AN INVESTIGATION OF THE IMPACT OF ENVIRONMENTAL DISCLOSURE ON STOCK INVESTMENT DECISIONS: A BEHAVIORAL FIELD EXPERIMENT

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CHAPTER I

INTRODUCTION

During recent years the concept of social accounting has received widespread attention in accounting literature. The term "social accounting" is used broadly to describe many facets of activities ranging from corporate social performance to the evaluation of governmental programs involving social problems. This study embraces the term only "in the context of measuring and reporting on the impact of a business firm upon society and the physical environment."[1]

Based on the assumption that a primary purpose for which accounting reports are generated is to facilitate decision-making, this study examines the impact of one type of social disclosure--corporate environmental disclosure--on stock investment decisions. However, knowing only how the statement user reacts to environmental disclosure is not enough. Because investor psychology is perceived to be important, the research also examines the problem in terms of human information processing behavior. Hence, there are two primary objectives of the study:

(1) To investigate whether corporate environmental disclosure will affect the users' evaluation of the firm.

(2) To evaluate the effect of environmental disclosure in terms of human information processing theory.

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[1] American Accounting Association Committee on Social Costs, "Report of the Committee on Social Costs," The Accounting Review, Supplement to Volume XLV (1975), p. 53.

Social Costs

Nearly all corporate activities affect society and the surrounding environment. Those activities which inflict losses on society--either directly or indirectly--are known as external diseconomies or social costs. Thus, pollution is a form of social cost.

Although there are many dimensions to what is commonly referred to as the "pollution problem," it is its economic impact that is of significance to the accounting profession. In this respect, it has been argued that " . . .a contributing factor to pollution is the failure of the managerial decision-making process to consider all the costs of producing and distributing a product."[2]

Beams and Fertig go so far as to suggest that accountants, by their refusal to accept social costs as private cost of doing business, are contributing to the deteriorating environment:

> The role of accounting in our current ecological crisis is not passive. Accounting provides information upon which decisions are made--decisions that result in economic and social actions. If the resulting activities disrupt the environment then accounting is, at least in part, accountable for that disruption.[3]

Not everyone agrees with the above viewpoint. For example, Paton argues against broadening the scope of accounting to include social costs:

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[2]American Accounting Association Committee on Environmental Effects of Organizational Behavior, "Report of the Committee on Environmental Effects of Organizational Behavior," The Accounting Review, Supplement to Volume XLVIII (1973), p. 76.

[3]Floyd A. Beams and Paul E. Fertig, "Pollution Control Through Social Cost Conversion," Journal of Accountancy, CXXXII (November, 1971), p. 37.

> I . . . find it difficult to accept the widening of the scope of accounting . . . to include responsibility for measuring pollution of air, water, and so on, and allocating the 'costs' to particular business entities for specific periods. I like to view accounting in fairly broad terms, but we can't cover the waterfront, and we surely don't deserve to be viewed as partners in acts of pollution.[4]

Current Status of Social Accounting

Interest in corporate social accounting has increased significantly in the past decade. The American Institute of Certified Public Accountants, the American Accounting Association, and the National Association of Accountants have all formed committees and published findings on the subject.

The Securities and Exchange Commission (SEC) now requires disclosure of the material effects of compliance with governmental environmental protection laws and the Committee on the Environmental Effects of Organizational Behavior has suggested that more environmental disclosure is needed: "Accountants to date are not adequately disclosing environmental information in the financial statements. This is in contrast to their avowed support of the principle of full disclosure."[5]

While traditionally the SEC has taken the posture that disclosure requirements should be limited to those matters having a financial effect, during recent years the Natural Resources Defense Council and

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[4]W. A. Paton, "Pollution Cost," Journal of Accountancy, CXXXIII (May, 1972), p. 28.

[5]A.A.A.C.E.O.B., "Report of the Committee on Environmental Effects of Organizational Behavior," pp. 93-94.

other public interest groups have challenged the Securities and Exchange Commission to broaden disclosure rules to include corporate social disclosure. In a suit brought against the SEC by the Natural Resources Defense Council, Federal Judge Charles Richey ordered the SEC to study the issue of social disclosure and to issue social disclosure rules for registrants.[6] The issue is still pending; however, the fact that the SEC has been forced to consider social disclosure rules suggests that nonfinancial social disclosure is almost a certainty in the future.

In ruling that the SEC consider expanding corporate disclosure to nonfinancial matters, Judge Richey stated:

> There are many so-called "ethical investors" in this country who want to invest their assets in firms which are concerned about the acting on environmental problems of the nation. This attitude may be based purely upon a concern for the environment; but it may also proceed from the recognition that awareness of and sensitivity to environmental problems is the mark of intelligent management.[7]

Evidence to support Judge Richey's statement exists. For example, several mutual funds, of which the Dreyfus Third Century Fund is the largest, have been formed for the purpose of investing in only "socially responsible" firms. Occasionally, institutional investors have used social criteria in making investment decisions. For example, "in 1973 the World Council of Churches liquidated $1.5 million

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[6] Natural Resources Defense Council, Inc., v. Securities and Exchange Commission, 389 F. Supp. 689 (D.D.C., 1974).

[7] U. S. Securities and Exchange Commission, Securities Act of 1933 Releast No. 5627 and Securities and Exchange Act of 1934 Release No. 11733 (Washington: U. S. Government Printing Office, October 14, 1975), p. 14.

(between 30 to 40 percent of its total shareholdings) in British, Dutch, and Swiss companies doing business with white-ruled African companies."[8] Investor-participants at hearings conducted by the SEC on the issue of social disclosure

> suggested a variety of courses through which shareholders may influence corporate social behavior, including shareholder proposals, political action, discussions with management, refusals to purchase securities, and publicity.[9]

However, most of the participants indicated they would use social information for voting decisions more than for investment decisions.

Unfortunately, while much has been written on the subject of social accounting, little, if any, progress has been made in determining what information should be disclosed or how to disclose it. Moreover, empirical evidence regarding the value of social accounting is virtually nonextistent. As is shown in the subsequent section, none of the accounting publications have addressed the issue of social disclosure in terms of its impact on the behavior of the user.

Literature Review

Publications addressing the issue of social accounting may be divided into two categories. The first consists primarily of constitutive definitions of what the role of the accountant in accounting

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[8]Robert E. Jensen, Phantasmagoric Accounting: Research and Analysis of Economic, Social and Environmental Impact of Corporate Business (Studies in Accounting Research #14), (Sarasota, Florida, 1976), p. 169.

[9]U.S.S.E.C., Securities Act of 1933 Release No. 5627 and Securities and Exchange Act of 1934 Release No. 11733, p. 39.

for social costs should be. The second category provides limited operational definitions and guidelines for social reporting models.

Constitutive Definitions

In 1971, the American Accounting Association established a Committee on Nonfinancial Measurements of Effectiveness. The committee attempted to "search out developments in the area of nonfinancial measures used in business or nonbusiness decision-making, suggest their applicability to accounting and make recommendations for research projects."[10] While the committee failed to reach any major conclusions, its primary contributions probably was to lay the groundwork for future committees on social accounting. This committee was followed, in 1972, by the Committee on Measures of Effectiveness for Social Programs.[11] While the primary focus of this committee was concerned with the difficulties of measuring government social programs, social measurement problems of the private sector were also discussed.

Much of the literature consists of discussions of measurement problems. Such problems exist because many of the transactions affecting an accounting system encompassing social costs and benefits are, by their very nature, elusive and not subject to the verification which accountants have traditionally considered necessary. Because of

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[10] American Accounting Association Committee on Nonfinancial Measures of Effectiveness, "Report of the Committee on Nonfinancial Measures of Effectiveness," The Accounting Review, Supplement to Volume XLVI (1971), p. 166.

[11] American Accounting Association Committee on Measures of Effectiveness for Social Programs, "Report of the Committee on Measures of Effectiveness for Social Programs," The Accounting Review, Supplement to Volume XLVII (1972).

the complicated aspects of social measurement, the American Institute of Certified Public Accountants sponsored an interdisciplinary conference in 1972 for the purpose of exploring some of the problems of social measurement. The conclusions of this group were "social measurement, in some form, is desirable," and " . . . there should be more corporate disclosures of socially relevant information."[12]

The American Accounting Association Committee on Environmental Effects of Organizational Behavior expressed a similar point of view:

> The committee believes that accountants have a substantial role to play in the external communication of environmental effects information, a significantly greater role than they have performed until now.[13]

Nonetheless, because the committee was unable to determine adequate measurement techniques to be applied, they concluded that accountants should refrain from measuring or attesting to social costs. Instead, the committee recommended adequate disclosure of environmental information in the financial reports.

The conclusions of the American Accounting Association Committee on the Measurement of Social Costs are similar. Recognizing that "social measurements may be qualitative or imprecise,"[14] the committee concluded there was a need for social reporting by both internal and

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[12] Social Measurement, (New York: American Institute of Certified Public Accountants, 1972), p. 117.

[13] A.A.A.C.E.O.B., "Report of the Committee on Environmental Effects of Organizational Behavior," p. 94.

[14] American Accounting Association Committee on the Measurement of Social Costs, "Report of the Committee on the Measurement of Social Costs," The Accounting Review, Supplement to Volume XLIX (1974), p. 103.

external decision makers. However, after considering the problems of attestation, the committee reasoned that attestation seemed unlikely in the near future.

The American Accounting Association Committee on Social Costs did not form any conclusions. Rather the committee reviewed the current state of the art of social accounting, described some of the problems of incorporating social accounting into the traditional accounting system, and examined some measurement problems.[15]

In 1976, the American Accounting Association Committee on Accounting for Social Performance updated the previous committee's survey of the state of the art of social accounting. Concluding that "the time has come to start paying some attention to social accounting in the accounting curriculum,"[16] the committee provided suggestions on integrating social accounting into the accounting curriculum. Finally, the committee recommended accounting research in the area of social accounting.

In addition to sponsoring the above committees, the American Accounting Association commissioned Robert E. Jensen to conduct a research project concerning social accounting. The resultant study, published in 1976, (1) chronicles societal pressures which have occurred in recent years and the effect of these pressures in forcing private business to assume greater social responsibility, (2) reviews

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[15] A.A.A.C.S.C., "Report of the Committee on Social Costs."

[16] American Accounting Association Committee on Accounting for Social Performance, "Report of the Committee on Accounting for Social Performance," The Accounting Review, Supplement to Volume XLXI (1976), p. 66.

current efforts to report corporate social information, (3) focuses on one area of social costs--the impact of pollution--and reviews some of the measuring difficulties of recording these social costs, (4) provides a checklist of possible criteria which might be used for evaluating corporate social performance, (5) discusses some research methodologies which might be appropriate in social accounting research and suggests that these methodologies be used in future studies of the social impact of corporate activities. While acknowledging that his study "raises many more questions than it answers," the study is "directed toward researchers with the primary hope of inspiring further research" in the area of social accounting.[17]

As an outgrowth of the interest generated at the 1972 interdisciplinary symposium sponsored by the American Institute of Certified Public Accountants (AICPA), the AICPA appointed a committee on social measurement. This committee prepared a monograph on social measurement in which they describe the characteristics of an ideal social measurement system, delineate some of the problems involving implementation of a social measurement system, discuss the installation and development of a system in specific areas of social concern, and examine the problems and limitations of reporting on social information. The committee concluded that "disclosure of social information will ultimately become a regular feature of corporate annual reporting."[18] Because of

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[17]Jensen, p. 2.

[18]Committee on Social Measurement, The Measurement of Corporate Social Performance (New York: American Institute of Certified Public Accountants, 1977), p. 236.

the many reporting problems, the committee suggests that the accounting profession move into the area of social accounting gradually and audit social information which is auditable rather than wait for an ideal social measurement system to be devised: "The likelihood that one can move directly from providing no assurance to the degree of assurance implied by a professional auditor's opinion seems to be remote. A more likely route is for both to grow together."[19]

The National Association of Accountant's Committee on Accounting for Corporate Social Performance published their first report in 1974. The report is limited to a statement of objectives of the committee and a classification of four major areas of social performance: community involvement, human resources, physical resources and environmental contributions, and product or service contributions. No conclusions are made; however, the committee submits that "the social significance of a corporation's net income should be recognized and then supplemented by measures of additional social effort and impact to determine a more nearly total measure of corporate performance."[20] The committee anticipates future reports on the subject.

The accounting literature also includes numerous individual works urging the accounting profession to expand into the area of social accounting. In 1968, David Linowes, one of the earliest promoters of social accounting, defined socio-economic accounting as "the application

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[19] Ibid., p. 262.

[20] Committee on Accounting for Corporate Social Performance, "Accounting for Corporate Social Performance," Management Accounting, LV (February, 1974), p. 40.

of accounting in the field of the social sciences,"[21] and recommended that accountants extend accounting techniques beyond the measurement of financial events.

Parker also advocated the expansion of traditional accounting to include social information:

> It must be remembered that from a societal viewpoint, accounting's raison d'etre lies in its role as a provider of information useful in making capital allocation decisions. Traditionally, financial accounting theory has guided the information system upon which society relies when making economic decisions. In order for accounting to continue to serve in this capacity, recognition must be given to external costs (and benefits), such as ecological consequences, which have become increasingly material in recent years.[22]

After considering the problems involved in measuring environmental information, Chastain concluded that the accountant's role should be expanded to include environmental information because societal pressures will force business to provide this information and, because so much of the environmental information is of a quantitative financial nature, measuring and communicating this information seems a logical extension of the accounting function.[23]

In his review of recent philosophies toward corporate social responsibility, Beyer suggested that stated goals of the accounting profession should include the establishment of principles of social

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[21] David F. Linowes, "Socio-Economic Accounting," Journal of Accountancy, CXXVI (November, 1968), p. 37.

[22] James E. Parker, "Accounting and Ecology: A Perspective," Journal of Accountancy, CXXXII (October, 1971), p. 44.

[23] Clark E. Chastain, "Communicating Environmental Information," Cost and Management, XLVIII (September-October, 1974), pp. 26-31.

accounting.[24] Keller, in a separate publication, echoed this belief: "There is a need to apply the same accounting techniques to the social activity of the business as is applied to economic activity."[25]

Others, supporting this position include Mobley who argued that "an accounting limited to economic effects provides only a surface view,"[26] and Churchman who submitted, "I believe the accounting profession should become deeply involved in helping society to measure the most critical aspects of social change--of pollution, population, information, whatever."[27]

The above review of literature, although not exhaustive, is representative of the arguments which have been made to extend the boundaries of accounting to include social accounting. Unfortunately, while all of these studies emphasize the importance of social accounting, none provide descriptions of the process necessary to implement social accounting into the present system.

Operational Definitions

The social audit has evolved as a means by which to appraise the impact of a corporation's actions on society. The use of the term

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[24] Robert Beyer, "Pilots of Social Progress," Management Accounting, LIII (July, 1972), pp. 11-15.

[25] I. Wayne Keller, "Planning Corporate Social Performance," Management Accounting, LVI (June, 1975), p. 19.

[26] Sybil C. Mobley, "The Challenges of Socio-Economic Accounting," The Accounting Review, XLV (October, 1970), p. 764.

[27] C. West Churchman, "On the Facility, Felicity and Morality of Measuring Social Change," The Accounting Review, XLVI (January, 1971), p. 33.

"social audit" has been criticized by some on the basis that "there are as yet no generally accepted social accounting principles, no professionally recognized independent auditors, and a general lack of agreed-upon criteria against which to measure a corporation's social performance."[28] However, Bauer and Fenn, who maintain that social responsibility cannot exist without some form of social audit, define the term as "a commitment to systematic assessment of and reporting on some meaningful, definable domain of a company's activities that have social impact."[29] Nonetheless, because of their recent origin, corporate social audits vary considerably both in terms of scope and disclosure.

Due to the absence of a social measurement system, Dilley and Weygandt have concluded that, at the present time, a cost-benefit approach to social disclosure is premature. As a practical alternative, they have suggested a cost approach whereby " . . .the business enterprise discloses its socially responsible activities and indicates the amount spent on each activity."[30] In order to implement their recommendation, Dilley and Weygandt conducted a social audit of a cooperating Midwestern utility company. The results of their audit

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[28]David H. Blake, William C. Frederick, and Mildred S. Myers, Social Auditing: Evaluating the Impact of Corporate Programs (New York, 1976, 1976), p. 3.

[29]Raymond A. Bauer and Dan H. Fenn, Jr., "What is a Corporate Social Audit?" Harvard Business Review, LI (January-February, 1973), p. 38.

[30]Steven C. Dilley and Jerry J. Weygandt, "Measuring Social Responsibility: An Empirical Test," Journal of Accountancy, CXXXIV (September, 1973), p. 63.

were reported in a "social responsibility annual report." Much of the information in the report consisted of information required by government agencies. It included: (1) descriptive characteristics of the company's social impact in the community, (2) the annual poundage of air pollutants emitted, (3) water resource demands for electric power generation, (4) occupational health and safety statistics, and (5) minority recruitment and promotion data.

Using a variety of measurement units, the authors made no attempt to assess the company's social performance. Thus, any judgment concerning the firm's social efforts was left to the reader.

Linowes, who submits that "social-economic audits would inevitably generate social reports,"[31] has proposed a Socio-Economic Operating Statement (SEOS) which is reproduced in Table I.

Linowes' report attempts to compare social contributions against social costs. To qualify as an improvement, "expenditures . . . have to be aimed at enhancing the welfare of either employees or the public, safety of the product, and/or environmental conditions."[32] Only voluntary activities are eligible for inclusion; thus, actions required by law or union contract do not qualify. Detriments are negative SEOS items which "would be charged against the company when a responsible authority brought the need for social action to management's attention but management did not voluntarily take the action required."[33]

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[31] D. F. Linowes, The Corporate Conscience (New York, 1974), p. 102.

[32] Ibid., p. 112

[33] Ibid.

TABLE I

CHEM PRODUCTS MANUFACTURING CO., INC.
SOCIO-ECONOMIC OPERATING STATEMENT
FOR THE YEAR ENDING
DECEMBER 31, 1973

I. Social Actions--People-Related		
A. Improvements		
1. Minority enterprise technical assistance program	$ 4,000	
2. Emergency flood relief	3,000	
3. Training program for handicapped workers	8,000	
4. Executive time--hospital trusteeship	5,000	
5. Minority hiring program--extra training and turnover costs	6,000	
6. Day-care center for children of employees: set-up and maintenance cost; voluntarily established	11,000	
Total Improvements		37,000
B. Less Detriments		
1. Postponed installation of hydraulic safety control system--cost of unit	16,000	16,000
C. People-Related Actions--Net Improvement for the Year		$21,000
II. Social Actions--Environment-Related		
A. Improvements		
1. Cost of installing water quality monitoring system to control pollution	22,000	
2. Cost of clearing and landscaping company-owned ravaged area and dump	41,000	
3. Executive time--free consulting service to state environmental protection agency	4,000	
Total Improvements		67,000
B. Less Detriments		
1. Deferral of liquid waste treatment facility	60,000	
2. Postponed installation of higher smoke stacks to reduce air pollution	19,000	
Total Detriments		79,000
C. Environment-Related Actions--Net Deficit for the Year		($12,000)
III. Social Actions--Product-Related		
A. Improvements		
1. Voluntarily discontinued alkaline product judged unsafe for home use--projected annual net income	23,000	
2. Salary of chemical engineer on loan to government product safety committee	21,000	
Total Improvements		44,000
B. Less Detriments		

TABLE I (CONTINUED)

1. Cost of process redesign to reduce manufacturing hazard--recommended by Safety Council, but implementation deferred	$36,000	36,000
C. Product-Related Actions--Net Improvement for the Year		$ 8,000
Total Socio-Economic Improvements for the Year Ending December 31, 1973		$ 17,000
Add: Net Cumulative Socio-Economic Improvements as at January 1, 1973		$176,000
Grand Total Net Socio-Economic Improvements To December 31, 1973		$193,000

Source: David F. Linowes, The Corporate Conscience, 1974, p. 117.

The major criticism of the Linowes report would seem to be that both benefits and costs are revealed in terms of dollars expended with no attempt to measure the quality of the expenditure.

Estes has proposed a social reporting model in which costs and benefits are reflected from the vantage point of society rather than the firm. A condensed version of the model is shown in Table II.

The objective of the Estes model is "to report fully the direct effects of the reporting entity on other elements of society and on society collectively."[34] The model measures social costs in terms of societal utility losses; however, benefits are measured in terms of outlays. Thus, the major criticism of the model would seem to be its failure to measure the quality of the benefits. Moreover, standardized

[34]Ralph W. Estes, "A Comprehensive Corporate Social Reporting Model," Social Accounting: Theory, Issues and Cases in Lee J. Seidler and Lynn L. Seidler (New York, 1975), p. 203.

measurement techniques are not available for some of the items in his report. At the present time, the model appears to be more conceptual than practical.

TABLE II

THE PROGRESSIVE COMPANY CORPORATE SOCIAL REPORT FOR THE YEAR ENDED DECEMBER 31, 1984

Social Benefits:		
Products and services provided	$ XXX	
Payments to other elements of society	XXX	
Services to employees	XXX	
Improvements in environment	XXX	
Staff services donated to others	XXX	
Equipment and facility services donated	XXX	
Other benefits	XXX	
Total Social Benefits		$ XXX
Social Costs:		
Human services used	XXX	
Raw material purchases	XXX	
Building and equipment purchases	XXX	
Other goods and materials used	XXX	
Payments from other elements of society	XXX	
Environmental damage	XXX	
Public services used	XXX	
Public facilities used	XXX	
Work-related injuries and illness	XXX	
Other social costs	XXX	
Total Social Costs		XXX
Social Surplus (Deficit) for the year		$ XXX
Accumulated Surplus (Deficit) for Company, December 31, 1983		XXX
Accumulated Surplus (Deficit) for Company, December 31, 1984		$ XXX

Source: Ralph W. Estes, "A Comprehensive Corporate Social Reporting Model," Social Accounting: Theory, Issues and Cases in L. J. and L. L. Seidler, (1975), p. 194.

Corcoran and Leininger have proposed an Environmental Exchange Report which utilizes several units of measurement to reflect inputs and outputs of both physical and human resources. Human resource input includes "information such as number of employees, educational level, tenure with firm; number of manhours used by the firm; and number of hours of paid vacation and sick leave."[35] Human resource output consists of employee retirements, terminations, and wage information. Physical resource input describes both direct and indirect materials used while physical output describes "the physical products marketed, the waste and residue resulting from the productive process."[36] Much of the report is in a narrative form. For example, Corcoran and Leininger list the following under "Physical Resources" in their sample report:

> Air--5 tons of solid material in the form of dust were unavoidably emitted into the atmosphere. During the month of June, the firm was fined $3,000 for excessive emissions into the air caused by the breakdown of our air pollution control system. Management decided against suspending production during the breakdown period.[37]

Unfortunately, the absence of certain economic information in the report creates a problem when attempting to evaluate the economic impact of the information. The primary advantage of the model lies in its simplicity and its utilization of existing measurement techniques.

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[35] A. Wayne Corcoran and Wayne E. Leininger, Jr., "Financial Statements--Who Needs Them?" Financial Executive, XXXVIII (August, 1970), p. 45.

[36] Ibid.

[37] Ibid., p. 47.

A less formal proposal to extend corporate social reporting has been submitted by Marlin.[38] After examining the various dimensions of the pollution problem, Marlin concluded that mere disclosure of expenditures and/or compliance information is inadequate because (1) expenditures frequently include costs of new equipment which will serve other purposes in addition to pollution control, and (2) compliance is a meaningless standard because environmental regulations vary considerably among states. Consequently, Marlin has proposed what he believes to be two more meaningful standards. The first of these is his "State-of-the-Art Standard." Its purpose is to determine if ". . . significantly better equipment to control pollution is available. If so, then the present equipment must be called inadequate."[39] To illustrate his proposal, Marlin set up a general guide for a fictitious paper manufacturer in which he listed various discharges associated with pulp production and several methods of controlling these discharges. Each individual mill was then evaluated to determine whether they were using the best possible equipment for each of five kinds of discharges. The results of this evaluation were then summarized in an "annual pollution report" complete with a hypothetical opinion:

> In addition to the financial statements, we have examined to the extent considered necessary in the circumstances all assertions in this report regarding the company's compliance with environmental regulations and the adequacy of its existing and planned pollution control equipment. In our opinion these assertions are consistent with independent inquiries made with regulatory authorities, equipment

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[38]John Tepper Marlin, "Accounting for Pollution," Journal of Accountancy, CXXXV (February, 1973), pp. 41-46.

[39]Ibid., pp. 42-43.

> suppliers and outside scientific consultants; with inspection of company records of equipment purchased and periodic efficiency ratings; and with state-of-the-art standards developed by the AICPA committees on environmental accounting and social measurement and the committee on pollution control of the American Paper Institute.[40]

Marlin also recommended a standard for measuring the types and amounts of pollutants emitted into the air. Compliance with this second standard would also be indicated in his hypothetical opinion.

Obviously, neither the standards nor the committees referenced in the above hypothetical opinion exist. While Marlin has proposed two standards, he has not attempted to provide measuring techniques for setting up these standards. Hence, Marlin's proposal, while interesting, is unworkable.

In 1971, Abt Associates Inc., conducted "the first comprehensive and quantitative social audit completed by a private corporation and presented to the public with other required financial reporting statements."[41] Since that time, Abt has continued to produce, in various formats, an annual social report. Because the Abt social audit "assumes that all social benefits and costs have economic values that can be expressed in monetized, quantitative terms,"[42] the components of the audit report are in dollars.

A condensed version of the 1975 Abt report is presented in Table III. It should be noted that net social income does not flow into the

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[40] Ibid., p. 44.

[41] Clark C. Abt, The Social Audit for Management (New York, 1977), p. 254.

[42] Ibid., p. 26.

social equity account on the social balance sheet; it is assumed to be paid out as it is created.

TABLE III

CONDENSED VERSION OF 1975 ABT SOCIAL REPORT
SOCIAL AND FINANCIAL BALANCE SHEET

	1975
Social Assets:	
1. Staff Assets	$26,727,000
2. Organization Assets	1,012,000
3. Public and Community Assets	940,000
4. Stockholder's Assets	8,417,000
Total Assets	$37,096,000
Social Liabilities:	
1. Staff Liabilities	$26,727,000
2. Organization Liabilities	1,189,000
3. Public and Community Liabilities	270,000
4. Stockholder's Liabilities	4,787,000
Total Liabilities	32,973,000
Social Equity	4,123,000
Total Liabilities and Social Equity	$37,096,000

SOCIAL AND FINANCIAL
INCOME STATEMENT

Social Benefits:	
1. To Company/Stockholders	$16,351,000
2. To Staff	9,197,000
3. To Clients/General Public	17,510,000
4. To Community	151,000
Total Benefits	$43,209,000
Social Costs:	
1. To Company/Stockholders	$15,457,000
2. To Staff	7,626,000
3. To Clients/General Public	16,235,000
4. To Community	45,000
Total Costs	39,363,000
Net Social Income	3,846,000
Total Social Costs and Net Social Income	$43,209,000

Source: Clark C. Abt, The Social Audit for Management (New York, 1977), pp. 256-259.

While extensive footnotes (not reproduced) provide the reader some understanding of the measurement techniques used in the Abt report, the physical and monetary measurements are, nevertheless, complex and controversial. A major criticism of the model is the attempt to reduce social performance to monetary terms. Other criticisms of the Abt report include the content. For example, Jensen observes: "Abt Associates included more in its social audits than have many other firms. But Abt also excluded many possible items."[43]

While a number of private companies have conducted some sort of social audit during recent years, the Abt model is probably the most comprehensive social audit report yet provided.

In summary, the above studies are representative--but not all-inclusive--of those works which endeavor to provide a means to report corporate social activity. Unfortunately, no attempt has been made to evaluate these models in terms of human response.

The Need for Research

The primary factor to be considered in evaluating any form of social reporting is the perceived impact of the information on the user's behavior. If users ignore social disclosure, there is no informational value in the disclosure. Yet, the failure to consider this factor is a common characteristic of all the proposed social reporting models.

Any attempt to expand the range of data currently provided in financial reports represents data expansion. Obviously, this includes

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[43]Jensen, p. 53.

social disclosure; however, there is little, if any, evidence that social disclosure will cause users to alter their judgmental process. Because it seems unlikely that any kind of data expansion is entirely costless, costs could exceed benefits.

"Information is any input that changes probabilities (or certainties) in any way."[44] However, "the utility of a particular type of information cannot be effectively evaluated apart from the users of that information."[45] Regrettably, a satisfactory definition of users remains obscure. While this failure to specify the users prohibits an optimal solution to the social reporting problem, sub-optimal research seems more palatable than no research at all.

Haphazard data expansion without the benefit of empirical study should not be the basis for policy-making. The informational value of social disclosure should be investigated before artibrarily including it in the financial report.

The difficulties of attempting to measure social costs and benefits have already received extensive coverage in the accounting literature; it is time to consider alternative methods of researching social disclosure. Jensen has already argued that there is a need for research along such lines as human response to corporate disclosure: "Analyses of human impressions may be worthwhile in circumstances where direct

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[44] Harold M. Schroder, Michael J. Driver, and Siegfried Streufert, Human Information Processing (New York, 1967), p. 95.

[45] Jerry D. Dermer, "Cognitive Characteristics and the Perceived Importance of Information," The Accounting Review, XLVIII (July, 1973), p. 518.

corporate impact measurement and normative evaluations appear intractable."[46]

One research approach to the problem involves a laboratory experiment in which the impact of corporate social disclosure is measured on human subjects representing different levels of sophistication. While it it recognized that this type of research methodology is suboptimal, it is justified because it is believed to be worthwhile under the circumstances.

> Evidence in science does not usually come in one big dumpload, i.e., most often it builds up one grain at a time. Laboratory experiments sacrifice realism for controls, whereas opinion surveys, self-explication, and other forms of inquiry on real-life behavior sacrifice controls for realism. The sands of each, however, may build upon one another until we at last feel we understand more about information needs and utilizations.[47]

Overview of Subsequent Chapters

The next chapter attempts to develop the background and relationships which support this study. Chapter III describes the methodology used to investigate the value of environmental disclosure in a laboratory setting. Also included is a description of human information processing theory and an attempt to evaluate the environmental disclosure in terms of decision style. Chapter IV summarizes the results of the study; conclusions and policy recommendations are presented in Chapter V.

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[46] Jensen, p. 149.

[47] Ibid., p. 169.

CHAPTER II

BACKGROUND AND BASIS FOR RESEARCH

The Role of Disclosure in Efficient Capital Markets

The primary purpose of the capital market is to allocate ownership of capital stock. Ideally, under this market-directed system, market prices direct capital resources to the most productive uses. Conversely, through this same mechanism, resources are diverted away from less productive uses. The efficiency of this system hinges somewhat on the assumption that market prices reflect the full economic consequences of all available information.

During recent years, considerable attention has been directed to the theory of efficient capital markets. For the most part, empirical research has been directed towards the question of whether investors perceive financial reports as a source of information from which people make their decisions. Most of the research on the theory of efficient markets has centered on testing whether particular subsets of information are completely reflected in security prices. When these subsets are historical prices, the theory is said to be of the weak form. In the semi-strong form, the subsets are defined as all publicly available information. Finally, the strong form of the capital markets hypothesis is concerned with all relevant information.

Essentially, a market is "efficient" if security prices fully reflect all available information. A rather large body of empirical evidence exists to support the proposition that an efficient capital market does exist "in the sense that: (1) market prices "fully reflect" all publicly available information and, by implication, (2) market prices react instantaneously and unbiasedly to new information."[1] In his review of the theory and evidence on efficient capital markets, Fama concluded that ". . . for the purposes of most investors the efficient markets model seems a good first (and second) approximation to reality."[2]

Financial reports are believed to be an important source of information for making investment and lending decisions:

> Accounting reports provide the information by which millions of investors judge corporate investment performance and by reference to which they make investment decisions. Every day, decisions concerning the allocation of resources of vast magnitude are made on the basis of accounting information.[3]

However, the financial report is only one source of information; there are many potential competitors. For example, competitors include national income reports, industrial-production reports, SEC registrations, statements released by corporate officials, reports

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[1]Nicholas J. Gonedes, "Efficient Capital Markets and External Accounting," The Accounting Review, XLVII (January, 1972), p. 12.

[2]Eugene F. Fama, "Efficient Capital Markets: A Review of Theory and Empirical Work," Journal of Finance, XXV (May, 1970), p. 416.

[3]American Accounting Association Committee on Establishment of An Accounting Commission, "Report of the Committee on Establishment of An Accounting Commission," The Accounting Review, XLVI (July, 1971), p. 610.

filed with the Security and Exchange Commission regarding insider trading, and other sources. If any information from any of these sources causes the perceived value of a particular company to change, then, according to capital market theory, this information will be impounded in stock prices. Thus, it seems possible that financial markets could be efficient whether corporate disclosure in financial reports was limited or significant. Nevertheless, because "it seems reasonable to assume that greater knowledge will increase the likelihood that capital will be channeled into its most productive uses,"[4] it would appear that significant disclosure of information is required in order for the market mechanism to accomplish the valuation process necessary to allocate funds for expansion so as to achieve an optimal resource allocation. Hence, it would appear that "efficiency" and "disclosure" are indivisibly linked in our economic system.

Normative Definition of Disclosure

In the broadest sense, disclosure encompasses all information necessary for making intelligent financial decisions about a company. The requirements for disclosure are to be found in the provisions of the Securities Act of 1933[5] and the Securities Exchange Act of 1934.[6] These Acts provide for disclosure of both specific and nonspecific information that is "necessary or appropriate in the public interest or

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[4]William S. Gray, III, "The Need for Disclosure Criteria," Corporate Financial Reporting: The Benefits and Problems of Disclosure, ed. D. R. Carmichael and Ben Makela (New York, 1976), p. 56.

[5]U.S. Congress, 77a, et seq.

[6]U.S.Congress, 78a, et seq.

for the protection of investors."[7] Furthermore, Congress has granted the Securities and Exchange Commission broad powers to adjudge what disclosures, in addition to those specified, should be required.

The Securities Act of 1933 was designed

> (a) to provide investors with material financial and other information concerning securities offered for public sale; and, (b) to prohibit misrepresentation, deceit, and other fraudulent acts and practices in the sale of securities generally (whether or not required to be registered.)[8]

However, the Act was restricted primarily to initial offerings.

Under the Securities Exchange Act of 1934, the fair disclosure doctrine was extended to include all companies registering securities on the national exchanges. Moreover, this Act provided for required reports, the form and content to be prescribed by the Securities and Exchange Commission.

The SEC's 1969 Wheat Report, in reappraising the Securities and Exchange Comission's policies under the 1933 and 1934 Acts, concluded that disclosure is vital in order to protect investors from financial manipulation and to supply investors and lenders with enough information for making informed judgments.[9]

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[7] See Section 10, Securities Act of 1933 and Sections 12 and 13, Securities Exchange Act of 1934.

[8] The Securities and Exchange Commission, The Work of the Securities and Exchange Commission (Washington, 1974), p. 1.

[9] The Securities and Exchange Commission, Disclosure to Investors: A Reappraisal of Federal Administrative Policies Under the '33 and '34 Acts (Washington, 1969), pp. 58-59. (Generally referred to as the Wheat Report.)

Underlying the disclosure requirements of these Acts is the general belief that disclosure enhances the efficiency of the capital markets. Few dispute this belief; thus, there have been no serious challenges regarding the goal of disclosure.[10] However, the method by which the Commission has implimented disclosure policy has been severely criticised.

Recent Trends in Disclosure

Since 1964, when Congress extended the disclosure requirements to companies trading on the over-the-counter markets, there has been ". . . a concerted effort to shift the emphasis in disclosure to building a reservoir of continuous up-to-date information about companies whose securities are the subject of a public trading market."[11] It is this shift in focus from disclosure in connection with the initial distribution of securities to continuous disclosure for the trading market which has prompted considerable criticism against the SEC's disclosure policies.

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[10] An exception to this statement would be the work done by Benston. He studied the subject of disclosure over a period of time and concluded that "the disclosure requirements of the Securities Exchange Act of 1934 had no measurable positive effect on the securities traded on the NYSE." See George Benston, "Required Disclosure and the Stock Market: An Evaluation of the Securities Exchange Act of 1934," American Economic Review, LXIII (March, 1973), pp. 132-153. Also see Irwin Friend and Randolph Westerfield, "Required Disclosure and the Stock Market: Comment," American Economic Review, LXV (June, 1975), pp. 467-472 for a criticism of Benston's study.

[11] Robert H. Mundheim, "Trends in SEC Disclosure for Public Corporations," Corporate Financial Reporting: The Benefits and Problems of Disclosure, ed. D. R. Carmichael and Ben Makela (New York, 1976), p. 56.

One of the problems with maintaining a public file of information is that disclosure is not always timely. For example, the annual report on Form 10-K does not have to be filed until ninety days after the end of the fiscal year. Consequently, the major stock exchanges have traditionally encouraged listed companies to release new information which might affect security prices before the release of the annual report. Hence, the possibility exists that this additional "reservoir of continuous up-to-date information about companies" is expensive and unnecessary because the information has already been impounded in the market price by the time the annual report is released. If this is the case, then ". . . governmental compulsion of disclosure imposes unnecessary costs (and shifts cost burdens from where a free market would place them) without realizing the goals sought by compelling disclosure."[12]

Disclosure and Social Responsibility

As previously stated, the Securities and Exchange Commission has broad powers to determine what disclosures are necessary or appropriate to protect the public interest:

> The Commission's broad discretion to require disclosure provides necessary latitude to expand or contract disclosure rules in light of changes in the relevant context in which securities issuers conduct their businesses. Statutes, business relationships, supply conditions and a host of other factors which could not be foreseen in 1933 and 1934 may today have a significant impact on the financial condition of companies and the priorities of investors.

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[12] Ibid., p. 22.

> If the Commission had not been vested with broad discretion to review continuously and determine the appropriate content of its disclosure requirements, either periodic review and adjustment thereof by Congress would have been necessary or disclosure would have been frozen in the mold dictated by conditions perceived in 1933 and 1934.[13]

In exercising these broad discretionary powers to expand or contract disclosure rules the Commission has traditionally regarded its objectives as disclosing those items which were essentially economic in nature. This is consistent with the spirit of the House Report which preceded the Securities Act:

> The type of information required to be disclosed is of a character comparable to that demanded by competent bankers from their borrowers, and has been worked out in the light of these and other requirements.[14]

The National Environmental Policy Act

Profound changes have transpired since the Commission was established. During the 1950s and 1960s, the deteriorating condition of the quality of air and water in our society resulted in widespread public concern about the environment. Along with this concern was the belief, by many, that business was responsible for this debasement of natural resources. Thus, in the past decade, industrial processes, and the environmental impact of these processes have come under close public scrutiny.

In an effort to deal with existing environmental problems and to attempt to avoid new ones, Congress, in 1969, passed the National

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[13] The Securities and Exchange Commission, Securities Act of 1933 Release No. 5627 and Securities and Exchange Act of 1934 Release No. 11733, p. 3.

[14] U. S. Congress, House, Report No. 85, 73d Congress, 1st Session (Washington, 1933), p. 4.

Environmental Policy Act (NEPA.)[15] Section 101(a) of this Act establishes the "continuing policy" of the federal government "to use all practicable means and measures" to protect environment values. The NEPA is unique in that it authorizes and requires all federal agencies to consider environmental protection when exercising rulemaking authority. For example, Section 102(1) requires that "to the fullest extent possible . . . the policies, regulations and public laws of the United States shall be interpreted and administered in accordance with the policies set forth in (the Act.)"

Against this background, the SEC, in 1973, adopted disclosure rules in order to "promote investor protection and at the same time promote the purposes of NEPA."[16] Essentially, these rules limited required disclosure to those "material effects which compliance with environmental laws and regulations may have upon the capital expenditures, earnings and competitive positions of the issuer and its subsidiaries."[17]

In a suit filed by the National Resources Defense Council in which the plaintiffs asked for review of the SEC's environmental disclosure rules, the district court judge held that the SEC failed to state the environmental disclosure rules in enough detail to enable the court to review the Commission's policies under NEPA. Moreover, the court ordered the Securities and Exchange Commission to implement

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[15]National Environmental Policy Act of 1969.

[16]U. S. Securities and Exchange Commission, "Release No. 5386/ April 20, 1973," SEC Docket (Washington, May 1, 1973), p. 2.

[17]Ibid.

"rulemaking action to bring the Commission's corporate disclosure regulations into full compliance with the letter and spirit of NEPA."[18]

As a result of this directive, the Securities and Exchange Commission scheduled public hearings on April 14, 1975, to examine the issue of social performance disclosure and to determine whether investors desire disclosure information on environmental (and other social) issues.

The number of respondents to the hearings was relatively small; nevertheless, as a result of the testimony, the Commission concluded:

> . . . information regarding the effects a company's operations have on the environment may be important to some investors if the information can be made available in a manageable form without substantial costs which outweight the benefits to investors. The Commission therefore proposes to amend the Instructions as to Exhibits of the various registration and reporting forms to include an additional instruction which would require the disclosure of certain environmental compliance information.[19]

In considering environmental disclosure alternatives, the Commission concluded that disclosure of corporate non-compliance with applicable environmental standards was a feasible option. "Pursuant to federal environmental statutes, most corporations are presently required to monitor and file quantitive reports, which are publicly available, regarding many aspects of their activities which affect the

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[18] Natural Resources Defense Council, Inc., v. Securities and Exchange Commission, 389 F. Supp. 689 (D.D.C., 1974).

[19] Securities Act of 1933 Release No. 5627 and Securities and Exchange Act of 1934 Release No. 11733, p. 49.

environment."[20] Thus, reasoning that environmental disclosure could be made without significant incremental costs, the SEC proposed amendments requiring a registrant to provide a report indicating noncompliance with applicable environmental standards within the past year. As submitted, the proposed amendments required that each report should list ". . . the general nature of the standard exceeded (e. g., air quality or water quality), the date of the report, and the name and address of the agency where the report was filed."[21] In addition, the proposed amendments made mandatory the disclosure of any "material estimated capital expenditures for environmental control facilities for the remainder of its current fiscal year and its succeeding fiscal year; and such further periods as the registrant may deem material."[22]

The SEC Rules on Environmental Disclosure

In May, 1976, the Securities and Exchange Commission issued its "final action" on environmental disclosure as proposed in Securities Act Release No. 5627:

> The Commission's disclosure requirements, as amended today, are designed to elicit information regarding (1) the material effects that compliance with federal, state and local environmental protection laws may have upon capital expenditures,

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[20] Ibid., p. 30. Although compliance reports are public information, practically speaking, under present circumstances, investors do not appear to have ready access to objective information regarding environmental practices because these reports are only available in the localities which are most affected by environmental practices. Thus, there is no central governmental source to which an investor may inquire.

[21] Ibid., p. 50.

[22] Ibid., p. 56.

> earnings and competitive position of registrants, (2) all litigation commenced or known to be contemplated against registrants by a government authority pursuant to federal, state or local environmental regulatory provisions, and (3) all other environmental information of which the average prudent investor ought reasonably to be informed.
>
> Such information appears to be that which is of interest to investors and its disclosure to them would appear also to be of some benefit to the environment. The Commission has also extensively considered whether other types of disclosure requirements might provide additional meaningful environmental information of interest to investors and of benefit to the environment, but has concluded that, at present, this is not the case. Many of the proposals which have been suggested seem to be premised upon the assumption that the Commission has the principal responsibility for substantive regulation of environmental practices. The Commission cannot, itself, undertake to regulate corporate conduct which affects the environment. Congress and the states have created government authorities specifically to perform this function. We must presume that these government authorities are responsibly performing their duties and our disclosure requirements are necessarily premised, in part, upon this assumption.[23]

At the same time, the Commission withdrew its proposal which would have required registrants to provide:

> . . . a list of the registrant's most recently filed environmental compliance reports which indicate that the registrant has not met, at any time within the previous twelve months, any applicable environmental standard established pursuant to any Federal statute.[24]

Defending this action, the Commission stated that required environmental compliance reports

> . . . would not provide additional meaningful information to investors interested in the environmentally significant aspects of the behavior of registrants and that no disclosure alternative of which it is aware would provide such additional information without costs and burdens grossly

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[23]U. S. Securities and Exchange Commission, "Release No. 5704/ May 6, 1976," SEC Docket (Washington, May 18, 1976), pp. 540-541.

[24]Ibid., p. 540.

disproportionate to any resulting benefits to investors and the environment.[25]

This action came after an extended deliberation by the Commission regarding its obligations under the federal securities laws and the National Environmental Policy Act. Unfortunately, the amendment is constitutive with little, if any, empirical evidence introduced to support the basic premise that the environmental disclosure rules, as amended, will enhance the efficiency of the capital markets. In reaching this decision, it appears the Commission arrived at the following conclusions. First, disclosure should be limited to matters affecting investor or shareholder decision-making. Second, environmental compliance reports are both costly and unnecessary to investors. Third, questions regarding disclosure of all other environmental information should be resolved in terms of what the average, prudent investor ought to know. However, the investor's decision model is not identified.

The conclusions supporting the Commission's action on required environmental disclosure are anecdotal and seem to be supported primarily by comments received by the Commission concerning the proposed amendment. For example, regarding their decision to require appropriate disclosure of the material effects of capital expenditures needed to comply with the environmental protection laws, the Commission stated that "the majority of commentators . . . either raised no objection to, or did not comment on, the proposal."[26]

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[25] Ibid.

[26] Ibid., p. 542.

In support of its decision to withdraw the proposal to require environmental compliance information, the Commission stated:

> Comments received by the Commission almost unanimously opposed the proposal to require lists of registrants' most recently filed environmental compliance reports which indicate noncompliance, at any time within the previous twelve months. . . . A significant number of interested parties suggested that the proposals would elicit disclosure which was inherently misleading. In this regard it was asserted that . . . environmental compliance reports generally consist of listings of detailed, technical information which require a comprehensive level of environmental expertise, not possessed by the average investor.[27]

This concept of the average investor seems inconsistent with the Commission's stated philosophy of requiring disclosure specifically designed for professional investors. For instance, the SEC has explicitly acknowledged that certain disclosure is:

> primarily designed to assist professional analysts who have the responsibility of developing an understanding in depth of corporate activity. (It is) not primarily intended to serve the direct needs of the 'average investor.' Such an investor does not usually have the time to study or the training necessary to fully understand the data which are called for. . . .[28]

When the Council on Environmental Quality challenged the Commission's interpretations of its obligations under the provisions of NEPA and suggested the SEC

> . . . solicit from registrants and from federal and state agencies a description of the types of environmental impact information gathered and submitted to these agencies . . . and then determine how such information could best be summarized and disclosed. . . .[29]

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[27] Ibid., pp. 542-543.

[28] U. S. Securities and Exchange Commission, "Release No. 5427/ October 4, 1973," SEC Docket (Washington, October 16, 1973), p. 526.

[29] SEC, "Release No. 5704," p. 544.

the Commission responded as follows:

> The Council's suggestion is not designed to, and would be unlikely to, produce information of the type which investors appear to be interested in. Furthermore, if the availability of summaries and condensations of this type would promote environmental goals, we believe that it is the responsibility of the government authorities which receive such information in the first instance to see that summaries . . . are made publicly available. In any event, in the absence of any indication that the substantial costs involved in such summarization would be outweighted by the resulting benefits, a determination which appears to be totally beyond the scope of our expertise, any such undertaking would clearly be inappropriate.[30]

Thus, the SEC made it quite clear that it does not consider social disclosure in general as falling under its area of responsibility nor does it consider its decision inconsistent with the provisions of the National Environmental Policy Act. Moreover, the Commission appears to have reaffirmed its traditional position that its role is to disclose only that information which is of financial or economic interest.

Nonetheless, dissatisfied with the Commission's decision to limit social disclosure to capital expenditures for environmental compliance purposes and to withdraw the other proposed environmental disclosures, Judge Richey recently ruled that the SEC's action violated the National Environmental Act. Consequently, the SEC has, once again, been ordered by Judge Richey to reconsider its position on environmental (and other social) disclosure.

With these continuing pressures from Judge Richey, the Natural Resources Defense Council, and other critics, it seems reasonable to assume that more social (environmental and other) disclosure will be required in future corporate financial reports. This, of course, will

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[30] Ibid.

expand the range of data currently provided in the accounting report model.

Data Expansion

During recent years there has been what appears to be a growing interest in expanding or supplementing traditional financial reports. For example, the AICPA Study Group on the Objectives of Financial Statements recommended a supplementary statement of financial activities which would "disclose events not described elsewhere, such as purchase commitments and changes in sales backlogs."[31] Data expansion has also been reflected in the significant increase in disclosure required by the Securities and Exchange Commission during the past decade.

Revsine has suggested that "one explanation for the recent emphasis on data expansion in external reporting is our lack of knowledge concerning detailed user decision models."[32] Proponents regard data expansion as an attractive means of compensating for the limitations of the present accounting model when users' needs for information are unknown.

Implicit in the argument for data expansion is the premise that additional disclosure will enhance the efficiency of the markets. "When information . . . is not disclosed to the general public, some

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[31]AICPA Study Group on the Objectives of Financial Statements, Objectives of Financial Statements (New York, October, 1973), p. 38.

[32]Lawrence Revsine, "Data Expansion and Conceptual Structure," The Accounting Review, XLV (October, 1970), p. 705.

individuals might obtain it and earn above average returns at the expense of all other investors."[33] The data expansion "school" appears to regard data expansion as an attractive way of avoiding these pitfalls of private information within our economic system. Information which is not available to decision makers cannot be used in the decision making process. However, if new data is incorporated into external reports and the decision maker incorporates this new information into his decision, then, certainly, the expanded financial report has contributed to a better allocation of resources. Thus, the argument that more is better than less if market prices are to fully reflect all available information is intuitively appealing. Furthermore, the logical extension of this argument would appear to support the inclusion of environmental compliance (and other social information) in the financial reports.

Unfortunately, there is some evidence that too much information could be dysfunctional:

> Information overload occurs when the human information processing system receives so much data that it is not able to accomodate to it. The demands that the information load makes on the processor lead to less than optimal behavior and send the user beyond the level of optimal performance into his area of "negative returns."[34]

Since the ultimate factor to be considered in making judgements regarding the value of financial disclosure is the perceived impact of

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[33]Baruch Lev, Financial Statement Analysis, (Englewood Cliffs, New Jersey, 1974), pp. 251-252.

[34]Jacob G. Birnberg, "Human Information Processing and Financial Disclosure," Corporate Financial Reporting: The Benefits and Problems of Disclosure, ed. D. R. Carmichael and Ben Makela (New York, 1976), p. 255.

that disclosure on the human information processor, more knowledge is needed regarding the investor's decision model.

Human Information Processing

While it has long been recognized that the user is an important consideration in determining what data should be included in the financial report, the lack of knowledge as to how people process information has hindered progress in developing an optimum reporting system. However, some recent studies in the field of psychology have provided some helpful insights into information processing.

Information processing "refers to the nature and interdependence of conceptual rules available for organizing dimensional values."[35] Schroder, Driver and Streufert have formulated a model of the human information processing system which argues that the relationship between conceptual level and environmental complexity is a U-shaped curve (see Figure 1.)

Initially, according to the model, more information results in improved decision making. Later, as the environment becomes more complex, increments of data become less useful. Finally, when so much data is provided that the system cannot cope with the massive amount of data, the system shifts into overload and begins to yield negative returns. This model, which applies to both individuals and groups, recognizes that not all systems are alike. Some systems use very little data; others use large amounts. However, at the two extremes of the U-curve, all systems appear to resemble each other.

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[35]Schroder, Driver and Streufert, p. 14.

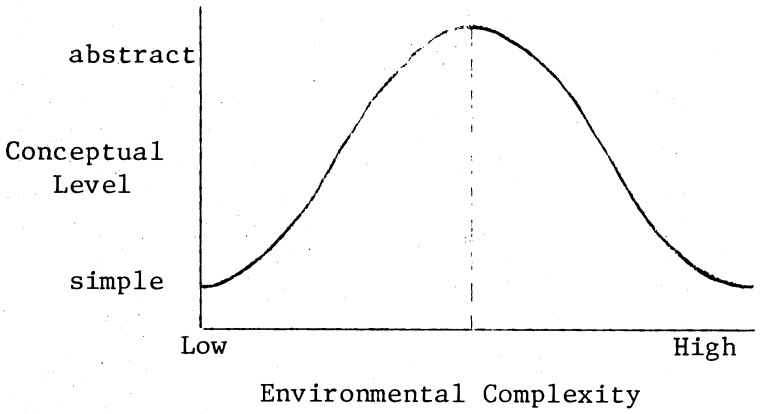

Figure 1. Relationship Between Conceptual Level and Environmental Complexity

Whether the volume of financial disclosure has reached the point where it reduces the effectiveness of decision making is, of course, unknown. However, it does seem reasonable to believe that expanded financial disclosure could impede, rather than strengthen, the value of the financial reporting system.

How can the demands by the data expansion "school" for more disclosure be resolved against the arguments and research on information overload? Unfortunately, there is no easy solution to this dilemma. However, if accounting is to provide useful information for financial decision making, some attempt should be made to resolve the issue. Obviously, there will always be those clamoring for more information. Likewise, it is probable that financial disclosure will never satisfy all users. Nonetheless, haphazard data expansion based solely on the argument that it might help someone is not the answer. At the same time, the argument of an overloaded system should not prevent the

inclusion of new information when such information is deemed significant. As the environment changes, new information may be required. It was for exactly this reason that the Securities and Exchange Commission was originally granted broad discretionary powers for determining disclosure requirements.

Information and Decision Making

Beaver defined relevant information as that which changes expectations. Moreover, "not only must there be a change in expectations but the change must be sufficiently large to induce a change in the decision maker's behavior."[36] While financial statement users are assumed to be decision makers who evaluate a firm's financial position in order to make future predictions, "various kinds of nonaccounting information are obviously relevant for decision making."[37]

Obviously, all information cannot be disclosed in the financial report. If disclosure is to contribute to the efficient allocation of resources, then the "usefulness" of proposed disclosure should be examined in terms of its effect on statement users. Specifically, proposals, such as the SEC's recent pollution disclosure amendment should be carefully examined in an attempt to determine whether the additional "load" on the environment has any relevance to the decision maker.

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[36]William H. Beaver, "The Information Content of Annual Earnings Announcements," Empirical Research in Accounting: Selected Studies, 1968, Supplement to Vol. VI, Journal of Accounting Research, p. 69.

[37]Lev, p. 247.

Ideally, such non-financial information should be incorporated into financial reports and examined in order to determine whether the ensuing decisions are an improvement over those made without the benefit of the added information. Evaluation, however, "requires a specification of the decision model for which the information is used. . . . A promising framework for the evaluation of accounting information is provided by the portfolio model."[38]

Portfolio Theory

"Portfolio theory provides a decision context within which to access information issues."[39] The portfolio model was developed to deal with investment decision problems under uncertainty and "is the most advanced and well-specified investment decision model currently available."[40]

The traditional approach to security analysis has utilized accounting data as a means of determining the "intrinsic value" of a security. The object of this "intrinsic value" approach is to ascertain whether an individual security price varies from its intrinsic value; in other words, the purpose is to detect overvalued or undervalued securities. Implicit in this type of single security analysis is the premise that capital markets are inefficient. However, as

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[38]Lev, p. 250.

[39]William H. Beaver, "The Behavior of Security Prices and Its Implications for Accounting Research (Methods)," Report of the Committee on Research Methodology in Accounting, The Accounting Review, Supplement to Vol. XLVII (1972), p. 410.

[40]Lev, p. 250.

indicated earlier in this chapter, extensive empirical evidence exists to support the premise that:

> Capital markets are both efficient and unbiased in that if information is useful in forming capital asset prices, then the market will adjust asset prices to that information quickly and without leaving any opportunity for further abnormal gain.[41]

Thus, if one accepts the efficient capital market theory, one must conclude that "unless the investor has inside information, searching for overvalued and undervalued securities is not an optimal decision strategy."[42] What then, is the role of accounting data in an efficient capital market? Basically, there are two roles. For the securities market as a whole, information serves as a means of establishing security prices so as to allocate funds and, hence, to achieve a better allocation of resources. For the individual investor, "the only potential value of accounting information . . . would be the assessment of the risk (and hence, expected return) associated with a given portfolio."[43]

The traditional "intrinsic value" approach is a one-parameter model which assumes a world of perfect certainty. Under these conditions, the investor should buy the security providing the highest rate

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[41]Ray Ball and Philip Brown, "An Empirical Evaluation of Accounting Income Numbers," Journal of Accounting Research, VI (Autumn, 1968), p. 160.

[42]William Beaver, Paul Kettler, and Myron Scholes, "The Association Between Market Determined and Accounting Determined Risk Measures," The Accounting Review, XLV (October, 1970), p. 655.

[43]Beaver, "The Behavior of Security Prices and its Implications for Accounting Research (Methods)," p. 425.

of return (or net present value). However, under the real world of uncertainty, the investor must consider not only the rate of return but also the risk involved in predicting this return.

The essential element of portfolio theory is that it incorporates uncertainty into the investment decision model; thus, portfolio theory is a two-dimensional risk-return decision model which utilizes a probability distribution for estimating future returns for each security. Only two parameters of the distribution are considered--the mean and the variance. The mean represents the security's expected return and the variance is used to measure the deviation of actual from predicted outcomes; hence, the variance measures the riskiness of a portfolio. In an efficient market, "all securities will be priced such that there is a single, market determined relationship between rate and return."[44] Thus, the expected return increases as risk becomes greater.

The Markowitz portfolio model, as simplified by Sharpe, assumes a linear relationship between individual security returns and market returns:[45]

$$R_{it} = a_i + B_i R_{Mt} + u_{it}$$

where: R_{it} = rate of return on security i for period t,

a_i = intercept,

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[44] Ibid., p. 426.

[45] The basis of portfolio theory was developed by Markowitz in the early 1950's. However, the original Markowitz Model required the estimation of a tremendously large number of variables. Sharpe reduced the number of variables; thus, simplifying the model. See William F. Sharpe, Portfolio Theory and Capital Markets (San Francisco, 1970), for a detailed presentation of portfolio theory.

B_i = slope of the relationship between the individual security i and all other securities in the market,

R_{Mt} = rate of return on all other securities in the market, and

u_{it} = stochastic factor representing individualistic component of R_{it}.

Thus, the variability (riskiness) of an individual security's return is affected by both the variability of the market as a whole (systematic risk) and the variability of the individual security (unsystematic risk).

It has been shown that within a large diversified portfolio, unsystematic risk can be eliminated; thus, the contribution of risk by an individual security is measured by its beta coefficient, B_i. Accordingly, the individual investor should not be concerned with the individual security's return but rather its impact on the entire portfolio of securities. In other words, only systematic risk becomes relevant in evaluating portfolio performance because the market will not pay a risk premium for unsystematic risk which can be diversified away. At the same time, investors will demand a risk premium for the systematic risk element of a security because the risk element cannot be eliminated.

To summarize, portfolio theory provides an investment decision model with considerable empirical support. For those who prefer to evaluate accounting (and non-financial) information in terms of the context of portfolio theory, security analysis is reduced to assessing

the systematic risk coefficient. Consequently, "the role of accounting data becomes its predictive ability with respect to B."[46]

If one accepts portfolio theory as an investment decision model, then:

> Given an expected value of B for a particular security the investor can be expected to make periodic (depending on the flow of relevant information to him) assessments of the B of each security in his portfolio to determine if that security continues to provide the required rate of return to compensate for the degree of risk with regard to the total portfolio that that particular security contributes.[47]

While most accountants believe that financial reports provide information which investors find useful in predicting the correlation between an individual security's variance and that of the market as a whole, no one knows what non-accounting data is impounded into security prices which might affect a particular value of B. Thus, it seems possible that environmental disclosure could have informational value to investors. Furthermore, it is possible that environmental compliance reports, dismissed by the SEC as "unlikely to produce information of the type which investors appear to be interested in,"[48] might cause an individual investor to reassess the B of a particular security within his portfolio. Failure to comply with environmental standards may suggest future expenditures for pollution control, fines, or even the forced closing of some plants--all of which could have negative effects

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[46]Beaver, "The Behavior of Security Prices and Its Implications for Accounting Research (Methods)," p. 424.

[47]Darrel W. Davis, "An Empirical Investigation of the Association Between Reported Earnings and Corporate Bond Prices" (unpub. Ph.D. dissertation, Oklahoma State University, 1975), p. 34.

[48]SEC, "Release No. 5704," p. 544.

on future profits. Moreover, pollution control is costly, hence it seems plausible that an investor would incorporate such non-financial data into his assessment of B.

Unfortunately, the SEC failed to supply any empirical evidence to (1) support its decision to require disclosure of expenditures for environmental control facilities, and (2) conclude that environmental compliance reports were of no value. In fact, empirical works addressing the issue of pollution disclosure are virtually non-existent. A review of the literature reveals only one study concerning the impact of pollution disclosure on investment decisions.

Belkaoui's Study of Pollution Disclosure

In an attempt to measure the impact of pollution control information on investors, Belkaoui conducted a behavioral field experiment in which subjects were asked to invest in two fictional firms.[49] The subjects were comprised of three groups: students, senior officers from commercial banks, and members of the National Association of Accountants. Each subject was provided with either conventional financial statements, conventional statements including the disclosure of abatement cost information in the footnotes, or statements disclosing abatement costs in both the income statements and the footnotes. In addition, subjects were asked to make their investment decisions under two different investment policies: (1) investment for income, and (2) investment for growth.

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[49]Ahmed Belkaoui, "The Impact of the Disclosure of 'Pollution Control' Information on The Investors: A Behavioral Field Experiment and A Market Reaction Investigation," (unpub. Ph.D. dissertation, Syracuse University, 1972.)

Belkaoui hypothesized that the investment decision would be affected by each of the independent variables--group membership, accounting treatment, and investment policy. Using an analysis of variance model to test his hypothesis, Belkaoui observed that both the accounting treatments for pollution control information and group membership had an effect on the investment decision. Bankers reacted to pollution control disclosure whether investing for income or for growth. The effect of pollution control disclosure was only significant for accountants when investing for capital gains. Finally, no significance was observed for students under either investment policy. Belkaoui concluded that "abatement costs information ought to be disclosed completely in the financial statements. Their impact on the investors' behavior has been significant in this experiment, especially for bankers."[50]

For the second part of his study, Belkaoui studied the behavior of stock prices of fifty companies during the twelve months before and after pollution control information was disclosed in the annual reports. Belkaoui theorized that the informational content of the pollution information would result in security price changes after the date of disclosure. Underlying this expectation was the efficient capital markets hypothesis which states that security prices adjust instantaneously to new information. A similar study was applied to a control group of fifty firms which did not disclose pollution information. As a result of the stock market investigation, Belkaoui observed:

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[50]Ibid., p. 86.

> The investigation of the 'pollution control' disclosing firms showed a drastic change in their price actions subsequent to the disclosure date of the annual reports. The investigation of the firms in one control group showed a drastically different stock behavior. The interpretation would be that the market made a conversion of the 'positive effect' of pollution control expenditures into higher share valuations. This follows the efficient market hypothesis.[51]

As a result of his study, Belkaoui concluded that pollution control expenditures were relevant to financial statement users and recommended that such information be disclosed in the annual report. However, generalizations about Belkaoui's conclusions are suspect. The principal limitation of his stock market study would seem to be his research design. Using a static-group comparison, he assumed that the differences in price behavior between the experimental and control groups were due to the pollution control information disclosure. However, the study did not provide for any formal means of certifying that the two groups would have been equivalent had it not been for the experimental variable, i.e., the disclosure of pollution control information. Moreover, it is possible that information regarding pollution control had been "leaked" to the public prior to the release date of the annual report. In that case, an efficient capital market would already have impounded the pollution information into the security prices. Thus, it is possible that the observed price changes were caused by some other variable.

Belkaoui's field experiment is also of limited utility because of its lack of external validity. Laboratory experiments are subject to numerous methodological limitations. Respondents operate in a sterile

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[51]Ibid., pp. 117-118.

environment which is not necessarily isomorphic to the real world. Thus, results of the experiment apply only to the subjects studied. Moreover, Belkaoui described his subjects as "lower echelon individuals who are more likely to follow some set of fixed decision rules in their investment decision."[52] Attributes of experimental subjects cannot be described by such sweeping assumptions. However, Belkaoui made no attempt in the study to identify the subjects in terms of information processing behavior.

Finally, Belkaoui conducted his study prior to the time the Securities and Exchange Commission first proposed pollution information disclosure. Thus, the SEC's disclosure amendment specifies a different form than Belkaoui used in his experiment. Moreover, prior to the SEC's action on pollution disclosure, companies disclosed such information on a voluntary basis; hence, it is possible that such disclosure was biased towards "positive" information.

Conclusions Regarding Environmental Disclosure in Financial Reporting

Allowing the process of haphazard data expansion to continue in determining the content of the financial report is not in the best interests of the accounting profession. There are several reasons why environmental disclosure should be investigated. First, there is little, if any, evidence that environmental disclosure will cause users to alter their judgmental process. If users ignore the additional data, then there is no informational value in the disclosure. Second, if

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[52]Ibid., p. 88.

users are unable to enhance their decisions with the additional data, then the concept of information overload may become an issue. Finally, as the public becomes more aware of corporate "social responsibility," it is possible that there is a need for disclosure of non-financial data, such as environmental compliance information.

Such non-financial information might be used by investors to judge management's ability to perceive society's changing demands so that they can act to keep the corporation profitable in the long run. Hence, the non-financial information might be used to evaluate the riskiness of the security.

In summary, some critical means of evaluating the relevance of environmental disclosure to financial decision-making is needed. In the following chapters, an attempt is made to determine whether environmental disclosure appears to have information value to the subjects tested. In addition, the research examines the problem in terms of decision style theory.

CHAPTER III

HYPOTHESES AND METHODOLOGY

Introduction

This chapter presents the hypotheses and methodology utilized to accomplish the objectives of this research. The first objective was to investigate the effect of environmental disclosure on users' decision making. In connection with this objective, the following null hypothesis was formulated:

> Ho^1: Disclosure of corporate compliance or non-compliance with applicable environmental standards in the annual report does not possess informational content.

However, questions concerning the content of financial reports cannot be resolved without considering the impact of the financial reports on multifarious users. Annual reports are used by diverse groups with various levels of financial sophistication. Thus, questions concerning the content of financial statements "invariably transform themselves into questions about perception, information processing and decision making."[1] While behavioral research in accounting is replete with methodological problems; nonetheless, as interest in investor psychology increases, a greater need for methodological refining becomes obvious. Although it is impossible to test the representativeness of

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[1]Thomas R. Hofstedt, "Some Behavioral Parameters of Financial Analysis," The Accounting Review, XLVII (October, 1972), p. 679.

"surrogate investors" until the "investor" is completely identified,[2] "behavioral research in accounting simultaneously must consist of theory-building and methodology (sic) refining. The problems of identifying significant variables and generalizing from experimental findings are inextricably linked."[3] Thus, a secondary objective of this study may be regarded as a "methodological experiment" in which an attempt is made to learn more about certain behavioral parameters of the receiver or user of accounting information. Certain key questions are considered: (1) What is the importance of the pollution disclosure information relative to that of the conventional statements? (2) Assuming that earnings per share is an important variable, will a decrease in earnings per share cause subjects to place more emphasis on the pollution disclosure information? (3) Is the pollution disclosure more influential as a negative force rather than a positive force in the decision making process? (4) Will all subject groups arrive at similar investment decisions in spite of differences in financial sophistication? (5) What is the effect of information processing behavior on the investment decision?

While the answers to these questions are obviously important in determining the content of annual reports, behavioral characteristics have been somewhat ignored in the designing of financial reporting

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[2]Beaver and Demski have addressed the issue of heterogeneous users and have concluded that "we cannot rely on a single, isolated investor in our description of the investor setting." William H. Beaver and Joal S. Demski, "The Nature of Financial Accounting Objectives: A Summary and Synthesis," Studies in Financial Accounting Objectives, 1974, pp. 170-185.

[3]Hofstedt, p. 692.

systems. Thus, this paper explores certain behavioral factors in terms of (1) levels of financial sophistication, and (2) information theory. In order to provide insight on the research methodology used, a review of certain features of information processing and decision style theory follows.

Human Information Processing and Decision Style Theory

The human information processing system model and decision style theory have developed through the "differential" school of cognitive psychology. According to this school of thought, it is assumed that "people differ in cognition but that categories of people can be identified with similar thought processes . . . . The advantage of this approach is that one can generalize yet be concerned with individual differences."[4] The approach is unique in that it specifically considers the decision maker as a human information processing system.

According to human information processing theory, the maximum level of information processing is achieved at some optimal level of environmental complexity (point X in Figure 2.) As environmental complexity increases or decreases (points Z and Y) from the optimum level, the conceptual level of information processing decreases. Thus, the conceptual level of the decision maker is influenced by the environmental complexity. Since, for the user of financial statements, the perceived complexity is a function of the content of the annual report,

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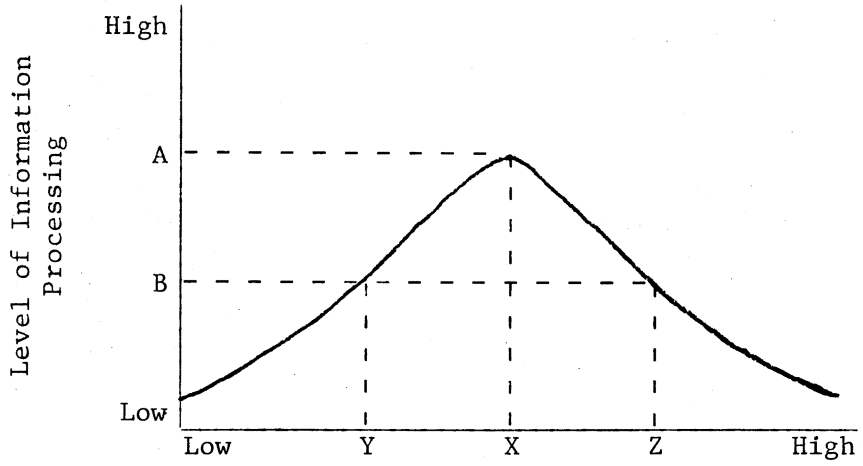
[4]Michael J. Driver and Theodore J. Mock, "Human Information Processing Decision Style Theory, and Accounting Information Systems," The Accounting Review, L (July, 1975), p. 495.

it seems that accounting does influence users' conceptual levels. Therefore, in order to provide more "useful" information, some knowledge of the users' data needs and decision models is desirable.



Source: Schroder, Driver and Streufer, p. 37.

Figure 2. General Relationship Between Environmental and Behavioral Complexity

Levels of Information Processing

Driver and Mock have postulated two dimensions of information processing. These dimensions are the amount of information used and the degree of focus in the use of the data.[5] The amount of information used varies according to the conceptual scheme of the decision maker.

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[5]Ibid., pp. 496-497.

At one extreme is the minimum data user who uses only enough data to make a reasonable decision within a minimum amount of time; at the other extreme is the maximum data user who perceives all of the available data to be relevant. Ignoring time, he examines the data until several superior solutions materialize.

The degree of focus refers to the number of conclusions reached by the decision maker. At one end of the scale is the person who sees all data as unambiguous. Since the problems of choice rarely arise, this person is able to form a single conclusion. The person who interprets several meanings from the data is at the other end of the scale; this person will generate multiple solutions regarding any given set of data.

From these two dimensions, four fundamental decision styles have been identified.

Decision Styles

The decisive (or simple) decision style identifies and evaluates stimuli unidimensionally. Because speed and efficiency are of the utmost importance, this style utilizes a minimum amount of data to form a single solution or decision. An example of the decisive style might be the investor who makes a decision based on a simple fixed rule regarding the change in earnings per share.

The flexible style, the second decision style, might be characterized by ambivalence for, at this level, there is not one fixed rule for decision making. At this level, alternate interpretations of stimuli exist; however, due to the absence of fixed rules for acting on these alternatives, no systematic arrangement for processing

the data exists; thus, there is confusion resulting in different interpretations at different times. This style is similar to the decisive style in that it uses minimal data, but unlike the decisive in that the flexible style likes variety and prefers multiple solutions.

The third decision style, referred to as the hierarchic or moderately high integration style, is systematically able to arrange various dimensions and discriminate among them. This style is able to utilize large amounts of data to form one best conclusion. At this conceptual level there is abstractness as opposed to fixity. Moreover, this style remains open and is able to perceive the effects of alternatives after making a decision.

The difference between the hierarchic style and the fourth decision style, the integrative style, is only a matter of degree. The latter style is highly effective in integrating a complex and changing amount of stimuli. Using large masses of data, this decision style generates multiple solutions. "At this level, the ability to discover and utilize information about a range of stimuli at any given time is maximized."[6]

Research in decision style theory has indicated that most individuals employ one dominant decision style except when the environmental load is very high or very low in which case most systems shift to either the flexible or decisive styles. However, some individuals consistently utilize more than one style. The integrative/hierarchic mixed style, although somewhat complex, is common enough that it is sometimes referred to as a fifth decision style.

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[6]Schroder, Driver and Streufert, p. 23.

While each decision style has a different point at which the optimal level for processing occurs, research has suggested that all styles tend to behave similarly as the information load increases; moreover, each style tends to achieve its maximum performance at the same level of complexity as evidenced in Figure 3.

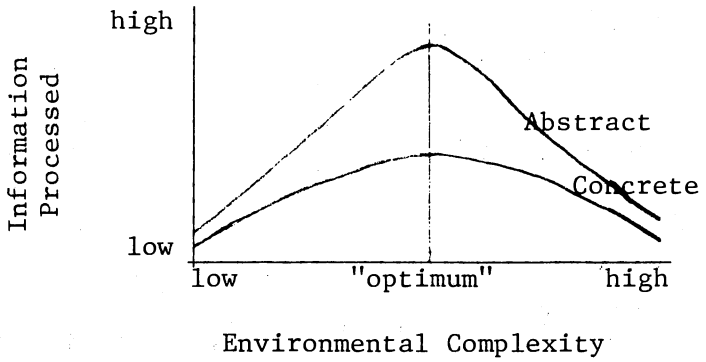

Figure 3. Conceptual levels for Concrete and Abstract Groups.

Two psychometric measures of decision style have been validated in laboratory and field studies. One involving a business problem which the subject solves and then explains his use of the data is the APSE (Administrative Problem Solving Exercise.) The other measure is the CXSD, a questionnaire which "reveals a person's self concept regarding his use of information."[7] Used together, these two measures have been found to be reliable in analyzing decision style.

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[7]Driver and Mock, p. 499. The letters CXSD are merely designation letters and do not stand for anything.

Decision style theory seems to have implications for accounting. Specifically, in the case of the proposed amendment to expand the financial report to include environmental disclosure, it is postulated that this will increase the environmental complexity of the decision maker; hence, it could have a bearing on the resultant decisions of the users. This experiment attempts to assess the subjects' use of the added disclosure in terms of his or her decision style.

Behavioral Hypotheses

The principal hypothesis presented in the initial section of this chapter represents an approach to evaluate the informational content of disclosure of corporate compliance or non-compliance with applicable environmental standards in the annual report. The remaining hypotheses, exploratory in nature, have to do with the impact of four variables: subject type, decision style, decision time behavior, and the amount of information utilized in the decision making process.

A major problem confronting the behavioral researcher involves the use of laboratory subjects. Are students good surrogates for businessmen? Are businessmen in a laboratory environment good surrogates for businessmen in the real world? Unfortunately, the quality of subjects cannot be measured until the "investor" is completely identified. However, assuming that investors do vary according to their level of financial sophistication, it seems reasonable to speculate that these differences will affect their investment decisions. Thus, this research examines three classes of subjects in order to assess the difference in decision behavior among the groups.

In an attempt to classify subjects according to financial sophistication, three subject classes were selected according to their education and experience. The first group was undergraduate accounting majors, the second group was MBA students, and the third group was businessmen. In an endeavor to test whether behavioral differences in the decision making process of these three groups exist, the following hypothesis was proposed:

Ho^2: Subjects' investment decisions will not differ according to their degree of financial sophistication.

In a further attempt to learn more about the behavioral aspects of users of accounting information, the effect of decision style on an investment decision was investigated. Presumably, subjects with different decision styles process information differently. Accordingly, it seems intuitively appealing to expect this difference in information processing behavior to affect the investment decision. In connection with this expectation, the following hypothesis was formulated:

Ho^3: Subjects' investment decisions will not differ according to their information processing behavior.

Human information processing theory is still in an early exploratory stage; however, according to the theory, the simple or concrete decision style tends to form a decision based on simple fixed rules; therefore, it is expected that persons of simple styles will utilize a smaller amount of information in making their investment decisions. Conversely, "integratively complex persons . . . perceive more conflicting elements of information in more situations."[8] Moreover, the complex styles "differentiate and integrate more complex

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[8]Schroder, Driver, and Streufert, p. 144.

information than do concrete structures."[9] Consequently, it is expected that complex styles will use more information from the experimental display than the concrete decision styles. Finally, because the integratively complex styles seek more information before making resolutions, it is expected that persons with integratively complex styles will take more time arriving at their investment decision than persons with concrete styles.

Because the results of prior studies involving similar expectations are inconsistent, the following two hypotheses were tested in an attempt to contribute to the human information processing literature.[10] While the results may provide some insight into the behavioral effects of the proposed disclosure on the subjects tested, it is believed that the findings will be too preliminary to affect current policy making; however, the findings may have value to the accounting researcher.

Ho^4: The amount of information used in the investment decision will not vary according to decision style.

Ho^5: The time required to make the decision will not vary according to decision style.

Description of the Experiment

For purposes of this study, the population of interest was defined as investors utilizing annual reports. A behavioral laboratory

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[9] Ibid., p. 126.

[10] See, for example, Driver and Mock, pp. 490-507, and Richard S. Savich, "The Use of Accounting Information in Decision Making," The Accounting Review, LII (July, 1977), pp. 642-651.

experiment utilizing both graduate and undergraduate students as well as businessmen provided the data. The sample of 125 subjects consisted of fifty-one undergraduate accounting majors, forty-two MBA students and thirty-two business executives. The ninety-three students were enrolled in a medium-sized Midwestern university and the businessmen were from middle to upper management levels at various firms within the geographical area; all of the businessmen had accounting backgrounds.

The Experimental Task

Subjects were asked to assume the role of an investor, to read and analyze financial statements provided them, and to make an investment decision. Subjects were provided with complete financial statements for two actual companies for the year 1971; the statements were edited only to the extent that the year and the identity of the companies were disguised. The companies used in the experiment were selected from the steel industry for two reasons. First, the steel industry has been identified as a major polluter, and second, and more importantly, information on the adequacy of pollution controls for both air and water pollutants for 1971 was available for this industry.[11]

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[11]This information was taken from the Council on Economic Priorities' in-depth study of the environmental quality of the steel industry. The CEP is a non-profit organization established to investigate practices of U. S. corporations that affect society and to disseminate information regarding their findings. Their year-long study was conducted on the basis of public data only; for example, water discharge information was obtained from mill Refuse Act permit applications and air emission information was gathered from both state and local pollution control agencies. See Council on Economic Priorities, Environmental Steel, IV (May, 1973).

Each subject was told to assume he had $100,000 to invest between the two companies, Company A and Company B. Company A had experienced an increase in earnings per share (from $2.72 in 1970 to $2.85 in 1971). Company B's earnings per share figure had declined from $1.63 in 1970 to $1.44 in 1971. In an attempt to provide as much realism as possible, the experimental display included complete annual reports (including all statements, footnotes, and the president's letter) as well as selected economic information for the past five years. In addition, the experimental groups also received disclosure information on the adequacy of pollution controls for both air and water pollutants for the various plants for both companies. However, because neither of the companies involved in the study appeared to have a "good" pollution record, one display was purposely revised to indicate a better state of compliance. The experimental display is reproduced in the Appendices.

The Experimental Design

Subjects were randomly assigned to four experimental groups and one control group. Randomization was also used within each group as to which company's statements were received first. The control group was asked to make their investment decisions based on the conventional statements for the two companies. All experimental groups received the conventional statements along with pollution compliance information. For Experimental Group I, the company with increased earnings per share was paired with "good" compliance information and the company with decreased earnings was paired with "bad" compliance information (Treatment I). Experimental Group II

was provided with the same information as Experimental Group I; however, the environmental disclosure information was switched so that the company with increased earnings per share included "bad" compliance information and the company with decreased earnings per share included "good" compliance information (Treatment II.) Experimental Group III received Company A (with increased earnings per share) and Company B (with decreased earnings per share); however, both displays included only "good" compliance information (Treatment III.) Experimental Group IV received the same treatment as Experimental Group III except that both displays included only "bad" compliance information (Treatment IV.) A diagram of the experimental design is shown in Figure 4.

Instructions and Setting

Each subject was provided with written instructions which stated the industry, the current stock prices of the two companies, and the investment objective. The investment objective was five years appreciation. This time period was selected in the belief that during this period, pollution compliance or non-compliance would affect the performance of the companies. The instructions emphasized that each subject was to make the investment decision entirely by himself but that any form of analysis the subject chose to use was acceptable.

Besides being asked to allocate the $100,000 between the two companies, the subjects were asked the following: (1) What additional information, if any, would you like available for evaluating these reports? (2) Besides the information furnished you, what additional information, if any, did you use in evaluating these reports? (3) If

your investment objective was for a period other than five years, would you have allocated the $100,000 differently? (4) How much time did you spend on your investment decision?

Experimental Group I

Treatment I

Aic
Bdn

Company A $ _____

Company B $ _____

TOTAL $ 100,000

Experimental Group II

Treatment II

Ain
Bdc

Company A $ _____

Company B $ _____

TOTAL $ 100,000

Experimental Group III

Treatment III

Aic
Bdc

Company A $ _____

Company B $ _____

TOTAL $ 100,000

Experimental Group IV

Treatment IV

Ain
Bdn

Company A $ _____

Company B $ _____

TOTAL $ 100,000

Control Group

Ai
Bd

Company A $ _____

Company B $ _____

TOTAL $ 100,000

KEY

A = Company A
B = Company B
i = increased earnings per share
d = decreased earnings per share
c = "good" compliance with pollution standards
n = "bad" compliance with pollution standards

Figure 4. Diagram of the Experimental Design

While the experimental task was administered on several occasions, all administrations were conducted in the same manner. Once the experimental display was handed out, subjects were not controlled. In most cases, subjects completed the experiment without being observed by the experimenter.

Upon submitting their analysis for the two companies, subjects were given both the APSE and the CXSD tests for measuring decision style. In addition, the subjects were asked to list each bit of information used in their decision from the experimental display.

Experimental Variables And Tests of Significance

Experimental Variables

The experiment was designed to test the hypotheses listed in the previous section. The design contained three levels or factors: subject type, decision style, and treatment. Three response variables were recorded. These variables were the amount invested in Company B, the number of items used in the decision, and the time required to make the decision. Due to the uneven distribution of data within levels, a three or two factor design was not used to test the hypothesis of differences in factors. Some cells had few or even no data. For this reason, a multivariate approach was not used.

One-Way Analysis of Variance

The one-way analysis of variance is a statistical technique used in testing whether a set of two or more sample means can be accepted as

random samples from the same population. The test is performed to reject the null hypothesis that there is no difference in the population means across all categories of the independent variable. If rejection occurs, then the alternative hypothesis that there is a difference in the population means across all categories is accepted. These hypotheses may be stated as follows:

$$H_o: u_1 = u_2 = u_3 = \ldots . u_n$$

$$H_1: u_1 \neq u_2 \neq u_3 \neq \ldots . u_n$$

where: u = the mean score for each category and

n = the number of categories.

In order to use the analysis of variance test, certain assumptions are necessary: (1) there must be interval measurement, (2) the sampling distribution must be normal, (3) samples must have common variances, and (4) samples must be independent of each other.

Acceptance of the alternative hypothesis permits the researcher to conclude that the dependent variable is significantly affected by the independent variable. Conversely, if the null hypothesis cannot be rejected, then the inference is that the independent variable does not significantly affect the value of the dependent variable.

In this study, the analysis of variance was used to examine what relationships exist between the independent variables--subject type, decision style, and treatment--and the dependent variables--the amount invested in Company B and the time required to make the decision.

Specifically, the one-way analysis of variance was used to address the following four research questions:

1. Will additional pollution disclosure affect the users' investment decision?

2. Will subjects' investment decisions differ according to their degree of financial sophistication?

3. Will differences in information processing behavior affect subjects' investment decisions?

4. Will the more complex decision styles utilize more decision time than the simple or flexible styles?

Kruskal-Wallis Test

The Kruskal-Wallis test is a nonparametric test which can be used as an alternative to the one-way analysis of variance test whenever there are a number of independent random samples and an ordinal scale level of measurement exists. The Kruskal-Wallis test is similar to the analysis of variance in that it enables the researcher to determine whether or not a relationship exists between the independent and the dependent variable. Unlike the analysis of variance test, the Kruskal-Wallis does not require the assumptions that all variances are equal or that interval measurement exists. Because of these relaxed assumptions, the Kruskal-Wallis method was employed in testing the effect of the independent variables on the number of items used in the decision. Since the number of items used was somewhat arbitrarily classified, it appeared that ordinal, rather than interval, measurement existed within this category.

The Kruskal-Wallis method is similar to the one-way analysis of variance in that it tests the null hypothesis that the category samples are from the same population. However, the Kruskal-Wallis differs from the analysis of variance in that the former replaces each of the observations (in all categories) with ranks in a single series. The ranks of each cagegory are then summed and these sums are inserted into the following formula:

$$H = \frac{12}{N(N + 1)} \sum_{j=1}^{k} \frac{R_j^2}{n_j} - 3(N + 1)$$

where: k = number of samples,

n_j = number of cases in jth sample,

N = number of cases in all samples combined,

R_j = sum of ranks in jth sample (column.)

The Kruskal-Wallis test permits the researcher to determine whether the ranks are so dissimilar that they are unlikely to have come from samples of the same population. The Kruskal-Wallis test was used in testing the fifth and last research question: Will the more complex decision styles utilize more information from the experimental display than the decisive or flexible styles?

A Priori Expectations

Due to the exploratory nature of the research, especially within the human information processing context, pre-experiment expectations are not well-developed hypotheses; however, certain "priors" are advanced.

Treatment-Investment

Because an increased earnings per share trend and compliance with pollution standards are both considered to be favorable signals for a company's profitability, it is hypothesized that subjects receiving Treatment I will invest more heavily in the company reporting these signals than in the company experiencing decreasing earnings per share and non-compliance with pollution standards. However, when the pollution compliance information is switched for Experimental Group II

(Treatment II), certain questions arise: (1) When a company has increased earnings per share and non-compliance or decreased earnings per share and compliance, will subjects perceive a conflict? If so, (2) Which has more influence in their investment decision, the earnings per share trend or the pollution disclosure?

Pollution control is costly; recognizing this fact, it is not unlikely that a company that has made progress in controlling its pollution problems would have done so at the expense of reduced earnings and, therefore, decreased earnings per share. On the other hand, a company exhibiting increased profits at, perhaps, the expense of pollution control, may only be postponing future outlays for pollution control, fines, or both. Hence, it is believed that the sophisticated investor will recognize the potential impact of noncompliance on future profitability and place more emphasis on the environmental disclosure and less emphasis on the earnings per share trend.

Since the experimental display provided subjects in Experimental Group III indicated compliance for both companies and the experimental display provided subjects in Experimental Group IV indicated non-compliance for both companies, it is expected that these two groups will place less emphasis on the environmental disclosure and more emphasis on the conventional statements.

Finally, it is hypothesized that environmental disclosure will cause investors to alter their decisions; it is expected that there will be a difference in allocation of the $100,000 between the control and experimental groups. In summary, the expectations are:

1. Experimental Group I will invest more heavily in Company A than in Company B.

2. Experimental Group II will place more value on environmental disclosure information, thus resulting in a greater investment in Company B than will occur among either the other three experimental groups or the control group.

3. The investment decisions of Experimental Groups III and IV will be similar. Because the pollution disclosure within each group will be the same for both companies, it is expected that the value of the environmental disclosure will be negated. Both treatment groups will be expected to invest more heavily in Company A.

4. The Control Group will invest more heavily in Company A than in Company B. However, due to the lack of reinforcement provided by the pollution disclosure received by Experimental Group I, the investment by the Control Group in Company A will be less than that invested in Company A by Experimental Group I.

Subject Type-Investment

While most laboratory experiments utilize students as subjects, these studies have frequently been criticized on the basis that students are poor surrogates for actual decision makers in the real world. It is interesting to note, however, that experiments utilizing businessmen as subjects have met with less disapproval. "A valid theoretical question, however, is whether businessmen in an experimental situation are good surrogates for businessmen in a non-experimental setting."[12] Unfortunately, sufficient evidence regarding the validity (or lack of validity) of using either students or businessmen as surrogates is lacking.

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[12]American Accounting Association Committee on Research Methodology in Accounting, "On The Use of Surrogates in Behavioral Experimentation," The Accounting Review, Supplement to Volume XLVII (1972), p. 459.

Hofsted has argued that "researchers cannot make simple and sweeping assumptions about the representativeness or non-representativeness of experimental subjects or tasks."[13] Moreover, Jensen, a former critic of laboratory experiments, has advocated "experiments relating corporate social accounting information to human response."[14] Jensen suggests that evidence from these studies might enable accounting researchers to identify "types" of people, thus leading "to better ways of predicting human responses to corporate social impacts, information, or lack of information."[15]

In an effort to contribute to the literature regarding the "surrogation controversy," this study attempts to assess whether significant differences exist in the behavior of the three subject types defined in this experiment.

Because of conflicting results from previous studies, it is difficult to make any strong predictions regarding subject types. However, it is hypothesized that businessmen, due to their greater experience, will be more sensitive to the experimental manipulations than either of the two student groups.

Decision Style-Investment

The application of decision style theory to accounting is relatively new and a review of the literature indicates that the results of

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[13]Hofsted, p. 692.

[14]Jensen, p. 169.

[15]Ibid.

empirical studies in the field are somewhat inconclusive. Driver and Mock, in testing the theory in terms of information purchase among the various structures, found patterns of information purchase "generally consistent with Decision Style Theory."[16] In their business game study, Mock, Estrin, and Vasarhelyi found that "decision approach had a significant effect upon payoffs and decision times;" however, they concluded that "learning patterns did not depend upon decision approach."[17]

This study investigates decision style theory in terms of an investment decision. Based on the premise that subjects with different decision styles process information differently, it is hypothesized that decision style will affect the investment decision. Specifically, it is expected that the amounts invested in Company B will vary significantly according to subjects' decision style behavior. Since, according to the human information processing model, all structures process information similarly at "overload," failure to support the above hypothesis might suggest--but certainly would not constitute proof--of overload.

Decision Style-Amount of Data Processed

As indicated earlier in this chapter, decisive and flexible decision styles utilize a minimum amount of data whereas hierarchic and integrative decision styles integrate large masses of data. Moreover,

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[16]Driver and Mock, p. 504.

[17]Theodore J. Mock, Teviah L. Estrin, and Midlos A. Vasarhelyi, "Learning Patterns, Decision Approach, and Value of Information," Journal of Accounting Research, X (Spring, 1972), pp. 146-147.

Decisives process less data than Flexibles, Flexibles process less data than Hierarchics, and Hierarchics process less data than Integratives. Thus, as stated earlier, decision style is expected to affect the amount of data processed. Consequently, it is hypothesized that the more complex styles in this study will utilize larger amounts of data from the experimental display than the decisive and flexible styles.

Decision Style-Time Behavior

Also as hypothesized earlier in this chapter, differences in information processing styles are expected to effectuate differences in decision time among the decision styles. It is predicted that the hierarchic, integrative, and integrative/hierarchic decision styles will take more time in making their investment decision than the decisive and flexible decision styles. The expected time sequence (slow to fast) is:

1. Integrative/Hierarchic
2. Integrative
3. Hierarchic
4. Flexible
5. Decisive

Limitations of Study

This research study is limited to the investigation of the value of environmental disclosure in a laboratory situation. There are always trade-offs when conducting empirical research. One has to weigh the benefits of the research against the limitations. Obviously, the most serious limitation of this research is the methodology itself, that is, the lack of external validity that can be attributed to laboratory experiments of this type.

The administration of the experiment necessarily occurs under somewhat artificial conditions. Subjects are not exposed to the rewards and punishments existing in the real world. The laboratory environment itself is sterile; subjects are required to make decisions based only on the information provided them. Finally, the subjects themselves are a limitation. Are students or businessmen valid surrogates for real-world decision makers? The answer to this question remains controversial.[18]

The introduction of information not presently disclosed on financial statements is another potential restriction of this study. The presence of this additional information may cause the subjects to overemphasize the importance of the new information.

Finally, the human information processing theory is still in a rudimentary stage. In order to use the model, one must assume that the output of the measures of decision style properly reflects the level of information processing. While this model has been applied in accounting research, the potential problems of applying behavioral research to the accounting discipline cannot be ignored.

Given the above limitations, it is recognized that the results of this research cannot be generalized to other decision situations; however, it is proposed because no other method of research into the area of social disclosure is obvious; thus, the alternative appears to be no research at all.

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[18]A discussion of the surrogate problems in behavioral research may be found in the "Report of the Committee on Research Methodology In Accounting," The Accounting Review, Supplement to Volume XLVII (1972), pp. 455-471.

CHAPTER IV

RESULTS OF THE STUDY

This chapter presents, evaluates, and analyzes the results of the statistical tests of the hypotheses proposed in Chapter III. Specifically, the following five research questions are investigated.

1. Will additional pollution disclosure affect users' investment decisions?
2. Will subjects' investment decisions differ according to their degree of financial sophistication?
3. Will differences in informational processing behavior affect subjects' investment decisions?
4. Will the more complex decision styles utilize more information from the experimental display than the simple decision styles?
5. Will the more complex decision styles utilize more decision time than the simple decision styles?

In the subsequent discussion of the results of the study, each of the five hypotheses will be restated prior to presenting and analyzing the relevant data.

Investors' Reaction to Environmental Disclosure

The primary objective of this research was to investigate the effect of environmental disclosure on users' investment decisions. The hypothesis states:

Null Hypothesis, H_o^1: Disclosure of corporate compliance or non-compliance with applicable environmental standards in the annual report does not possess information content.

Alternative Hypothesis, H_a^1: Disclosure of corporate compliance or non-compliance with environmental standards in the annual report does possess information content.

To test this hypothesis, the test statistic X_{kj} was computed to measure investors' response to the environmental disclosure. To compute this statistic, a one-way analysis of variance design was used as follows:

$$X_{kj} = \mu + \alpha_j + E_{kj}$$

where: X_{kj} = the amount invested in Company B for the kth observation in category j,

μ = the grand or over-all mean,

α_j = the effect associated with the particular treatment j,

E_{kj} = the random error term,

j = the treatment defined as pollution disclosure or nondisclosure; j = 1, 2, 3, 4, 5 which represents the five treatments utilized in this study.

The five treatments were initially described in Chapter III. In order to form a point of reference for the analysis that follows, the treatments are briefly reviewed.

In Treatment 1, Company A was paired with "good" pollution information and Company B was paired with "bad" pollution information. The pollution information was switched in Treatment 2. For Treatment 3, both Company A and Company B had "good" pollution information and for Treatment 4, both companies had "bad" pollution information. Treatment 5 was the control group which received no pollution disclosure.

Table IV displays the mean investment response for each treatment for Company B.[1]

TABLE IV

MEAN INVESTMENT RESPONSES
BY TREATMENT
FOR COMPANY B

	Treatments				
	1	2	3	4	5
Mean Amount Invested in Company B	22,826	67,800	38,889	39,808	52,500

The F statistic of 4.95 is necessary to obtain significance at the .001 level. The F statistic associated with the difference in the average investment among the five treatments is 7.310 which is greater than the .001 significance level as shown in Table V.

A test of the equality of variance assumption using Cochran's method indicated that the five treatment samples were homogeneous; thus, the conclusion is that the highly significant difference among

[1]Subjects were asked to invest $100,000 between Company A and Company B. Since the difference between $100,000 and the mean investment response for Company B represents the mean investment response for Company A, the selection of Company B was purely arbitrary. The selection of Company A would have produced the same results.

treatments was due to the effect of pollution disclosure. Therefor on the basis of the sample included in this study, it is possible to reject at the ninety-nine percent confidence level the null hypothesis that disclosure of corporate compliance or non-compliance with applicable environmental standards in the annual report does not possess information content.

TABLE V

RESULTS OF THE ONE-WAY ANALYSIS OF VARIANCE OF HOMOGENEITY AMONG THE TREATMENTS

Source of Variation	Degrees of Freedom	Mean Squares	Ratio	Probability of the F Statistic Occurring by Chance
Between Groups	4	6833.7967	7.310	< .001
Within Groups	120	934.8835		
Total	124			

Additional insight into the nature of differences among treatments can be obtained by making a number of specific comparisons among the different sets of experimental manipulations among the five treatments. The Newman-Keul's multiple comparisons test was used to compare each treatment mean with every other treatment mean. The Newman-Keuls' method is a multiple-range test which takes into account the number

of treatments in the experiment and is used for judging the significance of a set of differences. The procedure consists of computing:

$$w = q\alpha(p,n_2)s_{\bar{x}}$$

where: w = used to judge the significance of each of the observed differences.

$q\alpha$ = the critical value in the Studentized Range at 5%,

p = the number of treatments,

n_2 = error degrees of freedom,

$s_{\bar{x}}$ = the square root of the error mean square times the number of observations per mean.

The results of this test are included in Table VI. As illustrated, there are two possible groupings at the 5% level. Either Treatments 1, 3, and 4 are similar and Treatments 5 and 2 are similar or Treatments 1, 3, 4 and 5 are similar but different from Treatment 2.

Overall the results of the preceding tests tend to support the a priori expectations. However, an interesting phenomenon is observed in the case of the control group. As indicated previously, Company A had experienced an increase in earnings per share (from $2.72 in 1970 to $2.85 in 1971) whereas Company B's earnings per share figure had declined from $1.63 in 1970 to $1.44 in 1971. Moreover, Company A had total assets of 6.4 billion dollars compared to Company B's total assets of 2 billion dollars. Therefore, assuming that earnings per share and asset size were important variables, the expectations were that subjects would perceive Company A as a better investment than Company B. As indicated in Table IV, subjects actually allocated 52.5% of their investment to Company B. Obviously, factors other than size and earnings per share were considered. However, when "good" pollution information was included with the financial statements for

Company A and "bad" pollution information was included with the financial statements for Company B (Treatment 1), subjects allocated only 22.8% of their investment to Company B. In Treatment 2, the pollution information was switched so that the financial statements for Company B were reinforced with "good" pollution information and the statements for Company A were weakened with "bad" pollution information. Subjects responded to this treatment by investing 67.8% of their $100,000 in Company B. Hence, it appears that the pollution disclosure had a substantial effect--in both directions--on the image conveyed by the conventional financial statements for the two companies.

TABLE VI

MULTIPLE COMPARISONS OF TREATMENT WITH AMOUNT UTILIZING THE NEWMAN-KEUL'S TEST

	1	3	4	5	2	Standard error of the mean of any treatment
1			16.98	*29.67	*44.97	23.97
3				13.61	*28.91	22.565
4					*27.99	20.547
5					15.3	17.122
2						

*significant at 5%.

As predicted in Chapter III, investment responses in Treatments 3 and 4 were similar. In the former treatment, both companies received identical "good" pollution disclosure; in the latter treatment, both companies received identical "bad" pollution disclosure. The a priori expectations were that these similar disclosures would tend to negate the effect of the pollution information and that the mean investments in these two groups would be similar to the mean investment in the control group. However, it is interesting to observe that while subjects in the control group perceived Company B to be the better investment, subjects receiving Treatments 3 and 4 allocated a larger percentage of their investment to Company A. Statistically, Treatments 3 and 4 are similar to Treatment 1. These results suggest that the similar disclosures did not negate the effect of the pollution information. Rather, it appears that the pollution disclosure caused a change in expectations among decision makers. The implication is that the pollution disclosure in Treatments 3 and 4 had informational content despite the fact that the disclosure was identical for both companies. One possible explanation for this investment behavior is the pollution disclosure itself. In Treatment 4, the disclosure indicated that both companies would have to spend $682 million during the next five years to bring their plants into compliance with pollution control regulations. In the "good" pollution disclosure included in Treatment 3, both plants would still have to spend $65.5 million to achieve compliance with pollution control regulations. It seems somewhat appealing to speculate that subjects receiving Treatments 3 and 4 relied more on asset size to assess the capacity of the two companies to meet these future financial obligations. Since the control group

received no pollution disclosure, this group was unaware of these future outlays and appeared to place less emphasis on asset size in their investment decision.

The results of the Newman-Keul's multiple comparisons test were inconclusive as to whether Treatment 5 (the control group) was similar to Treatments 1, 3 and 4 or similar to Treatment 2. As indicated previously, subjects in the control group allocated a larger portion of their investment to Company B. One possible explanation for this investment behavior is that the economic conditions for the steel industry in general were poor. Since Company B was more diversified than Company A, subjects may have considered diversification an important factor. Hence, when this factor was reinforced with "good" pollution disclosure, investments increased in Company B; conversely, when it appeared that Company B would have to make future cash outlays to meet environmental standards, subjects reacted by decreasing the emphasis on diversification and increasing the emphasis on asset size. This investment behavior would tend to explain why the control group invested somewhere between the two extremes and, therefore, fell into a range of being statistically similar to both groupings identified by the Newman-Keul's test.

The Effect of Financial Sophistication

In an attempt to learn more about the qualities of the three classes of subjects identified in this study and to investigate any differences in their investment behavior, the following hypothesis was tested:

Null Hypothesis, H_o^2: Subjects' investment decisions will not differ according to their degree of financial sophistication.

Alternative Hypothesis, H_a^2: Subjects' investment decisions will differ according to their degree of financial sophistication.

Table VII presents the mean investment for each of the three subject classes used as inputs into the one-way analysis of variance design.

TABLE VII

MEAN INVESTMENT RESPONSES BY SUBJECT

Subject Type	Category Size	Mean Amount Invested in Company B
Undergraduates	51	46,569
Graduate Students	42	43,809
Businessmen	32	42,199

The F statistic associated with the difference in the average investment among the three subject classifications is .179 which has a probability of occurring by chance of .835. Thus, the conclusion is that the three subject types did not differ significally in terms of investment behavior; therefore, the null hypothesis cannot be rejected.

Since there were no significant differences among the investment responses for the three subject types, a further attempt to investigate the effect of financial sophistication on information processing was made by substituting the dependent variable, time spent on the investment decision, into the one-way analysis of variance design.

The mean time spent on the investment decision by subject class is presented in Table VIII. These differences among the samples yielded an F statistic of 2.557 which is significant at the .08 level.

TABLE VIII

MEAN TIME SPENT ON THE INVESTMENT DECISION BY SUBJECT CLASS

Subject Type	Category Size	Mean Time Spent on The Investment Decision (in minutes)
Undergraduates	51	51.9608
Graduate Students	42	86.4524
Businessmen	32	80.0000

Exploratory research is concerned with relationships between variables which seem interesting or which appear to make a difference. Thus, for the behavioral researcher, an .08 significance level, while greater than the conventional .05 level, has practical significance.

Therefore, the conclusion is that financial sophistication did make a difference in the time spent on the investment decision among the subjects tested in this experiment. The following discussion focuses on these differences.

In terms of time spent, businessmen and graduate students were relatively homogeneous; undergraduate students devoted less time to the decision making process. These findings suggest that the information processing behavior (as measured by decision time) does vary according to financial sophistication. One interpretation of these results is that undergraduates, due to their lack of financial sophistication, are not capable of integrating complex amounts of financial data to form a decision; thus, they tend to utilize only enough data to make a reasonable decision within a minimum amount of item.

In order to test the reasonableness of this interpretation, the Kruskal-Wallis one-way analysis of variance statistical test was employed to measure the effect of financial sophistication on information processing on the number of items used from the experimental display in making the investment decision. Because the undergraduates devoted less time to decision making, the expectations were that undergraduates would also process less data than either the graduate students or the businessmen.

The test procedure consisted of ranking the observations in all three categories in a single series; the ranks of each category were then summed. The sums of the ranks and the number of observations in each of the three samples are presented in Table IX. This data was used as input into the Kruskal-Wallis formula and produced an H value of 5.182 which has a significance level of approximately 10%.

TABLE IX

RANK TOTALS OF THE AMOUNT OF INFORMATION UTILIZED BY SUBJECT CLASS--USED AS INPUT IN THE KRUSKAL-WALLIS FORMULA

Subject Type	Category Size (n)	Sum of the Ranks (R)	R^2/n
Undergraduates	51	2,965.0	172,376.96
Graduate Students	42	2,492.5	147,918.00
Businessmen	32	2,417.5	182,634.60

The object of the Kruskal-Wallis test is to determine whether sums of ranks are too dissimilar to have come from samples from the same population. As illustrated in the last column of Table IX, graduate students utilized less data than the other two groups. Hence, it appears that it is this dissimilarity which is reflected in the computed H value. Thus, in terms of the amount of information utilized in the investment decision, undergraduates are more like businessmen than graduate students. This is counter to the expectations that undergraduates would process less data than either the graduate students or the businessmen.

In summary, the findings of this study suggest that information processing behavior--as measured by decision time and by the amount of

information utilized in the decision--does vary according to financial sophistication. However, as stated earlier, the objective of this research was purely exploratory in nature. No attempt was made to support or refute the representativeness of experimental subjects, rather certain attributes were investigated in an effort to discover what relationships, if any, existed. Therefore, it would be hazardous to make any generalizations about subject similarities or differences based on this research.

Investment Behavior Versus Decision Style

The third factor investigated in this study was decision style. The third hypothesis states:

Null Hypothesis, H_o^3: Subjects' investment decisions will not differ according to their information processing behavior.

Alternative Hypothesis, H_a^3: Subjects' investment decisions will differ according to their information processing behavior.

The data displayed in Table X present the average investment in Company B for each decision style. This data was utilized in a one-way analysis of variance design and produced an F statistic of .317 which has a probability of occurring by chance of .867. Thus, decision style does not explain significant differences in investment behavior.

According to decision style theory, most individuals employ one dominant decision style except when the environmental load is very high or very low in which case most individuals shift to a secondary, or backup, style. Furthermore, according to the theory, these backup styles are generally flexible or decisive styles. Thus, the failure to

find significant differences in the average investment in Company B for each decision style suggested the possibility that subjects went into "overload" in their investment game. The hypothesis that subjects were operating at overload seemed worthy of investigation.

TABLE X

AVERAGE INVESTMENT IN COMPANY B FOR EACH DECISION STYLE

Decision Style	Sample Size	Investment in Company B
Decisive	23	44,565
Flexible	47	45,638
Hierarchic	17	36,177
Integrative	28	47,143
Integrative/Hierarchic	10	46,000

Since the scoring formula for the Administrative Problem Solving Exercise (used to measure decision style) also provided backup styles for subjects used in this research, these backup styles were substituted into the one-way analysis of variance design to measure the investment response per category. These category mean responses are recorded in Table XI.

TABLE XI

AVERAGE INVESTMENT IN COMPANY B FOR EACH BACKUP DECISION STYLE

Backup Decision Style	Sample Size	Investment in Company B
Decisive	34	37,206
Flexible	10	53,500
Hierarchic	26	44,231
Integrative	39	47,949
Integrative/Hierarchic	16	46,563

The above evidence neither supports nor refutes the existence of overload. The F ratio computed for the above sample is .694 which has a probability of occurring by chance of .601. Therefore, the only conclusion to be made is that subjects' investment decisions do not differ according to their backup decision style.

Information Use Behavior

In Chapter III, it was hypothesized that complex decision styles would use more information from the experimental display than the concrete decision styles. This led to the hypothesis:

Null Hypothesis, H_o^4: The amount of information used in the investment decision will not vary according to decision style.

Alternative Hypothesis, H_a^4: The amount of information in the investment decision will vary according to decision style.

The Kruskal-Wallis one-way analysis of variance design was used to test the effect of decision style upon the amount of data processed. Table XII presents the sums of the ranks and the number of observations for each of the five decision styles.

TABLE XII

RANK TOTALS OF THE AMOUNT OF INFORMATION UTILIZED BY DECISION STYLE--USED AS INPUT IN THE KRUSKAL-WALLIS FORMULA

Decision Style	Category Size (n)	Sum of the Ranks (R)	R^2/n
Decisive	23	1,572	107,442.78
Flexible	47	2,836	171,125,44
Hierarchic	17	922	50,004.94
Integrative	28	1,862	123,823.00
Integrative/Hierarchic	10	646	41,731.60

The above data was utilized in the Kruskal-Wallis formula and produced an H value of 1.524 which has a probability of occurring by

chance of greater than .80. Thus, decision style does not explain significant differences in the amount of information utilized from the experimental display. The null hypothesis cannot be rejected.

The Kruskal-Wallis one-way analysis of variance test was repeated using backup decision styles as the independent variable in the design. The computed H value was 1.6554 which has a probability of occurring by chance of .80. The results of this test cannot be interpreted as evidence of overload. Hence, the conclusion is that the evidence does not support the hypothesis that the amount of data used varies according to backup decision style.

Decision Time Behavior

The final research question concerned decision speed. According to decision style theory, complex decision styles identify and integrate more complex information in their information processing than do concrete decision styles; therefore, it was hypothesized that complex decision styles would take more time arriving at their investment decisions than concrete decision styles. The hypothesis states:

Null Hypothesis, H_o^5: The time required to make the decision will not vary according to decision style.

Alternative Hypothesis, H_a^5: The time required to make the decision will vary according to decision style.

Table XIII presents the mean time used as inputs into the one-way analysis of variance design for each of the five decision styles. The F statistic associated with the differences in the average times among the five categories is .341 which has a probability of occurring by chance of .851. Therefore, the conclusion is that there is no

statistical difference between decision times among the subjects tested. The null hypothesis is not rejected.

TABLE XIII

AVERAGE DECISION TIME FOR EACH DECISION STYLE

Decision Style	Sample Size	Average Decision Time (in minutes)
Decisive	23	80.652
Flexible	47	74.255
Hierarchic	17	52.941
Integrative	28	66.786
Integrative/Hierarchic	10	72.600

The expected sequence in overall speed (slow to fast) was:

1. Integrative/Hierarchic
2. Integrative
3. Hierarchic
4. Flexible
5. Decisive

The actual sequence was:

1. Decisive
2. Flexible
3. Integrative/Hierarchic
4. Integrative
5. Hierarchic

Since the above findings are counter to decision style theory, one interpretation is the possibility of overload. Hence, backup decision styles were substituted into the one-way analysis of variance design in an attempt to investigate the effects on decision time behavior. The average decision time for each category of backup decision style is presented in Table XIV. These differences among the samples yielded an F statistic of .765 which has a probability of occurring by chance of .553. Again, the evidence is contrary to theoretical expectation. Backup decision style does not explain decision time behavior among the subjects tested.

TABLE XIV

AVERAGE DECISION TIME FOR EACH BACKUP DECISION STYLE

Backup Decision Style	Sample Size	Average Decision Time (in minutes)
Decisive	34	83.412
Flexible	10	88.000
Hierarchic	26	58.269
Integrative	39	71.923
Integrative/Hierarchic	16	50.313

Comments Concerning Decision Style Results

Any interpretations of exploratory research of this nature must be regarded as purely speculative. However, a few comments appear to be warranted.

Many researchers present ex post explanations in an attempt to explain unanticipated results. For example, Savich hypothesized that decisive and flexible decision style makers would process less data than hierarchic and integrative types. When tests of his hypothesis yielded mixed results, Savich suggested, "the possibility exists that the students had not previously been asked to make these types of decisions and thus had not yet formulated and tempered their decision styles."[2] Driver and Mock hypothesized that the more complex decision styles would take more decision time than the concrete decision styles. While their conclusion was that "decision style does explain significant variance in required decision times,"[3] their results were mixed. They explained the slow pace of the decisive style in their experiment as an overload condition.

It is the bias of this researcher that such interpretations as the above are much too tentative to be valid. Therefore, no attempt is made to justify the unexpected results in this study relative to decision style theory.

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[2] Savich, p. 650.

[3] Driver and Mock, p. 505.

According to decision style theory, most individuals employ one dominant decision style except when the environmental load is very high or very low in which case most systems shift to either the flexible or decisive styles. An interesting phenomenon observed in this study was that the backup styles for subjects did not follow this theoretical pattern. As indicated in several of the preceding tables, when backup styles were substituted for dominant styles, there was a greater shift to the more complex decision styles. While the number of decisives did increase for backup style, the number of flexibles decreased considerably. This phenomenon, while it cannot be generalized, does suggest some concern about the validity and/or reliability of the psychometric measures of decision style.

In summary, applications of human information processing and decision style theory to accounting are relatively few and, in the opinion of this researcher, inconclusive. The possibility exists that other classifications of decision style might be more appropriate. Further research efforts in this area are needed to determine whether the theory itself may need to be re-examined.

CHAPTER V

SUMMARY, CONCLUSIONS, AND IMPLICATIONS FOR FURTHER RESEARCH

The objectives of this study were to seek, and hopefully provide, empirical evidence regarding the impact of environmental disclosure on investment decisions and to evaluate this impact in terms of human information processing theory. The purposes of this chapter are to summarize the research, to advance conclusions concerning the results, and to provide recommendations for future research.

Summary of Research

The concepts of social accounting and social disclosure have pervaded the accounting literature during the past decade. The Securities and Exchange Commission now requires disclosure of the material effects of compliance with governmental environmental protection laws. Yet, a survey of the literature revealed that, while widespread attention has been given to constitutive and operational definitions of social accounting, only one empirical study addressing the issue of pollution disclosure in external reporting exists. Thus, further research concerning the effect of environmental disclosure in a user-oriented sense was deemed desirable.

While the primary objective of this study was to investigate the effect of pollution disclosure on user's decision making, a secondary

objective of the study was an attempt to learn more about certain behavioral parameters of the users of accounting information.

The methodology involved a laboratory experiment in which one hundred and twenty-five subjects were asked to make an investment decision between two actual companies, Company A and Company B. In addition, subjects were asked to record the time required to make the investment decision and the number of items in the experimental display which were used in the investment decision. All subjects received the same pair of financial statements in one of five forms. The control group received only conventional statements. Favorable and unfavorable pollution disclosures were manipulated to form four treatment groups. In Treatment 1, Company A was paired with "good" pollution information and Company B was paired with "bad" pollution information. The pollution information was switched in Treatment 2. For Treatment 3, both companies had identical "good" pollution information and for Treatment 4, both companies had identical "bad" pollution information. Treatment 5 was the control group which received no pollution disclosure.

In addition, subjects were classified according to financial sophistication. The three categories were undergraduate students, graduate students, and businessmen. Finally, psychometric tests were administered to all subjects in order to classify subjects according to their decision styles. Thus, the study examined the impact of three independent variables or factors--pollution disclosure treatment, subject type, and decision style--on three response variables--the amount invested in Company B, the time required to make the investment decision, and the number of items in the experimental display which were utilized in the investment decision.

Due to the uneven distribution of data within levels, a multivariate research design was not used. A one-way analysis of variance technique was utilized to test the research hypothesis that pollution disclosure would affect users' investment decisions. To test the effect of financial sophistication and decision style on information processing behavior, a one-way design of each of these variables with each response variable was calculated. In the case where the number of items in the experimental display which were utilized in the investment decision was tested, a nonparametric Kruskal-Wallis analysis of variance test was employed.

Conclusions

While it should be stressed that the following conclusions are highly tentative pending further replication and verification, the import of the results of this study for the SEC is that there is some empirical support for required pollution disclosure.

First, the results of the tests of the primary hypothesis provide evidence that users' investment decisions are significantly affected by pollution disclosure. When included with the conventional financial statements, environmental disclosure did cause subjects to alter their investment decisions. These findings are consistent with those of Belkaoui who found that "information content of pollution control expenditures was effective enough to induce investors' reactions."[1]

Second, the results of this study indicate that both conventional accounting information and pollution disclosure are important inputs

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[1]Belkaoui, p. 118.

for the investor. For example, the control group perceived Company B as the better investment. However, when favorable pollution data was included with the financial statements for Company A and unfavorable pollution data was included with financial statements for Company B, subjects allocated a larger portion of their investment to Company A. When the pollution disclosure was switched between the two companies, subjects reacted accordingly and invested heavily in Company B. Thus, pollution disclosure appears to be influential both as a negative and a positive force in the decision making process.

Third, pollution disclosure appeared to have more influence in subjects' investment decisions than earnings per share trend. When subjects were asked to allocate their investment between a company with a decreasing trend in earnings per share and favorable pollution data and a company with an increasing trend in earnings per share and unfavorable pollution data, subjects allocated a larger percentage to the former company. The implication is that subjects were sophisticated enough to recognize the potential impact of noncompliance on future profitability.

Fourth, the experimental findings suggest that the observed influence of the pollution disclosure varies according to other factors, including asset size and diversification. As indicated previously, subjects in the control group perceived Company B as the better investment. One interpretation of this preference for a smaller company with a decreasing trend in earnings per share is that Company B was more diversified than Company A. Since the economic conditions for the steel industry were poor, investors apparently believed diversification to be an important factor in their decision making--perhaps even more

important than asset size or earnings per share trend. However, when identical pollution disclosure was added to the financial statements of both companies, subjects responded by allocating more of their investment to Company A. Subjects apparently believed that the larger company was in a better position to make future cash outlays to meet environmental standards. Thus, pending further investigation of explanatory variables, the most likely cause of decision change was that, when faced with the knowledge that additional pollution control expenditures were required, subjects reacted by decreasing the emphasis on diversification and increasing the emphasis on asset size. This behavior also suggests, but certainly does not constitute proof, that users of financial statements are able to integrate large masses of data and discriminate among them.

Financial sophistication did not affect investment decisions among the subjects tested. No statistical difference was found between the responses of students and businessmen. While it might be tempting to conclude that students are a reasonable surrogate for businessmen for experimental tasks such as the one in this experiment, "the relevant personal attributes of experimental subjects cannot be captured adequately by simple untested scales like that of financial sophistication."[2] Financial sophistication, in this study, was represented by an ordinal scale based on education and experience. While it is recognized that such a scale has not been validated, "an 'education and experience spectrum' appears to have a high face validity."[3]

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[2]Hofstedt, p. 692.

[3]Ibid., p. 680.

Nonetheless, it is the opinion of this researcher that the results are too preliminary to warrant any conclusions about the representativeness or nonrepresentativeness of experimental subjects; however, the findings may have value to the behavioral researcher.

The findings do suggest that information processing behavior--as measured by decision time and by the amount of information utilized in the decision--does vary somewhat according to financial sophistication. In terms of the amount of information utilized, undergraduates and businessmen tended to use more information than graduate students. In terms of time spent, businessmen and graduate students were relatively homogeneous; undergraduate students devoted less time to the decision making process.

Decision style had no effect on any of the response variables tested. However, according to decision style theory, when the environmental load is very high, information overload occurs and most decision styles shift to secondary or "backup" processing styles. The failure to find any significant differences among decision styles suggested the possibility of information overload. To test this theory, the subjects' backup decision styles were substituted for their dominant decision styles in the research design and the effect of these backup styles on the three response variables was investigated. The results of these tests were also insignificant.

The decision style analysis provided results which are inconsistent with decision style theory. Because the applications of human information processing and decision style theory to accounting information have not been extensively tested, any interpretations of the unexpected results would be purely speculative. However, the study raised

some questions about the validity and/or reliability of the psychometric measures of decision style. The possibility exists that the output of the measures of decision style do not properly reflect the level of information processing. Furthermore, it is conceivable that attributes other than those presently used in identifying decision style might result in improved classifications of conceptual schemes of human information processors.

Implications for Further Research

Accounting policy requiring pollution disclosure has already been initiated by the Securities and Exchange Commission without the benefit of empirical research. However, haphazard data expansion should not be the basis for policy-making. Because the goal for accounting theorists should be to improve external reporting models, the implications of the research described herein seem evident.

First, while this study provided some tentative evidence that the informational content of pollution disclosure caused a change in expectations among investors, a single study such as this does not provide adequate support for implementation of accounting policy. Studies of this type depend on replication and corroboration before they can be accepted as an authoritative basis for expanding the extant financial reporting model.

It is recommended that this study be replicated using different groups of subjects, different judgmental tasks, and a larger sample size. Another approach might involve testing the effects of specific alternative accounting treatments regarding pollution disclosure upon investment decisions. While the representativeness or nonrepresenta-

tiveness of experimental subjects remains controversial, a replication utilizing less controversial surrogates such as securities analysts and practicing certified public accountants is suggested.

Second, the results of the research described in this paper do not support decision style theory as advanced by Driver and Mock. Moreover, the results lend some uncertainty to the validity of the theory and/or the psychometric measures used in identifying decision styles. While Driver and Mock have explained unexpected deviations from decision style theory as a result of overload, they have failed to test their conclusions utilizing backup decision style. Since the concepts of overload and backup decision styles are an integral part of human information processing theory, more testing of these concepts is needed.

Third, an implied assumption in the literature on human information processing, and specifically on information overload, is that added information contains relatively small increments at the risk of sending the user beyond the level of optimal performance. While it is mere conjecture, it would seem that some information may have considerable relevance and would, therefore, still enable the user to make a better decision than if that information was not available--even at overload. Moreover, based on the observed performance of the subjects in this experiment, it appears that subjects may utilize some sort of filtering process whereby he or she sorts through the data and selects that which appears relevant to his or her own information processing limitations. Thus, it is suggested that the possibility exists that users select information to suit their individual abilities. If this is indeed the case, the implications for accounting would seem to be to

permit maximum disclosure. Because human information processing theory is still in a primitive state, only further research can resolve this issue.

Fourth, all of the applications of human information processing to accounting information have been conducted in laboratory or field settings. Ideally, human information processing theory should be tested with "real world" decisions in order to eliminate some of the problems of external validity that are attributed to laboratory experiments of the type described in this study. It is suggested that research endeavors be directed towards investigating whether abstract decision styles make superior decisions when compared to concrete decision styles in "real world" situations.

Finally, more research is need to measure the impact of accounting information on behavioral responses. The lack of knowledge as to how people process information has hindered progress in developing an optimum reporting system. Therefore, replication appears to be the only obvious means by which, eventually, we may be able to identify certain attributes of information processing behavior. The identification of certain key variables, if they exist at all, could lead to a much-improved financial reporting system.

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APPENDIX A

INSTRUCTIONS

INSTRUCTIONS

Your eccentric uncle (a former steel company executive) left you $100,000 in his will; however, under the terms of the will, you may only have the money after it has been invested for 5 years in either Company A or Company B or some combination. (The uncle was never employed by either company). Enclosed are the financial statements (these are actual financial statements but are "disguised" here) of the two companies--both of which are in the steel industry. During the current year, Company A's common stock price has ranged between $35 7/8 and $25; Company B's common stock price has ranged between $23 1/8 and $15 1/4.

In your role as analyst, please assume that:

1. The decision to make this allocation is entirely yours.

2. The auditing firms for the two companies are firms in which you have confidence.

3. The investment objective is for five years.

Using the enclosed packet, please allocate the $100,000 available for investment between Company A and Company B. You may use any form of analysis you choose in splitting the $100,000 between the two companies.

APPENDIX B

THE EXPERIMENTAL DISPLAY CONSISTING OF CONVENTIONAL FINANCIAL STATEMENTS WITHOUT POLLUTION DISCLOSURE

TO COMPANY A SHAREHOLDERS:

This year was a difficult year for Company A--and the steel industry in general--with lower steel shipments, erratic and uneconomical operating levels, labor negotiations, surging imports, reduced employment and hours of work for employees, and lower dividends for stockholders.

Company A's income for the year was $154.5 million, a return of 3.1% on sales of $5.0 billion. Income for the previous year was $147.5 million, a return of 3.0% on sales of $4.9 billion.

Income taxes and pension costs were lower this year than last year. As explained in the notes to financial statements, no provision for estimated U. S. and foreign taxes on income was required this year, and the interest rate assumption for funding pension costs was revised, as it has been from time to time in the past, in light of the actual earnings experience of the pension fund. Many other factors must also be recognized to place this year in proper perspective.

Operations moved up sharply in the first half of the year. Shipments of steel products exceeded two million tons per month in the second quarter and in July. Good production levels were attained on many new facilities. There was a noticeably improved level of earnings.

During the last five months of the year, however, monthly shipments averaged less than half the rate of the first seven months and were lower than any level of shipments experienced on a prolonged basis in a nonstrike period since the 1930's.

Last year, the Annual Report indicated that it was our objective to improve the profit contribution from our steel producing operations. The profit contribution from these operations was substantially improved in the first seven months--helped by greater volume, more effective utilization of our production facilities and an improved cost-price relationship.

In these operations, however, we lost ground in the last five months because of the problems of coping with a very low volume of business. Second half results were also reduced by the costs involved in the shutdown and the subsequent start-up of steel operations related to the steel labor negotiations and by steelworker hourly employment cost increases averaging 15% starting August 1. Furthermore, in the fourth quarter there was a 44-day coal strike and a substantial cost increase resulting from the new labor contract with the United Mine Workers of America. Because of all these factors, financial results from steel producing operations were at an unsatisfactory level for the second half of the year.

Many of our other operations this year, as during last year, continued to achieve improvements in income.

A number of major cost reduction actions have been taken in every area of the Corporation, including permanent reductions in administrative and other forces. With sufficient volume, we are confident that our manpower, machinery and material resources provide the base now for substantially improved earnings.

All these expectations, however, presume that the Government's efforts to control inflation will be successful, that we can at least maintain the existing cost-price relationship in the future, and that the levels of steel mill product imports are kept economically realistic and in line with the growth of steel consumption in this nation.

The growth in steel consumption in recent years has all been siphoned off by imports of foreign steel. Record steel mill product imports of 18.3 million net tons this year took 18% of the domestic market. They took 27% of the market during the three months immediately following the steel labor settlement.

This foreign steel was produced not by more efficient use of labor or by better technology or equipment, but by labor whose hourly pay and benefits total from one third to one half those of American steelworkers. Foreign steel producers also receive aid from their governments in the form of subsidies, tax preferences and various practices which encourage exports and restrict imports of steel into their home markets.

The United States Government is negotiating new voluntary restraint arrangements with principal steel producing groups around the world. As proposed, these arrangements would limit steel imports into this country to an increase of 2.5% per year, a rate in line with expected growth in domestic steel consumption. They would also provide restrictions on changes in product mix and in geographical distribution within the U. S.

There is a growing awareness that another important factor concerning the economic well-being of the steel industry is improved productivity. The joint union-management committees, established at each plant under terms of this year's steel-worker labor agreement, should be of effective help in promoting productivity improvements. Ways must be found for further reducing costs and increasing the output per man-hour on all our facilities.

Billions of dollars have been invested by the American steel industry in new technology and facilities during the past six years. Company A alone has invested $3.3 billion in plant and equipment, with $452 million of this expended this year.

We appreciate the continued support from so many stockholders. We also appreciate the support of our employees who have worked to improve Company A's competitive position, and we are sure all employees will continue to exert every effort to accomplish the results we are all seeking.

Edward W. Jones
Chairman, Board of Directors

COMPANY A
CONSOLIDATED STATEMENT OF FINANCIAL POSITION
DECEMBER 31, 1976 AND 1975

	Dec. 31, 1976	Dec. 31, 1975
Current Assets:		
Cash	$ 218,531,673	$ 217,686,393
Marketable Securities, at cost (approximates market)	54,977,259	11,529,302
Receivables, less estimated bad debts	580,487,511	617,204,941
Inventories	840,774,573	923,458,156
Total	$1,694,771,016	$1,769,878,792
less		
Current Liabilities:		
Notes and accounts payable	785,782,871	753,992,126
Accrued taxes	264,617,949	248,157,996
Dividend payable	21,667,095	32,490,357
Long-term debt due within one year	53,796,999	38,082,506
Total	$1,125,864,914	$1,072,722,985
Working Capital	568,906,102	697,155,807
Marketable securities, at cost (approximates market), set aside for plant and equipment additions and replacements	255,000,000	255,000,000
Investments in realty, leasing and finance operations	63,500,443	62,598,249
Long-term receivables and other investments, less estimated losses	179,726,420	171,819,531
Plant and equipment, less depreciation	4,077,929,561	3,922,961,695
Operating parts and supplies	58,290,299	54,083,796
Costs applicable to future periods	79,441,461	74,695,801
TOTAL ASSETS LESS CURRENT LIABILITIES	5,282,794,286	5,238,314,879
deduct		
Long-term debt	1,444,070,597	1,398,684,573
Reserves and deferred taxes on income	331,560,086	389,480,530
EXCESS OF ASSETS OVER LIABILITIES AND RESERVES	$3,507,163,603	$3,450,149,776
Ownership Evidenced by		
Common stock (authorized 90,000,000 shares; outstanding 54,169,462 shares) Par value $30 per share	$1,625,083,860	$1,625,083,860
Income reinvested in business	1,882,079,743	1,825,065,916
TOTAL	$3,507,163,603	$3,450,149,776

COMPANY A
CONSOLIDATED STATEMENT OF INCOME
FOR THE YEARS ENDED DECEMBER 31, 1976 AND 1975

	1976	1975
Products and Services Sold:	$4,963,175,479	$4,883,208,641
Costs:		
Employment costs:		
Wages and salaries	1,835,061,152	1,861,017,904
Employee benefits	356,181,762	389,509,914
	2,191,242,914	2,250,527,818
Products and services bought	2,102,880,037	1,969,122,490
Wear and exhaustion of facilities	290,111,256	296,506,123
Interest and other costs on long-term debt	74,945,969	66,467,698
State, local and miscellaneous taxes	149,479,549	137,093,415
Estimated United States and foreign taxes on income	-	16,000,000
Total	$4,808,659,725	$4,735,717,544
Income	154,515,754	147,491,097
Income Per Common Share	$2.85	$2.72
Dividends Declared		
On common stock ($1.80 per share in 1976; $2.40 per share in 1975)	97,501,927	129,961,428
Income Reinvested in Business	$ 57,013,827	$ 17,529,669

COMPANY A
SUMMARY OF FINANCIAL OPERATIONS

	1976	1975
Additions to Working Capital		
Income	$154,515,754	$147,491,097
Add--Wear and exhaustion of facilities	290,111,256	296,506,123
Deferred taxes on income	(57,920,444)	28,109,783
Proceeds from sales and salvage of plant and equipment	8,363,560	7,770,575
Increases in long-term debt due after one year	163,349,062	37,239,161
Miscellaneous additions	--	5,164,575
Total Additions	558,419,188	522,299,688
Deductions from Working Capital		
Expended for plant and equipment less use of funds set aside in prior years	452,008,561	514,466,353
	--	400,000,000
	452,008,561	114,466,353
Increases in investments and long-term receivables	8,809,083	41,128,175
Dividends declared on common stock	97,501,927	129,961,428
Decreases in long-term debt due after one year	117,963,038	73,221,822
Miscellaneous deductions	10,386,284	--
Total Deductions	686,668,893	358,777,778
INCREASE(DECREASE) IN WORKING CAPITAL	($128,249,705)	$163,521,910

ANALYSIS OF CHANGES IN WORKING CAPITAL

WORKING CAPITAL AT BEGINNING OF YEAR	$697,155,807	$533,633,897
Cash and marketable securities	44,293,237	(119,815,454)
Receivables, less estimated bad debts	(36,717,430)	(30,361,576)
Inventories	(82,683,583)	54,861,977
Notes and accounts payable	(31,790,745)	222,407,725
Other payables	(21,351,184)	36,429,238
INCREASE(DECREASE) IN WORKING CAPITAL	(128,249,705)	163,521,910
WORKING CAPITAL AT END OF YEAR	$568,906,102	$697,155,807

Details of Selected Items (in millions)

INVENTORIES

	Ore, limestone, coal coke & non-ferrous metals	Semi-Finished Products	Finished Products	Supplies & Sundry Items	Total Inventories
Dec. 31, 1975	$184.5	$316.6	$283.1	$139.3	$923.5
Dec. 31, 1976	$200.8	260.6	260.9	118.5	840.8

For the most part, inventories are carried at cost as determined under the last-in, first-out method, and the remainder is carried at cost or market, whichever is lower.

Details of Selected Items (continued)

PLANT AND EQUIPMENT

	Facilities (at cost)			
	Land	Plant	Transportation	Total
Balance Dec. 31, 1975	$116.3	$8,496.8	$858.1	$9,471.2
Additions	6.3	420.2	25.5	452.0
Deductions	1.4	122.1	17.4	140.9
Balance Dec. 31, 1976	$121.2	$8,794.9	866.2	$9,782.3

	Depreciation and Depletion		
	Plant	Transportation	Total
Balance Dec. 31, 1975	$5,097.7	$450.5	$5,548.2
Additions	283.1	11.7	294.8
Deductions	123.9	14.7	138.6
Balance Dec. 31, 1976	$5,256.9	$447.5	$5,704.4

LONG-TERM DEBT

	Rate	Maturity	Outstanding 12-31-76	Outstanding 12-31-75
Company A				
Sinking Fund Debentures(Callable)	4	1988	$ 160.7	$ 166.5
Sinking Fund Debentures(Callable)	4½	1991	189.0	197.7
Sinking Fund Debentures(Callable)	7 3/4	2006	150.0	--
Subordinated Debentures(Callable)	4 5/8	2001	622.8	622.8
Notes Payable **	*	1977-1981	170.0	220.0
Long-term lease obligations relating to Industrial Development Revenue Bonds	3-5 3/8	1977-1993	100.0	99.3
Mortgages & purchase money obligations	-	--	8.6	3.0
Consolidated Subsidiaries				
Railroads First Mortgage Bonds	3	1977	9.6	9.8
Notes payable	5-8 1/4	1977-1990	86.4	116.9
Mortgages & purchase money obligations	-	--	.8	.8
Total long-term debt			1,497.9	1,436.8
Less amount due within one year			53.8	38.1
Long-term debt due after one year			$1,444.1	$1,398.7

* Rate varies with prime commercial rate.

** Issued pursuant to agreements providing a revolving credit of up to $310 million, convertible at the option of the Corporation in 1977 into a four year term loan.

NOTES TO FINANCIAL STATEMENTS

Principles Applied in Consolidation
All majority owned subsidiaries are consolidated, except for those described below accounted for on an equity basis and companies which are insignificant.

Investments
Investments in realty, leasing and finance operations are carried in the consolidated statements at Company A's equity in the net assets and advances to such operations summarized as follows:

	(in millions) December 31	
	1976	1975
Realty, leasing and finance companies		
Cash, receivables and inventory	$172.3	$202.2
Plant and equipment, less depreciation	.3	14.6
Investments and other assets	7.7	6.9
Total Assets	180.3	223.7
Less liabilities*		
Current notes and accounts payable	138.3	194.0
Debt due after one year	13.8	5.5
	28.2	24.2
Other realty operations	35.3	38.4
Total	$ 63.5	$ 62.6

*Includes $79.5 million and $144.5 million guaranteed by Company A at December 31, 1976 and December 31, 1975 respectively.

long-term receivables and other investments, less estimated losses, include other investments of $92.0 million and $71.2 million at December 31, 1976 and December 31, 1975 respectively.

Those investments which represent significant ownership interest are carried on the equity basis and all others are carried at cost. Company A's equity in 1976 and 1975 net income of companies carried on an equity basis amounted to $4.8 million and $3.1 million, respectively, which is included in consolidated income as part of interest, dividends and other income.

Securities Set Aside for Plant and Equipment Additions and Replacements
At December 31, 1976 and December 31, 1975, completion of authorized additions to and replacements of facilities required an estimated further expenditure of $850 million and $1,050 million, respectively. At the end of 1974, $655 million of marketable securities had been set aside to cover in part such authorized expenditures. During 1975, $400 million was used for such purpose, leaving a balance of $255 million set aside at December 31, 1975 and December 31, 1976.

Stock Option Incentive Plan
The Stock Option Incentive Plan approved by stockholders in 1964 authorized the option and sale of up to 1,500,000 shares of common stock to key management employees. The option period begins on the date the option is granted and ends five years thereafter, except in cases of death, retirement or other earlier termination. The granting of options terminated in 1969, thus no more than 553,725 shares have been or can be issued. In 1975, one optionee purchased 500 shares at $36.75 per share. In 1976, no shares were purchased. At December 31, 1976, 228 optionees held options to purchase 521,300 shares at $39.625 and $48.00 per share for a total of $20.8 million.

Preferred Stock
Company A is authorized to issue 20,000,000 shares of preferred stock, without par value. At December 31, 1976, none of this stock had been issued.

Pension Funding
Company A's pension plan covers substantially all its employees. Pension costs are determined by an independent actuary, based upon various actuarial factors and an actuarial method under which both current and unfunded past service costs are funded over the future on a combined basis by payment into pension trusts. From time to time actuarial factors are adjusted in the light of actual experience; in 1976 the effect of a revision of the interest factor was to decrease pension costs by $42.6 million. For 1976 the cost of pensions amounted to $62.1 million compared with $104.8 million in 1975.

Wear and Exhaustion of Facilities
For the most part, wear and exhaustion of facilities is related to Company A's rate of operations and is computed on the straight-line method based on the guideline procedures established in 1962 by the Internal Revenue Service.

Estimated United States and Foreign Taxes on Income
No provision for taxes on income is required for 1976 due principally to statuatory deductions associated with mineral production and investment credits and since deferred taxes provided in prior years on foreign subsidiary earnings exceeded the taxes on such earnings repatriated in December 1976 because of credits for foreign taxes paid. Estimated United States and foreign taxes on income payable for the year 1976 of $57.9 million are offset by deferred tax credits of a like amount.

The investment credits for 1976 and amortization of the pre-1968 investment credits, which are reflected in deferred taxes, reduced the provision by $23.5 million. In addition, the net effect of all timing differences served to reduce the provision for income taxes by $34.4 million. Such timing differences represent taxes applicable to items reported for tax purposes in a period different from the period in which they are included in the determination of net income for financial accounting purposes. Amounts charged for wear and exhaustion of facilities and amounts of earnings of certain foreign subsidiaries are typical examples of such reporting differences.

The provision for estimated taxes on income in 1975 reflects tax deductions associated with mineral production payments completed in that year and investment credits of $31.1 million.

Tax Litigation

In 1975 an unfavorable lower court decision relating to $28 million claims for refund of 1955 excess profits tax and interest was reversed by the U. S. Court of Appeals, Second Circuit, and remanded to the District Court for trial. The Government's petition to the U. S. Supreme Court for a review of the Court of Appeals decision was denied in February 1976. A final decision in this case may affect two other years involving Internal Revenue claims for a maximum remaining tax of $90 million and approximately $95 million of interest. The financial statements of Company A for 1976 and prior years properly reflect its financial position, including provision for any tax liability which ultimately may be assessed.

Other Items

Products and Services Sold--Products and services sold include interest, dividends and other income of $34.9 million in 1976 and $68.8 million in 1975. Costs--Wages and salaries totaled $1,866.7 million in 1976 and $1,896.0 million in 1975 of which $1,835.1 million and $1,861.0 million, respectively, were included in costs of products and services sold and the balances were charged to construction.

Products and services bought reflect the changes during each year in inventories and deferred costs. These items decreased during 1976 approximately $74 million and increased during 1975 approximately $59 million.

If the total of wages and salaries and products and services bought were reclassified as costs of products and services sold and general administrative and selling expenses, the amounts thereof would be $3,705.5 million and $232.4 million in 1976 and $3,600.8 million and $229.3 million in 1975 respectively.

Maintenance and repairs of plant and equipment totaled $651.1 million in 1976 and $697.8 million in 1975.

In 1976 and 1975, expenditures on noncancellable charters and leases covering ore ships, office space and other properties totaled $56 million and $41 million, respectively. At December 31, 1976 minimum rentals totaled $50 million per year, the major portion of which terminates within ten years.

ACCOUNTANTS' OPINION

To the Stockholders of Company A

In our opinion, the accompanying Consolidated Statement of Financial Position and related Statement of Income and Summary of Financial Operations present fairly the position of Company A Corporation and subsidiaries at December 31, 1976 and December 31, 1975 and the results of operations and changes in working capital for each year, in conformity with generally accepted accounting principles applied on a consistent basis. Our examinations of these statements were made in accordance with generally accepted auditing standards and accordingly included such tests of the accounting records and such other auditing procedures as we considered necessary in the circumstances.

Horner and Helper
Certified Public Accountants

COMPANY A -- FIVE YEAR SUMMARY

Results for Year (in millions of dollars)

	1975	1974	1973	1972	1971
Net Income	$154.5	$147.5	$217.2	$253.7	$172.5
*Net Income as a per cent of net sales	3.1%	3.0%	4.5%	5.5%	4.2%
Income per share of common stock	$2.85	$2.72	$4.01	$4.69	$3.19
Dividends per share on common stock	$2.00	$2.40	$2.40	$2.40	$2.40
Year-End Data (in millions of dollars)					
Working Capital	$568.9	$697.2	$533.6	$875.3	$655.2
Long-term Debt	$1444.1	$1398.7	$1434.7	$1571.3	$1200.7
Stockholders' Equity	$3407.2	$3450.1	$3432.6	$3344.5	$3220.7
Selected Ratios					
Current Ratio	1.51	1.65	1.40	1.77	1.64
% sales to total assets	76.90	76.28	72.47	70.98	71.45
% net income to net worth	4.41	4.27	6.33	7.58	12.44
Other Data					
Gross National Product (in billions of dollars)	1050.4	976.4	930.3	865.7	793.5
Standard & Poor's Stock Index (composite)	108.4	91.29	197.1	107.5	99.13
Standard & Poor's Index (steel)	40.02	41.36	54.71	53.33	56.21
Company A price range	35-25	39-28	49-32	45-38	50-38
Steel Products Shipped (net tons in 000's)	19,300	21,000	22,400	22,500	19,800

*Industry average during the current year is 2.7%.

TO COMPANY B SHAREHOLDERS:

This year was a difficult and disappointing year for Company B people and for our shareholders.

Shareholders, employees, and suppliers all were hurt by the economic conditions that depressed our business throughout the year. The punishing impact of higher costs of labor and material, combined with significantly reduced operating levels in the latter part of the year due to imported steel and earlier strike-hedge buying, held Company B's earnings to their lowest levels in nine years.

Although the fourth quarter results of this year were ahead of the fourth quarter results of last year, earnings for the full year slipped to $1.44 per share compared to $1.64 per share last year.

Because of the continuing cost-price squeeze, and the depressed economy, this year was a year of painful decisions. To keep the company financially healthy, the common stock dividend had to be cut, management compensation reduced, a significant number of hourly and salaried employees laid off or terminated, and operating and overhead expenses drastically reduced.

It is important to emphasize that several of Company B's businesses performed extremely well during the year in spite of the problems of the economy.

The Metal Products Division, which makes construction products ranging from corrugated steel pipe to highway guardrail and pre-engineered steel buildings, achieved sales and earnings records. The Machinery and Equipment Division, which makes oil well drilling equipment, tubular products, oil field and industrial pumps, and other machinery, had its best year in 13 years.

Our insurance and general equipment leasing businesses continued to contribute to corporate earnings. These financial enterprises are now being conducted as international businesses with offices in Bermuda, Europe and Australia.

These non-steel activities helped offset the financial impact of low volume operations in our steel and advanced materials businesses.

Our forecasts indicate improved results for next year. The massive modernization program for our steel plants, which was initiated six years ago, is now virtually complete. The much-needed new facilities are in place and operating. They will help us increase our share of those steel markets in which we participate.

With the possible exception of pollution control facilities, we do not plan to undertake any major new capital expenditure programs that require additional long-term financing for at least several years.

We also find reason for optimism in the number of new products developed by our research that are now reaching the marketplace. Throughout its history, Company B has been able to develop and produce specialty materials to meet the customer's individual needs.

Our greatest confidence in the future of Company B grows out of our conviction that the people who make up this company constitute one of the finest business organizations in the world.

Company B's managagement accomplished significant force and cost reductions during the past two years making the entire organization lean and ready to meet the challenges of next year.

Imports of foreign steel reached a new all-time high of 18,300,000 tons during this past year. This represents more than three times the total steel shipments of Company B. Such massive tonnages of imports disrupted markets and reduced domestic shipments to their lowest level in eight years. Stainless and specialty steels were hardest hit, with imports taking as much as 65 percent of the domestic business in some product lines.

Since the majority of these imports enter this country with the benefit of subsidies from the producing country, and come from nations which restrict entry of American steel products, our government has been trying to negotiate a new voluntary quota arrangement. This will limit shipments from Japan and the Common Market countries to a reasonable share of the domestic markets.

Japan has agreed to these voluntary restraints. We expect the other countries to agree to a similar quota plan. If voluntary agreement cannot be reached, the steel industry will ask Congress to regulate this one-way traffic in carbon and stainless steel products.

The Administration's New Economic Policies should make next year a much better business year than the past year. We expect that improvement will be gradual but substantial throughout the year.

Sincerely,

C. William Smith
Chairman and Chief
Executive Officer

COMPANY B CORPORATION AND SUBSIDIARY COMPANIES
STATEMENT OF CONSOLIDATED FINANCIAL POSITION
DECEMBER 31, 1976 and 1975
(DOLLARS IN THOUSANDS)

	1976	1975
ASSETS		
Current Assets:		
Cash and marketable securities	$ 29,367	$ 29,246
Accounts and notes receivable		
Trade (less allowance for doubtful accounts of $3,635 for 1976 and $3,506 for 1975)	210,345	206,431
Other	33,882	37,642
Inventories, at the lower of cost (principally LIFO) or market		
Finished and semi-finished products	239,472	246,044
Raw materials and supplies	142,989	138,351
Total Current Assets	656,053	657,696
Investments (Note 1)		
At cost plus equity in undistributed earnings	84,912	74,718
At cost	36,860	35,541
Property Plant and Equipment--At Cost (Note 6)		
Land, land improvements, and leaseholds	69,512	63,900
Buildings	247,362	234,208
Machinery and equipment	1,599,247	1,474,166
Other	78,868	73,629
Construction in progress	52,904	85,537
Total	2,047,893	1,931,440
less accumulated depreciation	974,892	928,732
Property, Plant & Equipment--Net	1,073,001	1,002,708
Unamortized Lease Rights (Note 8)	159,907	175,383
Excess of Cost over Equity in Net Assets of Purchased Businesses (Note 1)	12,173	10,322
Prepaid Expenses and Deferred Charges	21,540	22,545
Total	$2,044,448	$1,978,913

	1976	1975
LIABILITIES AND SHAREHOLDERS' EQUITY		
Current Liabilities:		
Notes payable	$ 91,830	$ 69,336
Accounts payable		
Trade	61,994	69,089
Other	21,545	34,533
Accrued taxes	37,026	29,569
Accrued salaries, wages and commissions	52,639	54,172
Other accurals	24,122	29,614
Current portion of long-term debt	6,333	9,866
Total Current Liabilities	295,489	296,179
Long-Term Debt (Note 7)	384,054	371,546
Long-Term Lease Obligations (Note 8)	179,065	186,989
Deferred Income Taxes (Note 9)	67,329	56,663
Other Liabilities	58,841	25,155
Shareholders' Equity (Note 3)		
Preferred stock--authorized 5,000,000 shares of no par value, issuable in series: $2.10 cumulative convertible series; shares issued and outstanding 4,031,346 in 1975, at stated value (involuntary liquidation preference aggregates approximately $61,000)	17,214	17,133
Common stock--authorized 60,000 shares of $5 par value each; shares outstanding, 29,174,020 in 1975	146,884	145,870
Additional paid-in capital	115,542	112,239
Income retained in the business	780,030	767,139
Total Shareholders' Equity	1,059,670	1,042,381
Total	$2,044,448	$1,978,913

COMPANY B CORPORATION AND SUBSIDIARY COMPANIES
STATEMENT OF CONSOLIDATED INCOME AND RETAINED EARNINGS
FOR THE YEARS ENDED DECEMBER 31, 1976 and 1975
(DOLLARS IN THOUSANDS)

	1976	1975
Revenues		
Sales, less discounts, returns and allowances	$1,696,169	$1,583,673
Royalties, dividends, interest, etc.	17,540	17,316
Total	1,713,709	1,600,989
Costs and Expenses		
Cost of products sold	1,463,903	1,362,844
Selling and administrative expenses	145,601	137,527
Interest expense	33,576	27,925
Sundry other (credits) - net	(2,162)	(943)
Federal, state and foreign income taxes, less investment tax credits of $5,815 for 1976 and $12,357 for 1975 (Note 9)	26,798	21,412
Total	1,667,716	1,548,765
Net Income of Company B Corporation and Consolidated Subsidiaries	45,993	52,224
Equity in Net Income of Unconsolidated Subsidiaries (Note 1)	4,718	3,929
Net Income	50,711	56,153
Income Retained in the Business-Beginning of Year	767,139	765,875
Total	817,850	822,028
Less Cash Dividends Paid		
Common Stock	29,325	46,435
Preferred Stock	8,495	8,454
Total	37,820	54,889
Income Retained in the Business--End of Year	$ 780,030	$ 767,139
Per Share		
Common Stock		
Income (Note 2)	$ 1.44	$ 1.64
Dividends	1.00	1.60
Preferred Stock--Dividends	2.10	2.10

COMPANY B CORPORATION AND SUBSIDIARY COMPANIES
STATEMENT OF CHANGES IN CONSOLIDATED FINANCIAL POSITION
FOR THE YEARS ENDED DECEMBER 31, 1976 AND 1975
(DOLLARS IN THOUSANDS)

	1976	1975
Source of Funds		
Operations		
Net income for the year	$ 50,711	$ 56,153
Depreciation	70,575	66,033
Lease right amortization	15,146	13,981
Deferred income taxes	10,884	7,955
Equity in net income of unconsolidated subsidiaries	(4,718)	(3,929)
Total	142,598	140,193
Proceeds from debentures and long-term notes payable	39,720	233,848
Increase in other liabilities	33,686	3,921
Increase in current notes payable	22,494	25,888
Decrease (increase) in inventories	1,934	(25,379)
Other--net	6,539	4,443
Total	246,971	382.914
Use of Funds		
Capital expenditures	144,900	182,899
Cash dividends	37,820	54,889
Payments on long-term debt	32,732	149,597
Decrease (increase) in accounts payable and accruals	17,456	(5,088)
Payments on long-term lease obligations	6,975	5,900
Increase (decrease) in investments	6,795	(1,318)
Increase in accounts and notes receivable	172	20,154
Total	246,850	407,033
INCREASE (DECREASE) IN CASH AND MARKETABLE SECURITIES	121	(24,119)
Cash and Marketable Securities		
Beginning of year	29,246	53,365
End of year	$ 29,367	$ 29,246

Company B Corporation & Subsidiary Companies

FINANCIAL SUMMARY

Summary of Accounting Policies (Note 1)

Principles of Consolidation

The accompanying consolidated financial statements include the accounts of all subsidiary companies except leasing and insurance companies. Investments in subsidiary companies not consolidated and in 50% owned companies are stated at cost plus equity in undistributed earnings since acquisition, which is Company B's equity in their net assets; all other investments are stated at cost.

Accounting for Acquisitions

During 1976, Company B purchased the net assets and business of a company in exchange for 199,995 shares of common stock.

In 1975, Company B acquired the net assets and businesses of three companies in exchange for 258,819 shares of common stock. One of the acquisitions was accounted for as a pooling of interests and the others, which did not qualify for that method of accounting, were accounted for as purchases.

These acquisitions had no material effect on consolidated financial position or results of operations in either year.

Translation of Foreign Currencies

The accounts of foreign subsidiaries have been translated from local currencies into United States dollars as follows: monetary assets and liabilities at current exchange rates; nonmonetary assets and liabilities at historical rates; income accounts primarily at the average exchange rates for the period, except that depreciation charges have been translated at the exchange rates prevailing when the assets were acquired. The translation of foreign currency balances resulted in a net debit adjustment of $983,000, of which $823,000 has been deferred to be amortized over future periods.

Depreciation Policy

Depreciation is calculated on the straight-line method designed to amortize the cost of various classes of depreciable assets over their estimated useful lives. Leasehold costs are amortized over the shorter of the life of the related asset or the life of the lease.

For federal income tax purposes, accelerated methods of depreciation are used and deferred income taxes are provided on the difference between the depreciation expense for financial accounting purposes and that for income tax purposes.

Excess of Cost over Equity in Net Assets of Purchased Businesses

In consolidation, $12,173,900 at December 31, 1976 and $10,322,000 at December 31, 1975 have been classified as excess of cost over equity in net assets of purchased businesses. Commencing in 1976, such amounts are being amortized over the estimated future periods to be benefitted.

Computation of Income per Share

Income per share of common stock is determined by dividing the weighted average number of shares of common stock outstanding during each year into net income less dividends on the $2.10 preferred stock. Common stock equivalents and shares issuable contingent upon future earnings have no material dilutive effect on income per share.

Net Income and Dividends (Note 2)

Net Income of Company B and subsidiary companies for the year ended December 31, 1976, amounted to $50,711,000, or $1.44 per share of common stock. For 1975, the company earned $56,153,000, or $1.64 per share of common stock.

Cash dividends paid on common stock during 1976 amounted to $1.00 per share as compared to $1.60 per share in 1975. Dividends on the preferred stock were paid at the $2.10 rate in 1976 and 1975.

Shareholders' Equity (Note 3)

$2.10 Cumulative Convertible Preferred Stock--The number of shares of $2.10 preferred stock outstanding increased from 4,031,346 shares at December 31, 1975 to 4,050,296 shares at December 31, 1976. At those respective dates, 106,575 and 74,700 shares were reserved for issuance to optionees for outstanding stock options. The preferred stock has the following rights: annual dividends at the rate of $2.10 are cumulative whether or not earned, and each share is entitled to one vote and is convertible into .85 shares of Company B's common stock. The $2.10 preferred stock may be redeemed by Company B at any time after January 1, 1980 for $40 a share plus any accrued but unpaid dividends.

Common Stock--The shares of common stock outstanding amounted to 29,376,824 at December 31, 1976 and 29,174,020 at December 31, 1975. The number of shares outstanding is after deducting 415,663 shares and 618,467 shares held in treasury at those respective dates. During 1976, the company issued 199,995 treasury shares to acquire a company and 2,799 treasury shares in connection with the acquisition of 2,360 "founders shares of Company B Leasing Corporation."

At December 31, 1976 and 1975, shares of common stock amounting to 3,506,247 and 3,517,233, respectively, were reserved for conversion of $2.10 preferred stock and 501,080 and 778,230, respectively, were reserved for issuance to optionees for outstanding stock options. Also, at those dates, 212,000 and 132,000 shares of common stock, respectively, were reserved for issuance contingent upon future earnings of certain acquired companies.

Company B Leasing Corporation has outstanding 42,640 "founders shares" of common stock which, under a Stockholders' Agreement providing for the acquisition thereof by Company B, have specific restrictions on their transferability, sale, and equity rights. Company B will acquire approximately one-fifth of such shares in each of the five years beginning in 1977 in exchange for its common stock on the basis of an exchange ratio developed from the earnings per share of Company B Leasing Corporation and Company B for the second calendar year preceding the year of exchange. The 1977 rate of exchange, computed to be 2.6787 shares of Company B common stock in exchange for one "founders share" of common stock, is presently being disputed by some holders of founders shares. Since the ratio of exchange for 1978-1981 will be determined by a comparison of future income per share, the number of Company B shares to be issued in those years is not presently determinable.

Additional Paid-In Capital--Additional paid-in capital increased during 1976 from $112,239,000 to $115,542,000 as a result of credits arising from (a) the excess of market value over the par value of common stock issued in connection with the acquisition of a company ($3,000,000), (b) the excess of proceeds over stated value of preferred stock issued under stock option plans ($293,000), and (c) miscellaneous treasury stock transactions ($10,000). During 1975, additional paid-in capital increased from $108,930,000 to $112,239,000 as a result of net credits from the sum of (a) the excess of market value over the par value of common stock issued to purchase two companies ($2,678,000) and for Incentive Compensation Plan stock awards ($564,000) and (b) the excess of proceeds over stated value of preferred stock issued under stock option plans ($78,000), less (c) miscellaneous treasury stock transactions ($11,000).

Income Retained in the Business--Consolidated income retained in the business at December 31, 1976 amounted to $780,030,000 compared with $767,139,000 at December 31, 1975. Under restrictive provisions of the credit agreement mentioned under Long-Term Debt, $80,000,000 of income retained in the business at December 31, 1976 was available for declaration of cash dividends and payment on account of the purchase, acquisition, redemption or other retirement of capital stock.

Stock Options (Note 4)

Description of Stock	Number of Shares	Option Price Per Share
$2.10 Cumulative Convertible Preferred Stock		
Options outstanding December 31		
1976	74,700	$20.63 - 47.75
1975	106,575	5.50 - 47.75
Options exercised		
1976	18,950	5.50 - 25.38
1975	11,948	5.63 - 22.72
Common Stock Options outstanding December 31		
Qualified		
1976	493,800	16.75 - 30.47
1975	496,900	20.25 - 30.47
Nonqualified		
1976	501,080	16.75 - 30.47
1975	500,030	20.25 - 30.47
Options granted		
Qualified		
1976	21,000	16.75 - 20.19
1975	152,300	20.25 - 30.47
Nonqualified		
1976	21,000	16.75 - 20.19
1975	153,030	20.25 - 26.00

The options to purchase $2.10 cumulative convertible preferred stock were granted in years 1970 through 1974 and will become exercisable in varying amounts through August 4, 1978.

The Common Stock Option Plan was adopted by the shareholders of Company B on April 17, 1974. This plan provides generally for the granting of both qualified and nonqualified options to purchase common stock, not to exceed 1,000,000 shares in the aggregate, at a purchase price of not less than 100% of the market price of Company B's common stock on the date the option is granted. Optionees may exercise 25% (cumulatively) of their options after each of the next four anniversaries of the date of the grant. With the exception of stock options for 3,130 shares, qualified and nonqualified stock options under the Plan have been granted on a "matching" basis--that is, granted for the same number of shares to the same optionee generally at the same time and at the same price. Under specified conditions, an optionee may elect to exercise either his qualified or nonqualified option; subject, however, to the limitation that to the extent a "matching option" is exercised, the other (unless it has expired) will be reduced in a like amount. Subject to earlier termination under certain conditions, qualified options granted under this plan expire five years after the date of the grant and nonqualified options expire ten years after the date of the grant. No options to purchase common stock were exercised in 1976 and 1975.

Foreign Subsidiaries (Note 5)

Financial data relating to Company B's investment in foreign subsidiaries consolidated are presented below:

	1976	1975
Net Sales	$230,695,000	$218,763,000
Net Income	8,389,000	12,497,000
Net Current Assets	62,379,000	62,109,000
Properties, less depreciation	61,784,000	57,420,000
Total	124,163,000	119,529,000
Other Liabilities	10,222,000	16,952,000
Net Assets	$113,941,000	$102,577,000

Properties and Depreciation (Note 6)

Expenditures for property, plant and equipment during 1976 amounted to $144,900,000 as compared with $182,899,000 during 1975. In addition to amounts expended by Company B, $2,836,000 in 1976 and $15,962,000 in 1975 was expended by municipalities for facilities to be leased by Company B upon completion of construction (see Long-Term Leases).

Depreciation expense amounted to $70,575,000 for 1976 as compared with $66,033,000 for 1975.

Long-Term Debt (Note 7)

Long-term debt at December 31, less current maturities and amounts in treasury, was as follows:

	1976	1975
Sinking Fund Debentures:		
8.7% due 2000; annual sinking fund of $5,000,000 commencing in 1982	$100,000,000	$100,000,000
5.9% due 1997; annual sinking fund of $3,000,000 commencing in 1980	60,000,000	60,000,000
4.35% due 1989; annual sinking fund of $3,750,000	45,000,000	48,750,000
4.5% due 1991; annual sinking fund of $2,500,000	35,000,000	37,500,000
7.25% Guaranteed Debentures, due 1985; annual sinking fund of $750,000 in 1977, $1,250,000 in 1978-1981, $2,000,000 in 1982-1984 and $2,500,000 in 1985	13,500,000	14,250,000
Notes Payable--8.25%, due 1980	50,000,000	50,000,000
Notes Payable--7.875%, due 2001, annual payments of $1,750,000 commencing in 1983	29,500,000	
Revolving Credit Notes	15,000,000	30,000,000
Other	36,054,000	31,046,000
Total	$384,054,000	$371,546,000

Under the terms of a credit agreement with a group of banks, Company B may borrow on a revolving credit basis, up to $150,000,000 at the prime commercial rate of the banks on the dates of borrowings. Loans up to such maximum amount are convertible into term loans on December 31,1979 with interest of 1/2 of 1 percent above the prime commercial rates. Such loans would mature in stipulated annual amounts through 1983.

During the five years ending December 31, 1981, maturities (after giving effect to amounts held in treasury and assuming conversion of the outstanding Revolving Credit Notes to term loans) of long-term debt will be as follows: 1977, $6,333,000; 1978, $14,123,000; 1979, $12,259,000; 1980, $70,149,000; and 1981, $15,844,000.

Long-Term Leases (Note 8)

Company B has entered into lease agreements for the use of facilities that have been or are being constructed with funds provided from the proceeds ($203,900,000) of Industrial Revenue Bonds. The lease agreements provide for the payment in annual amounts ($16,000,000 in 1977, and in generally decreasing annual amounts to approximately $14,000,000 in 1985 through 1996 and approximately $7,000,000 in 1997 and 1998) sufficient to service principal and interest (combined effective rate of approximately 4.8%) on the bonds. Amounts, which comprehend lease rights, equivalent to the aggregate lease payments generally are being amortized and charged to income on a straight line basis over the estimated productive lives of the facilities, which for the most part are shorter than the terms of the leases. Company B has options to purchase the facilities at any time during the term of the leases at the scheduled redemption prices of the bonds or for nominal amounts at the end of the lease periods. Unamortized lease rights as shown in the statement of consolidated financial position at December 31, 1976 and 1975, respectively, include $6,025,000 and $12,239,000 of remaining proceeds held by trustees.

Income Taxes (Note 9)

The provision for income taxes consists of:

	1976	1975
Current		
Federal - Net	$ 6,175,000	$ 3,565,000
State and Foreign	9,739,000	9,892,000
Total	15,914,000	13,457,000
Deferred - Net	10,884,000	7,955,000
Total	$26,798,000	$21,412,000

Company B files a consolidated federal income tax return which includes the domestic leasing and insurance companies that are not consolidated for financial statement purposes and utilizes in its tax return its share of operating costs of Red Mining Company (see Commitments and Contingencies) including the depreciation, amortization, depletion and investment tax credits attributable to the properties of Red Mining Co.

The provision for current income taxes has been reduced in each year by items such as foreign tax credits, allowance for percentage depletion and dividend exclusions. The provision for deferred income taxes as shown above consists principally of the tax effect of the difference between Company B's depreciation and lease expenses for financial accounting purposes and for income tax purposes, less (a) reversal of the tax-effect of the difference, accumulated in prior years, between Company B's share of Red Mining Company's depreciation and amortization expenses for financial accounting purposes and for income tax purposes, (b) investment tax credits of $5,815,000 for 1976 and $16,244,000 for 1975 carried forward to future years and (c) for 1976, foreign tax credits of $5,000,000 carried forward to future years. The deferred income taxes shown in the accompanying statement of consolidated financial position

are comprised principally of the cumulative effect of the above items, which at December 31, 1976, included investment tax credits of $22,000,000 and foreign tax credits of $5,000,000 carried forward to be used in federal income tax returns.

Pension Plans (Note 10)

Company B and certain of its subsidiaries have in effect several pension plans covering substantially all of their employees. Pension costs (defined as normal cost plus interest on unfunded past service costs and, if required, an amount for vested benefits) are funded. Income for 1976 was charged with $25,275,000 as compared with $25,101,000 in 1975. Based upon actuarial estimates, the total amount required at December 31, 1976 to provide fully for past service cost was $521,324,000. At that date the unfunded past service cost of the plans amounted to approximately $138,605,000. At January 1, 1976, the date of the latest actuarial determination, the assets of the pension funds exceeded vested benefits under the plans.

Thrift Plan for Salaried Employees (Note 11)

Under the terms of the Thrift Plan for Salaried Employees, 570,037 shares of the company's common stock were purchased during the year by the trustee. Thrift Plan shares are allocated to participating employees and are held in trust by the trustee. Company B's contribution to this plan amounted to $3,036,000 in 1976 and $2,967,000 in 1975. Such contribution represented 50 cents for each dollar invested by the participants.

Commitments and Contingencies (Note 12)

In connection with the debt financing of Company B Leasing Corporation, Company B has agreed to cause Company B Leasing to maintain working capital (as defined) of not less than $1,000,000 and equity (as defined) of not less than $5,000,000.

Company B and the other 50% shareholders of Red Mining Company are obligated, until the outstanding principal amount of first mortgage bonds (Series A, $73,591,000; Series B, $61,920,000) of Red Mining Company is paid in full, to take the entire production of Red Mining Company, and, as to each half-owner, to pay 50% of Red's operating and interest costs. If and to the extent that Red shall not have made the necessary payments each shareholder is also obligated to pay one-half of amounts needed by Red for (a) fixed sinking fund requirements and final maturity amount on the said bonds, and (b) certain future capital replacements. Separate financial statements for Red are included in reports filed annually with the Securities and Exchange Commission.

Company B is similarly obligated up to approximately $3,800,000 under arrangements with another associated company in which a 5.87% interest is held.

At December 31, 1976, Company B was guarantor of $72,000,000 of debt issued by a company for use in constructing production facilities and operating a nickel mining venture in which Company B has a 17.5% interest.

Commitments for the purchase of property, plant, and equipment (including unexpended amounts relating to projects substantially under way) amounted to $66,000,000 at December 31, 1976.

ACCOUNTANT'S OPINION

To Company B, its Shareholders and Directors:

We have examined the statement of consolidated financial position of Company B and subsidiary companies as of December 31, 1976 and 1975 and the related statements of consolidated income retained in the business and changes in consolidated financial position for the years then ended. We have also examined the combined statement of financial position of the unconsolidated subsidiaries of Company B as of December 31, 1976 and 1975 and the related combined statements of income and changes in financial position for the years then ended. Our examinations were made in accordance with generally accepted auditing standards and accordingly included such tests of the accounting records and such other auditing procedures as we considered necessary in the circumstances.

In our opinion, the accompanying financial statements present fairly the financial position of Company B and subsidiary companies and of the unconsolidated subsidiaries of Company B at December 31, 1976 and 1975 and their respective results of operations and changes in financial position for the years then ended, in conformity with generally accepted accounting principles applied on a consistent basis.

Starks and Sherman
Certified Public Accountants

COMPANY B -- FIVE YEAR SUMMARY

Results for Year (in millions of dollars)

	1975	1974	1973	1972	1971
Net Income	$ 50.7	$ 56.2	$ 95.7	$ 95.0	$ 76.0
Net Income as a per cent of net sales	3.0%	3.5%	6.1%	6.4%	5.6%
Income per share of common stock	$1.44	$1.64	$3.01	$2.96	$2.29
Dividends per share on common stock	$1.00	$1.60	$1.575	$1.50	$1.50
Year-End Data (in millions of dollars)					
Working Capital	$360.6	$361.5	$377.9	$361.0	$399.9
Long-term Debt	$384.1	$371.5	$293.1	$246.7	$271.8
Stockholders' Equity	$1059.7	$1042.4	$1036.3	$986.6	$951.5
Selected Ratios					
Current Ratio	2.22	2.22	2.50	2.76	3.17
% sales to total assets	82.96	80.02	84.80	87.24	82.16
% net income to net worth	4.79	5.38	9.23	9.63	7.64
Other Data					
Gross National Product (in billions of dollars)	1050.4	976.4	930.3	865.7	793.5
Standard & Poor's stock Index (composite)	108.4	91.29	197.1	107.5	99.13
Standard & Poor's Index (steel)	40.02	41.36	54.71	53.33	56.21
Company B price range	23-15	29-18	33-25	59-45	58-46
Steel Products Shipped (net tons in 000's)	5353	5442	5479	5506	4915

*Industry average during the current year is 2.7%.

APPENDIX C

FAVORABLE AND UNFAVORABLE POLLUTION DISCLOSURE USED AS EXPERIMENTAL VARIABLES IN THE FOUR TREATMENT GROUPS

ADEQUACY OF
COMPANY A'S PLANT POLLUTION CONTROLS

	AIR POLLUTANTS		MAJOR WATER POLLUTANTS							
PLANT	Particulates	Sulfur Dioxide	Temperature (winter & summer)	Acidity/Alkalinity	Dissolved Solids	Suspended Solids	Biochemical Oxygen Demand	Oil/Grease	Cyanide	Iron
A	N	N	N	N	C	N	N	C	C	N
B	N	N	C	C	C	C	C	C	C	C
C	N	N	N	N	N	N	N	N	N	N
D	N	N	N	N	N	N	N	C	N	N
E	N	N	C	N	N	N	N	N	C	N
F	N	N	N	N	N	N	N	N	N	N
G	N	N	N	N	C	C	N	N	N	N
H	N	N	N	C	N	N	N	C	N	N
I	N	N	N	C	N	C	N	C	C	N
J	N	N	N	C	N	C	N	N	N	N
K	N	C	N	C	C	C	N	N	N	N
L	N	N	N	C	N	N	N	N	C	N
M	N	N	N	N	C	C	N	C	C	N
N	N	C	N	C	C	C	C	N	N	C
O	N	N	N	C	C	C	N	C	C	N

LEGEND:
N = Noncompliance with environmental standards.
C = Compliance with environmental standards.

Based on EPA estimates of the steel industry pollution control bill, Company A would have to spend $682 million during the next five years to bring its plants into compliance with pollution control regulations.

ADEQUACY OF
COMPANY A'S PLANT POLLUTION CONTROLS

	AIR POLLUTANTS		MAJOR WATER POLLUTANTS							
PLANT	Particulates	Sulfur Dioxide	Temperature (winter & summer)	Acidity/Alkalinity	Dissolved Solids	Suspended Solids	Biochemical Oxygen Demand	Oil/Grease	Cyanide	Iron
A	C	C	N	C	C	C	C	C	C	C
B	C	C	N	C	C	C	N	C	C	C
C	C	C	C	C	C	C	C	C	C	C
D	N	C	N	C	N	C	N	C	C	C
E	C	C	C	C	C	C	C	C	C	C
F	N	C	N	C	C	C	C	C	C	C
G	C	C	N	N	N	C	N	C	N	N
H	C	C	C	C	C	C	C	C	C	C
I	C	C	N	C	C	C	C	C	N	N
J	C	C	C	N	C	C	C	C	C	C
K	C	C	C	N	C	C	C	C	C	C
L	C	N	C	C	C	C	C	C	C	C
M	C	N	C	N	C	C	C	C	C	C
N	C	N	C	C	C	C	C	C	C	N
O	C	C	C	N	C	C	C	C	C	C

LEGEND:
N = Noncompliance with environmental standards.
C = Compliance with environmental standards.

Based on EPA estimates of the steel industry pollution control bill, Company A would have to spend $45.5 million during the next five years to bring its plants into compliance with pollution control regulations.

ADEQUACY OF
COMPANY B'S PLANT POLLUTION CONTROLS

	AIR POLLUTANTS		MAJOR WATER POLLUTANTS							
PLANT	Particulates	Sulfur Dioxide	Temperature (winter & summer)	Acidity/Alkalinity	Dissolved Solids	Suspended Solids	Biochemical Oxygen Demand	Oil/Grease	Cyanide	Iron
A	C	C	N	C	C	C	C	C	C	C
B	C	C	N	C	C	C	N	C	C	C
C	C	C	C	C	C	C	C	C	C	C
D	N	C	N	C	C	C	C	C	C	C
E	C	C	C	C	C	C	C	C	C	C
F	N	C	N	C	C	C	C	C	C	C
G	C	C	N	C	C	C	N	C	N	C
H	C	C	C	C	C	C	C	C	C	C

LEGEND:
N = Noncompliance with environmental standards.
C = Compliance with environmental standards.

Based on EPA estimates of the steel industry pollution control bill, Company B would have to spend $45.5 million during the next five years to bring its plants into compliance with pollution control regulations.

ADEQUACY OF
COMPANY B'S PLANT POLLUTION CONTROLS

	AIR POLLUTANTS		MAJOR WATER POLLUTANTS							
PLANT	Particulates	sulfur dioxide	Temperature (winter & summer)	Acidity/Alkalinity	Dissolved Solids	Suspended Solids	Biochemical Oxygen Demand	Oil/Grease	Cyanide	Iron
A	N	N	N	N	N	N	N	N	N	N
B	N	C	N	C	C	C	N	N	N	N
C	N	N	N	N	N	N	C	C	N	N
D	N	N	N	C	N	N	N	N	N	N
E	N	N	N	N	C	N	N	C	N	N
F	N	N	N	N	N	N	N	N	C	N
G	N	N	N	N	N	N	N	N	N	N
H	C	C	N	C	C	C	C	C	C	C

LEGEND:
N = Noncompliance with environmental standards.
C = Compliance with environmental standards.

Based on EPA estimates of the steel industry pollution control bill, Company B would have to spend $682 million during the next five years to bring its plants into compliance with pollution control regulations.

APPENDIX D

QUESTIONNAIRE

Now that you have examined the financial statements, how much of the $100,000 do you choose to invest in:

Company A $_____

Company B $_____

TOTAL $ 100,000

Please answer the following questions:

1. Are you: (Check one)

   A. An undergraduate student _____

   B. a graduate student _____

   C. not a student _____

2. Are you usually employed? (If you are on leave of absence consider yourself employed). (Check one)

   A. full time _____

   B. part time _____

   C. not employed _____ (If not employed, skip to Question 4).

3. What is your occupation? _____

4. What additional information, if any, would you like available for evaluating these reports? _____

5. Besides the information furnished you, what additional information, if any, did you use in evaluating these reports? _____

6. If your investment objective was for a period other than 5 years, would you have allocated the $100,000 differently?

   Yes _____* No _____

   *If answer is "yes", please explain why. _____

7. How much time did you spend on your investment decision? _____

8. Please fill in your social security number. _____

APPENDIX E

POST INTERVIEW QUESTIONNAIRE

POST INTERVIEW QUESTIONNAIRE

Please list the information you used (from the experimental display provided you) in making your allocation of the $100,000 between the two companies. Assign weights to each unit of information used. Total weight should equal 100.

VITA

Rita Prizler Hull

Candidate for the Degree of

Doctor of Philosophy

Thesis: AN INVESTIGATION OF THE IMPACT OF ENVIRONMENTAL DISCLOSURE ON STOCK INVESTMENT DECISIONS: A BEHAVIORAL FIELD EXPERIMENT

Major Field: Business Administration

Biographical:

Personal Data: Born in Lone Tree, Iowa, the daughter of Mr. Ernest R. and Ms. Mildred Huskins Prizler.

Education: Received the Bachelor of Arts degree from Augustana College, Rock Island, Illinois in 1967; received the Master of Accountancy degree from Western Illinois State University in 1973; completed requirements for the Doctor of Philosophy degree at Oklahoma State University in July, 1978.

Professional Experience: Staff Accountant, Price Waterhouse & Company, Chicago, Illinois, 1967-1970; Divisional Controller, Beatrice Foods, Chicago, Illinois, 1970-1971; Part-time Instructor, Western Illinois State University, 1972-1973; Part-time Instructor, Oklahoma State University, 1973-1976; Assistant Professor, Department of Quantitative Analysis and Control, Bowling Green State University, 1976-1978; Assistant Professor, Department of Accountancy, Northern Illinois University, 1978-present.

Professional Organizations: American Accounting Association, American Institute of Certified Public Accountants.