
Building Suppliers—fined for asbestos related incidents.
Packaging—increasing waste disposal costs and penalties.
Mining—carefully has to watch land depletion levels.
The CERCLA of 1980 is the legislation behind the Oak Grove Landfill litigation, the naming of PRPs in the case, and the eventual incurrence of liabilities for individual companies. The headline of the May 6 Star Tribune reads "Small firms get cleanup bills from big polluters, face lawsuit threat" (Kaszuba A1). The article discusses the implications of a superfund cleanup of the Oak Grove landfill located in Anoka County. An estimated 1000 companies are being cited for contributing to the hazardous landfill. Oak Grove was but one of the 62 landfills and 189 total sites in Minnesota on the federal superfund list. Large, influential companies such as 3M, NSP, Control Data and Northwest Airlines were identified as the landfill's major polluters and responsible for the majority of the estimated $6.5 million dollar cleanup. "Even the smallest of businesses...may be liable because under federal law virtually any waste stream sent to {the}...site may contain hazardous substances subject to broad superfund liability" (1A).

Many small businesses have been under the assumption that once their garbage bill was paid their responsibility for the waste was over. Many are finding this not to be the case. This frustrating misconception was held by Steve Jenson of Jenson's Department Store as he finds himself being held liable for 25 year-old garbage (11A).

Mike Kaszuba's reporting of the Oak Grove Landfill is followed up in the June 15 Star Tribune where he states that the East Bethel and Andover landfills also located in Anoka County may follow suit in trying to recover cleanup costs. The described hazardous waste sites are one of the growing sources of environmental liabilities.

There are also personal injury liabilities caused by environmental matters. Lawsuits claiming damages from exposure to chemicals affects a variety of companies. Often personal injury lawsuits entail substantial sums
and greatly affect a company's financial position. An illustration of environmental liabilities caused by personal injuries can be seen in the ongoing litigation surrounding Fibreboard Corporation. Although the California-based Fibreboard produces wood products and operates a resort near Lake Tahoe, its insulation production has been the focus of the recent publicity. A headline of the August 31st edition of *The New York Times* reads, "Fibreboard faces claims from some 145,000 people who say they were harmed by its products..." (Peter Keer D1). The article continues by discussing the insurance accord reached between Fibreboard and its two insurance carriers, Chubb Corporation and CNA Financial Corp., could award up to $3 billion to Fibreboard. This money would be paid to injured parties but may not cover all pending litigation.

Reclamation, waste water pond closure, and the ultimate closure of production sites are some of the future expenditures or "exit" costs that many companies face. These kind of expenditures also qualify as environmental liabilities. The argument regarding how these costs should be accounted for, either capitalizing or expensing, is a central issue of debate. A capitalized cost is one that is spread over (amortized) over a period of years; an expense is a cost recognized in the single accounting period. According to the publication *Small Business Notes*, a technical advice memorandum issued by the Internal Revenue Service requires expenditures by companies facing environmental cleanup costs to be capitalized, not deducted (expensed). Writing for *The Tax Advisor*, Michael Dell discusses the same issue. He addresses some of the exceptions to the rule but cites contamination assessment, excavation, transportation, disposal, and new soil/backfilling costs as those that should be capitalized and amortized.
There are obviously a variety of circumstances that may lead to, or are, potential environmental liabilities. The next section will analyze why these liabilities are so difficult to measure.
#3 Measurability Concerns of Environmental Liabilities

Inadequate recording of environmental liabilities is leaving many companies defending themselves in Environmental Protection Agency claims, trying to calm irate shareholders, filing bankruptcy, or facing other negative repercussions. The reason why environmental concerns are creating such havoc in the business world is that many of the traditional accounting methods and definitions, discussed in section one, do not encompass these issues and fail to portray economic reality. At the core of the problem is that many environmental liabilities are often difficult to measure. Measure, in accounting terminology, translates to placing a dollar value on the liability.

There are numerous reasons why environmental liabilities are difficult to estimate, and therefore record. In an article by Surma and Vondra, remediation costs (those costs in connection with cleaning up hazardous waste sites) are identified as a company's largest and most difficult to estimate. The concept of joint and several liability provisions multiply the difficulty (Trapp 13). This provision does not require the EPA to prove that a Potentially Responsible Party was negligent or "at-fault". It becomes the duty of the EPA and the courts to apportion the liability based on the factors they consider most reasonable (13).

Particular elements affecting the estimation of environmental liabilities are illustrated in the Surma and Vondra article as follows:
More measurable
(less difficult to estimate)

Experience with similar sites
Fewer PRPS
Stable regulations
Technically straightforward site

Number of regulators
Financial viability of PRPs
Insurance coverage

Complex site
Numerous PRPs
Many possible remediation techniques
Uncertain standards

Less measurable
(more difficult to estimate)

As the liabilities become less measurable, subjectivity plays a greater role. Estimates are less likely to be accurate and therefore reliability is sacrificed.

A factor directly related to the concern of measurability is the timing of the estimated liability. Timing, or the point at which the liability is recognized, has historically varied among companies. Returning to the principles of accounting discussed earlier, one can see that comparability between entities is lost if they recognize liabilities at different points in time. The discrepancy in timing is described by Surma and Vondra, "Some companies recognize liabilities at the sale, disposal, or abandonment of facilities; other recognized them at or before completion or a remedial investigation and feasible study..." (52).

The ambiguity of when a liability should be recognized is so great that companies have legitimate arguments against the accrual of these obligations. For accounting purposes, accrual accounting requires the recognition of expenses when they are incurred. The opposite of this principle is the cash
basis of accounting, or "pay-as-you-go" concept. The controversy of timing realization is caused by regulations and obligations that are not firmly enforced, situations not specifically covered under existing regulations, and the expectations that facilities (disposal sites in particular) will last indefinitely.

Surma and Vondra suggest a conclusion that is sound and succinct, "Financial and business executives must learn to manage, control, and most importantly, predict uncertainties to ensure their enterprises' future competitiveness. As the spotlight on environmental issues becomes more focused, cleanup technology will improve, the estimation of cleanup costs will become easier, and therefore earlier recognition of the liability within the financial statements will occur. This will bring greater structure and consistency to environmental accounting" (55).

Even with a more focused approach ahead, the ramifications of environmental liabilities, their magnitude, and their complexity have initiated the need for environmental auditors. Under a variety of titles, such as corporate greening audit, environmental compliance audit, and emissions audit, these auditors attempt to sift through environmental laws and liabilities. An agreed upon method or procedure for performing the environmental audit has not yet been attained. Yet as early as 1989 the International Chamber of Commerce Working Party on Environmental Auditing issued the following definition of Environmental Auditing:
A management tool comprising a systematic, documented, periodic and objective evaluation of how well environmental organization, management and equipment are performing with the aim of helping to safeguard the environment by (1) facilitating management control of environmental practices; and (2) Assessing compliance with company polices, which would include meeting regulatory requirements" (Goodfellow and Willis 44).

Although an agreed upon definition was a start, little progress has been made in the standardizing of environmental audits. Deciding who these auditors should report to and what their evaluation should consist of (be it qualitative or quantitative) has caused discord. Similarly, there are no generally accepted ways of disclosing and reporting this information to stakeholders via financial statements. The fact that internal and external auditors are mainly scientists and engineers, with neither audit experience nor accounting know-how, adds to the ambiguity of environmental auditing (Goodfellow and Willis 45).

Environmental auditing is an adaptation of the traditional auditing role. The following section discusses the shortcomings of traditional accounting, and suggests how the methodology can be improved.
#4 Traditional Accounting Methods

In his article, "Lessons of Love", Dan Rubenstein questions traditional methods of accounting because of their inapplicability toward environmental issues. The rationale behind this sentiment is that many of the actual stakeholders in a company's operations, including future generations, are not considered. Rubenstein asks us to widen the traditionally narrow concepts of accounting, namely the definitions of assets and liabilities to include these invisible stakeholders.

The problem with our definition of an asset, a potential future benefit obtainable by a particular entity resulting from a past transaction or event, is that it does not consider public goods. Public goods are those things such as air, the quality of usable water, the productivity of land, that no one person or entity owns. Instead, we share these goods communally in the present and with future generations.

Liabilities, as defined earlier, are probable future sacrifices of economic benefits arising from present obligations of a particular entity to transfer assets or provide services to other entities in the future as a result of past transactions or events (Mosich 19). This definition fails to recognize the future economic sacrifices by an entity to unidentified entities (i.e. future generations). Rubenstein expands on the inadequacy of the definition and concept further: "Only explicit contractual obligations to shareholders, suppliers and so on can be recorded as liabilities. Accordingly, since there is no transaction with future generations, the potential liability of dumping toxic wastes at a landfill site cannot be recognized at the time of dumping" (37). The problem then becomes magnified as other definitions stem from those
such as assets and liabilities (i.e., equity—the residual interest in a company or total assets minus total liabilities).

A previously mentioned article by Rubenstein, "There's no Accounting for the Exxon Valdez ", illustrates how traditional accounting terms and procedures conflict with economic reality and the principles of accounting. The reason behind the article's title is that none of the social costs of the spill are recorded, and that expensing the entire cost is in fact "poor accounting" (it fails to match revenues and expenses). Current practices fail in two general categories. One, double-entry accounting is unable to represent resource consumption and therefore handicaps our effort at recording social costs. Two, accounting procedures as currently practiced are penalizing rather than encouraging environmentally responsible entities. Dollars spent on environmental research, prevention, and cleanup lead to lower earnings. An account for "green assets" does not exist (42).

This problem is multiplied by the vague environmental disclosures of many companies. Traditionally, companies have only disclosed what is necessary to "keep out of trouble". This problem is somewhat attributable to the fact that there are no recognition, valuation, or disclosure requirements which specifically relate to environmental issues (Senge 34). This leads many corporations to disclose their environmental concerns in apparently tainted opinions. This observation held true for Merch '92, Osmonics '90, Texaco '90, Waste Management Inc. '91, Chevron '91, and Wisconsin Energy Corp. '91 to name just a few. For example the following excerpt is taken from the 1991 Annual Report of The Upohn Company:
Efforts to force the company to remove a sludge pile from the site of its discontinued industrial chemical operations in North Haven continue. At the same time, efforts are being made to learn more about the nature of the wastes at the site and the alternatives which exist for their treatment, containment or disposal. The company believes that existing accruals are adequate based upon available information, although added costs are reasonably possible.

The 1990 Annual Report of USX contains the following disclosure:

USX is subject to federal, state, and local laws and regulations relating to the environment. These laws generally provide for control of pollutants released into the air and water and require responsible parties to undertake remediation of hazardous waste disposal sites. Civil penalties may be imposed for noncompliance. ...For a number of years, USX has made substantial capital expenditures to bring existing facilities into compliance with various laws relating to the environment. ...USX anticipates making additional such expenditures in the future; however, the exact amount and timing of such expenditures are uncertain because of the continuing evolution of specific regulatory requirements.

Richard Derwent, a senior technical manager with Clark Whitehill, writes on corporate environmental disclosure; "Generally, disclosures by entities refer only to the positive impact of their activities on the environment, and some err on the side of self-congratulation" (94). Marginal disclosures erode the principles of reliability and relevance. Reliability obviously suffers due to a lack of impartial judgment. Relevance is especially affected by the incomplete application of environmental liability disclosure.
To reiterate, "There (are) no generally agreed-upon and uniform way(s) of meeting the growing demand for environmental accountability information, either qualitative or quantitative" (Goodfellow and Willis 49). In hopes of portraying economic reality via the principles of accounting, we must overcome the downfalls of environmental accounting. Rubenstein suggests some standards and solutions that strive toward a greater consistency in environmental accounting. The standards include:

1-Alerting investors and other stakeholders to the amount of insurance companies have against environmental liabilities.
2-Encouraging companies towards prevention rather than reaction in the form of cleanup.
3-Matching the costs of prevention and cleanup with period earnings.
4-Reflecting the "invisible stakeholders" interest in corporate activities.

Standards are important, but the means in attaining those standards are often more difficult to formulate. Some suggestion for improving traditional accounting methods follow.
#5 The Greening of Financial Statements

The problems of accounting for the environment have been defined and the sources from which they arise identified. What remains is to suggest a proposal for improving environmental accounting.

Stephen Senge discusses models of improving environmental accounting in an article entitled "Accounting for the Environment: An Analysis of Issues". Senge gives a brief overview of four of the most prominent revisionist models; the normative, the green, the environmental incentives, and the national asset trust models.

The normative model is broad because it is based on an industry-wide generalization. The social practices of industries would be recorded allowing stakeholders to identify those industries most detrimental to the environment. No defined method of recording these costs was proposed.

The green model also lacks a specific proposal for recording social costs. But, the principle behind the method is to allocate specific dollar values to natural resources and, as firms pollute, charge them a financial fine based on quantities polluted and the specific resource pollution rate.

The environmental incentives model views expenditures toward environmental prevention and cleanup as "investments in the environment." Under this model costs would be recognized as assets, but they would not be depreciated and therefore would not affect the income statement (37).

The fourth method, the national asset trust model, is somewhat similar in concept to the solution I have found to be most accurate in portraying economic reality. The national asset trust model allows individual firms to account for stocks and flows of natural resources while encouraging the sustainable development of those resources. As a business uses and pollutes
clean air or water it would be required to expense the costs of using these social goods.

In an attempt to achieve effective management of natural resources and provide decision makers access to constant, reliable and comparable data on the availability of these resources, Daniel Rubenstein presents a case study illustrating the benefits of a "natural" asset trust model of accounting for the environment (37). (The titles "natural" and "national" asset trust accounts are in most cases synonymous). In analyzing Rubenstein's case study of Hooker Chemical, I began to identify those characteristics paramount in presenting relevant environmental information. Those attributes (parallel to those of the London Environmental Economics Center [LEEC]) outline the formulation of a natural asset trust account in addition to the traditional set of books. The LEEC suggests to:

1-Prepare a balance sheet that identifies the stock resources (the natural assets themselves) available at a specific point in time.

2-Prepare an account that illustrates the use of the stock resources, where they are derived from, and how they are transformed over a period of time (a quantitative way of portraying the flows of natural resources).

3-Make the stock accounts consistent so that the balance sheet amount for a one year can be derived from the previous year's balance plus or minus any flows of the account.

By utilizing these guidelines, Rubenstein feels all production costs and costs to the environment will be recorded in a fashion he calls "ecopreneurship" (37). Incorporating this information into the financial data allows particular statements to become "resource" based.

My solution to some of the problems of environmental accounting is based on the data and circumstances Rubenstein uses in the Hooker Chemical
example. By adapting and expanding his example I hope to present a plausible method of accounting for the environment (39-41).

The natural asset itself, in this case the land, will expand the present set of financial statements by becoming an integral and quantitative part of the reporting process. The land trust account will be accounted for much like a governmental fiduciary fund. In substance, this account becomes its own entity and can be evaluated via its own balance sheet.

The five hypothetical operating situations I will evaluate are for illustrative purposes only, as are all the dollar values (in millions). The operations are the creation of the natural asset account, years of land degradation, a land value boom, a court ruling naming Hooker liable for cleanup, and the cleanup years.

In general, the asset account will be initially recorded at the amount of estimated future degradation costs or the estimated present value of the land's future production value (over the resource's natural regenerative life cycle in some cases), whichever is greater. In Hooker's case, because there are no estimated future degradation costs at this point, the estimated future production value is used. The value is set at $50 million on 1/1/x1, it is determined by rent received on similar land, the potential residential value, the effect of inflation, and average land value increases, all discounted to the present date. The initial entry does not affect any of Hooker's traditional accounting records, but is recorded as follows (journal entry followed by balance sheet status):
Natural Land Fund Trust Account

Natural Asset-Land $50

Invisible Stakeholder's Equity (Fund Balance) $50

(1/1/x1)

Natural Asset-Land $50 = F.B. $50

Throughout the first year of operations, no changes occur in the account and the year-end balance is also $50 million (12/31/x1). But in year x2, some dumping by Hooker has occurred and experts estimate that 20% of the land's value has been lost. The entry in Hooker's books would be,

Hooker's Books

a) Natural Resource Expense $10
   (50,000,000*20%)

b) Transfer due to Natural Asset Fund-Land $10

Entry "a" records an actual expense reported on Hooker's income statement for the period and entry "b" records a liability reported on Hooker's balance sheet. The transactions that affect Hooker's Balance Sheet are totaled in Appendix II. The effect on the natural trust account is,
Natural Land Fund Trust Account

Transfer due from Hooker Chemical $10
(Receivable)

Natural Asset Depletion $10

(12/31/x2)

Natural Asset (land) $50
Less: Acc. Depletion $10
Add: Due from Hooker $10

$50 = F.B. $50

Assume this practice of dumping continued, the year was x20 and the land had been degraded 90% throughout the years. The journal entries recording the expenses and liabilities for Hooker had been made each year as well as the receivable and depletion entries for the natural asset account. The Natural asset trust account would read (90% of 50,000,000 = 45,000,000)

Natural Land Fund Trust Account (12/31/x20)

Natural Asset (land) $50
Less: Acc. Depletion $45
Add: Due from Hooker $10

$50 = F.B. $50

According to Rubenstein, "The underlying economic reality represented by these entries is that the land is now polluted, with limited future value, and
that Hooker (whose dumping was responsible for the degradation of the land) is liable to environmental stakeholders for the cleanup costs" (40).

The third situation in the sequence is that dumping has temporarily stopped and during x21 there is a general land value boom (due to economic circumstances). The value of the land, if used for residential purposes, would now be estimated at $100 million. Thus, the land took on an additional $50 million value that must be recorded. The fact that the land is still 90% depleted creates an additional expense of $45 million now due from Hooker that must be capitalized and amortized over five years. I recommend amortization over five years for the following reason.

Governmental depletion rates range from 5% for gravel and sand to 22% for elements such as platinum, nickel, and uranium. The percentages translate into a range of about 5 to 20 years for complete depletion write-off. By allowing companies to expense depletion over a shorter period, such as five years, the government is encouraging mining in specific industries (the incentive being lower taxable income). In my hypothetical example I have also chosen to capitalize the additional expense over five years. My rationale is that the government would support companies which acknowledge their environmental responsibilities by offering the accelerated rate. The expense ($45,000,000/5 years = $9,000,000/year) is then recorded into Hooker's books.

**Hooker's Books**

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deferred Natural Resource Expense</td>
<td>$36</td>
</tr>
<tr>
<td>Natural Resource Ex.</td>
<td>$9</td>
</tr>
<tr>
<td>Transfer due to Natural Asset Fund-Land</td>
<td>$45</td>
</tr>
</tbody>
</table>
The deferred expense will be eliminated by a debit to Natural Resource Expense and a credit to the deferred account for the next four years.

The resulting entries in the natural asset trust account followed by the updated balance sheet are

<table>
<thead>
<tr>
<th>Natural Land Fund Trust Account (12/31/x21)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Natural Asset-Land</td>
</tr>
<tr>
<td>Invisible Stakeholder's</td>
</tr>
<tr>
<td>(Fund Balance)</td>
</tr>
<tr>
<td>Transfer due from</td>
</tr>
<tr>
<td>Hooker Chemical</td>
</tr>
<tr>
<td>Natural Asset Depletion</td>
</tr>
</tbody>
</table>

| Natural Asset (land)                     | $100      |
| Less: Acc. Depletion                     | <90>      |
| Add: Due from Hooker                     | $90       |

$100 = F.B. $100

At this point a larger liability is shown on the financial statements than traditional accounting would require. The rationale is that, because of the land degradation, the value of the land to society has been diminished by 90 percent.

For the next few years the valuation remains the same as dumping has once again stopped, and no cleanup has been made. In x28 the courts rule that Hooker may be liable for $120 million of environmental damage. Revaluation of the natural asset is again necessary because the estimated cleanup costs are now greater than the future production value of the land. The resulting
entries in the natural asset trust account are followed by the updated balance sheet and finally by the capitalization entries on Hooker's books. (Note, that the asset is still deemed to be 90% depleted by the trust account.)

**Natural Land Fund Trust Account** (12/31/x28)

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Natural Asset-Land</td>
<td>$20</td>
</tr>
<tr>
<td>Invisible Stakeholder's (Fund Balance)</td>
<td>$20</td>
</tr>
<tr>
<td>Transfer due from Hooker Chemical</td>
<td>$18</td>
</tr>
<tr>
<td>(90% of $20,000,000)</td>
<td></td>
</tr>
<tr>
<td>Natural Asset Depletion</td>
<td>$18</td>
</tr>
</tbody>
</table>

---

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Natural Asset (land)</td>
<td>$120</td>
</tr>
<tr>
<td>Less: Acc. Depletion</td>
<td>$&lt;108&gt;</td>
</tr>
<tr>
<td>Add: Due from Hooker</td>
<td>$108</td>
</tr>
</tbody>
</table>

$120 = F.B. $120

**Hooker’s Books**

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deferred Natural Resource Expense</td>
<td>$14.4</td>
</tr>
<tr>
<td>Natural Resource Expense</td>
<td>$3.6</td>
</tr>
<tr>
<td>(18,000,000/5 years of Cap.)</td>
<td></td>
</tr>
<tr>
<td>Transfer due to Natural Asset Fund-Land</td>
<td>$18</td>
</tr>
</tbody>
</table>

The final step of this illustration is accounting for the year that Hooker begins cleanup of the degraded land. In the year x29, Hooker spends $50 million on cleanup, "...And, in a sense, is now repaying its 'debt' to the fund
and the invisible stakeholders" (Rubenstein 41). The journal entry to record this transaction is

<table>
<thead>
<tr>
<th>Hooker's Books</th>
<th>Natural Land Fund Trust Account</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transfer Due to</td>
<td>Cash</td>
</tr>
<tr>
<td>Natural Asset</td>
<td>$50</td>
</tr>
<tr>
<td>Trust Fund</td>
<td></td>
</tr>
<tr>
<td>Cash</td>
<td>$50</td>
</tr>
<tr>
<td>Transfer Due</td>
<td></td>
</tr>
<tr>
<td>From Hooker</td>
<td>$50</td>
</tr>
<tr>
<td>Depletion (Restoration)</td>
<td></td>
</tr>
<tr>
<td>$50</td>
<td></td>
</tr>
<tr>
<td>Cash</td>
<td>$50</td>
</tr>
</tbody>
</table>

The natural asset account itself is adjusted to show the restoration of some of the land's value.

\[
\begin{align*}
\text{Natural Asset (land)} & \quad \$120 \\
\text{Less: Acc. Depletion} & \quad <108> \\
\text{Add: Restoration} & \quad \$50 \\
\text{Effort} & \quad \$62 \\
\text{Add: Due from} & \quad \$58 \\
\text{Hooker (108-50)} & \quad \$
\end{align*}
\]

\[120 = \text{F.B. } 120\]

Because this method, like Rubenstein's, deviates significantly from GAAP it must not only prove a better representation of economic reality, but it must also overcome years of professional molding. Yet, many accountants feel that the profession can overcome this barrier and adapt to changing circumstances, as they have in the past for challenges such as inflation, foreign currency activity, and pensions. By incorporating "resource based"
statements into accounting information, a business's effect on social goods will be measured and reported. In an attempt to make this information more reliable, the duty of environmental auditors should be expanded and better defined. Socially, this would force companies to be responsible for natural depletion and environmental damages under their operations.

Perhaps the method suggested here would fail if subject to the trials of the real world, but some steps should be taken to provide more reliable and relevant information, while taking a positive stance in protecting our most valuable assets.
Forcing businesses to change their environmental accounting methods will not be simple. Having them agree to the costly implementation of environmentally-conscious practices will therefore be a challenge. The key may be in their economic survival. Perhaps pressure from consumers, investors, and policy makers can influence businesses financially and dictate some of their decisions. Business would be forced to respond to these influences to ensure their economic survival, a positive bottom line.

Consumers are the lifeline of most companies and their satisfaction is indisputably important. Jane E. Bruss, an Edina-based international consultant who has written many books on "Greening" corporations, states that "Businesses that anticipate and respond to the consumer demand by making smaller, lighter and greener products gain an early share of the market" (3D). She says that companies that use less energy and fewer natural resources will succeed down the line by outperforming the industry competition. This success can be attributed to the public response to companies that have proven they are operating in a environmentally positive fashion. Furthermore, the outbreak of consumer environmentalism is hardly a trend. This claim is backed by simple demographics. As Alicia Moore illustrates, "The combination of baby-boomers having children and a significant part of the population moving into their senior years means an enormous percentage of the population is taking the attitude of stewardship" (46).

Investors are the primary stakeholders behind the operations of publicly owned companies. Their interest in the environment and the social goods at stake is often twice that of the general public. Not only are they
concerned with the Earth that they and their future generations will inhabit, but they must also consider their direct financial interest in the company itself. Simply put, many investors feel that companies taking an active part to protect the environment are better investments. Moore discusses the actions of a group of institutional investors who control over $150 billion in assets. Speaking together, the investors asked "...Companies to reduce waste, use resources prudently, market safe products, and take responsibility for past harm (to the environment)" (47). The implicit suggestion was that their investment in these companies could be contingent upon compliance.

This sentiment is also shared by Jane Bruss. She states that investors are often "Frightened by the capital expense of tack-on solutions, end-of-the-pipe penalties, [and]...costly accidents, are looking at the environmental performance of companies as a quality criteria" (3D). Companies must retain their present investors and attract new ones. Without properly addressing these investors' concerns through good environmental policies, the corporation's financial backing may evaporate.

In addition to consumers and investors, a third influence is the increasing number of court rulings against companies for lack of environmental liability disclosure. Increasing numbers of shareholders are filing suit for damages claiming that a lack of disclosure misled their investment decisions. For example, one company's stock (Western Capital) sank from $21.50 to a mere $4.75 in one year because of allegations that environmental liabilities were not properly disclosed. One consultant claims that, if he threw a dart at the stock exchange listing of public companies, he could successfully file a non-disclosure suit against that company and win (Feder 10F). Perhaps this is an overstatement, but his point is still apparent
and the threat of lawsuit is becoming a strong incentive forcing companies to reevaluate their environmental accounting methods.

The various influences of the consumer, investor, and policy maker have affected some of the nation's leading corporations. The following is an example of how they have reacted (Business Week April 23, 1990).

IBM has decreased chlorofluorocarbons (CFCs) emission by 31% in the past two years, and has dedicated a research center to climatic study.

General Electric has invested $200 million on environmentally based projects in 1990.

Du Pont will reduce air emissions 60% by 1993 by developing alternatives to (CFCs).

Texaco established a $792 million reserve for environmental programs and has created a new division on environmental health and safety.

Kodak is spending millions of dollars on improved storage tanks and carrying pipes and is also recycling disposable cameras.

Consumers, investors, and policy makers are making an impact on the environmental policies of many companies. These stakeholders look to the information provided by accountants to judge and evaluate which companies they ought to patronize and invest in. The more relevant and reliable this information becomes, the more exact the picture of a company's environmental operations is portrayed.
#7 Conclusion

The discussion of environmental accounting is complete. The environment has been identified as our most valuable asset, and the role it plays in our lives has undergone a metamorphosis. This change in the way we interact with the environment has magnified the accountant's deficiency in reporting environmental liabilities. Fortunately, these deficiencies are beginning to be recognized. Changes in environmental accounting will validate the relevance and reliability of information as well as foster positive environmental practices. Through the influence of consumers, investors, and policy makers, companies will be forced to adapt these accounting changes, and a step will be taken to stop environmental abuses.
Appendix I: Accounting Principles

DEcision USEFULNESS
Accounting Information Characteristics

RELEVANT
1-TIMELY
2-PREDICTIVE VALUE
3-FEEDBACK VALUE

RELIABLE
1-VERIFIABLE
2-NEUTRALITY
3-UNBIASED

COMPARABILITY/CONSISTENCY
### Appendix II: Hooker Chemical

Summary of Account:
"Transfer Due to Natural Asset Fund-Land" (Liability)
(Millions)

<table>
<thead>
<tr>
<th>Year(s)</th>
<th>Event</th>
<th>Amount</th>
<th>Balance</th>
</tr>
</thead>
<tbody>
<tr>
<td>x2</td>
<td>First year of land pollution caused by dumping; creates liability due to Natural Asset Fund</td>
<td>$10</td>
<td>$10</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(12/30/x2)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>x3-x20</td>
<td>Dumping continues throughout the years adding to the liability</td>
<td>$35</td>
<td>$45</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(12/31/x20)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>x21</td>
<td>Land value boom creating additional liability</td>
<td>$45</td>
<td>$90</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(12/31/x21)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>x28</td>
<td>Court ruling against Hooker increases the liability</td>
<td>$18</td>
<td>$108</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(12/31/x28)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>x29</td>
<td>Cleanup efforts begin satisfying a portion of the liability</td>
<td>&lt;$50&gt;</td>
<td>$58</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(12/31/x29)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>


"Courts Begin to Interpret Environmental Protection Agency's Secured Lender Rule." Small Business Notes March 1993, 8:5.


