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MASTER

METHODS OF ECONOMIC ANALYSIS APPLIED
TO FUSION RESEARCH: DISCOUNT RATE
DETERMINATION AND THE FOSSIL FUEL PRICE EFFECT

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Department of Energy
Division of Magnetic Fusion Energy

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ABSTRACT

In current and previous efforts, ECON has provided a preliminary economic assessment of a fusion research program. Part of this effort was the demonstration of a methodology for the estimation of reactor system costs and risk and for the treatment of program alternatives as a series of steps (tests) to buy information, thereby controlling program risk and providing a sound economic rationale for properly constructed research programs. The first phase of work also identified two areas which greatly affect the overall economic evaluation of fusion research and which warranted further study in the second phase. This led to the two tasks of the second phase reported herein: (1) discount rate determination and (2) evaluation of the effect of the expectation of the introduction of fusion power on current fossil fuel prices.

In the first task, various conceptual measures of the social rate of discount were reviewed and critiqued. It was determined that some opportunity cost of capital measure was appropriate, and that prevailing rates of return in the marketplace would place a firm upper-bound on the appropriate discount rate. The nominal rates reported by corporations and in the capital markets in recent years, however, were assessed as being inaccurate because they contain large, fictitious components due to inflation. Thus, a methodology was set up to properly assess the true rates of return prevailing in the private sector. This effort yielded estimates of about 6 percent return on assets for 1600 corporations studied and about 1 percent for return rates on U.S. Treasury bonds. In light of these results and other considerations, a 3 to 5 percent discount rate is advocated for use in evaluating long-range energy R&D, providing that the risks have been properly accounted for.

In the second task, a benefit area that had been called out by ECON was further examined. Long-range R&D yields short-term benefits in the form of lower nonrenewable energy resource prices because the R&D provides an expectation of future competition for the remaining reserves at the time of technology availability. Thus, there is economic incentive to accelerate the production of these conventional resources, lowering prices in the near-term. To study this effect and estimate the size of the benefits, ECON developed a model of optimal OPEC petroleum pricing as a function of the expectation of future competing technologies. It was shown that the existence of this expectation lowers the optimal OPEC export price and that accelerated technology R&D programs should provide further price decreases. These price reductions translate into benefits to the U.S. of at least a billion dollars.

NOTE OF TRANSMITTAL

The application of principles of economics to the economic evaluation of fusion research reported in this document was prepared for the U.S. Department of Energy, Division of Magnetic Fusion Energy, under Contract No. EG-77-C-02-4181. ECON study manager for this effort has been Dr. George A. Hazelrigg, Jr. Other individuals contributing to this study include Mr. Keith R. Lietzke and Dr. Klaus P. Heiss. The DOE technical representative for this study was Dr. Charles Head.

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INTRODUCTION

Since April 1977, ECON, Inc. has been under contract to the U.S. Department of Energy to study advanced methods of economic analysis applied to fusion research. This work was predicated on the belief that "conventional" methods of economic analysis, principally benefit-cost analysis, are inadequate for the analysis of long-range energy alternatives. The cause of this inadequacy can be summarized in two main reasons:

1. The results of any research program are uncertain prior to the start of the program and conventional benefit-cost analysis does not properly account for this uncertainty.
2. The decision to undertake a research program does not constitute a commitment to the technology in question. Rather, it is a commitment to buy information for future decisions regarding that and alternative technologies.

The initial work that ECON performed focused on laying the groundwork for an in-depth economic analysis of fusion research that would overcome the shortcomings of conventional benefit-cost analysis. There are two fairly technical issues encountered in even a preliminary analysis of an advanced technology system such as fusion: (1) Can it be done? and (2) Can it be done competitively? These questions were addressed in the initial work, and two major problem areas in the economic evaluation of fusion research (or research on any long-range energy technology) were identified.

Social Discount Rate

First, the use of a 10 percent rate of discount, required by the Office of Management and Budget (OMB), severely penalizes investment into any long-range project, and inappropriately so, as the evidence presented in Part I of this report shows. When a project has a cost outlay stream and a benefit stream which are not

completely contemporaneous (for example, costs may have to be incurred early in the form of research and development expenditures), some method of comparing the two streams must be formulated.¹ If the basis for project selection is the comparison of the simple sums of the benefit and cost streams, then it can be said that a zero discount rate has been applied, that is, future costs or benefits have not been discounted when compared to present costs or benefits.

Generally, a positive discount rate is applied to the evaluation of time-displaced benefits and costs. In large measure, this is due to the fact that there exist investment opportunities which promise to yield a positive rate of return on the assets.² All other things equal, society should not give up an opportunity to make a 10 percent rate of return in order to take on an investment yielding zero or even 5 percent. Since the government withdraws resources from the private sector (via taxes and Treasury borrowing) in order to finance its investments, it is only appropriate that its investments yield approximately the same return as they would had they been left in the private sector. A discount rate based upon this rationale could be referred to as an "opportunity cost rate of discount;"³ this appears to be the conceptual basis for OMB's recommended 10 percent rate.

If, as suggested by the work reported in Part I, the 10 percent rate is too high, the effects of using it are significant. An example drawn from Part I

¹This would not be necessary in the very unusual case where either benefits exceeded costs for every time period under consideration, or the converse. Where neither of these situations arise, some means for comparison is needed.

²In addition to this, there is also the simple preference among consumers for income today over income tomorrow. As explained in Part I of this report, the actual market interest rate (upon which the discount rate is in large measure based) is a meld of individuals' time preference for income and time productivity of investments.

³Alternative measures also exist, as discussed in Part I, Chapter 2.

illustrates one effect of the use of an incorrect discount rate. Consider two hypothetical projects, A and B. For both projects, the cost is \$25 million and is incurred immediately. Project A begins to yield an immediate flow of benefits at \$5 million per year for the next 10 years. Project B yields \$15 million for 30 years, however the benefit stream does not begin until 20 years from the present. As shown in Table 1, the use of a 10 percent discount rate would clearly cause the selection of Project A (net present value of \$10.7 million) and the abandonment of Project B (net present value of -\$4.0 million), even though the latter yields an annual benefit rate three times as large for three times as long. This is a crucial issue for, unless the benefit rate were somehow to increase or the cost to decrease, Project B would never be funded if evaluated at a 10 percent discount rate. A reevaluation of the projects at the lower discount rate of 5 percent changes the project comparison considerably. Project B is now worth \$61.9 million compared to only \$13.6 million for Project A, the former being clearly preferred.

As the use of a higher discount rate promotes the present consumption of available resources, another effect of a high discount rate, if applied economy-wide, is to accelerate the consumption of available nonrenewable energy stocks, such as fossil fuels. This effect results because the future revenues earned by

TABLE 1 EVALUATION OF TWO HYPOTHETICAL PROJECTS AT DIFFERENT DISCOUNT RATES			
PROJECT	PRESENT VALUE OF PROJECT (MILLIONS OF \$, NET OF COSTS) AT ANNUAL DISCOUNT RATE OF		
	10%	5%	2%
A	10.7	13.6	19.9
B	-4.0	61.9	201.1

conserving the energy reserves (by withholding the resource from present consumption) are more heavily discounted when a higher discount rate is used. Thus, there is a tendency to accelerate the consumption of the existing resources, an effect in stark contradiction with current federal emphasis on conservation.

Fossil Fuel Price Effect

Although the benefits from implementing fusion (if available at a competitive price) cannot be expected for several decades, some near-term benefits to fusion research also exist. First, the research itself provides information that can be used to guide future decisions on the contribution of the fusion program and in other areas of the economy. Establishing and demonstrating a methodology to assess the value of this information to the fusion research program was the primary subject of the initial work phase.

Also, in its initial study of the economics of fusion research, ECON identified an area of near-term benefit that had not been made explicit in other studies. This benefit is due to the effect of future, new energy supplies upon the intertemporal consumption of conventional, nonrenewable energy resources such as fossil fuels and uranium. The depletable nature of these resources means that their present consumption precludes future consumption. Thus, the resource holders will "hoard" their inventory if the value of doing so--as measured by the discounted, expected future price--exceeds the price offered today. The expectation of a new energy source which will compete with the depletable resource in the future results in a decreased expected future demand for the resource, thus stimulating increased production and lower prices today. Viewed from a societal welfare aspect, the availability of future energy sources means that current energy resources need not be unduly saved for future generations. This phenomenon leads to benefits in the near-term, as changes in expectations on future energy supplies result in

immediate changes in the optimal intertemporal allocation of the depleted resources. In order to investigate this broad benefit area, ECON selected one particular market where this effect could be studied: the production decisions for OPEC oil.

The benefits (in the form of lower OPEC prices) to long-range energy technologies such as fusion have been estimated to be at least a billion dollars. Other benefits can be expected due to this effect upon domestic fossil fuel reserves and uranium reserves. Whereas this benefit does not underwrite the entire fusion research and development program, it does provide additional incentive.

This report is presented in two stand-alone parts. As such it can be broken apart for separate distribution of the two studies. The chapter, figure and table numbering are separate for the two parts. Reference to Figure 2.1, for example, refers to the figure in that part in which the reference was made; there is no cross-reference.

PART I

DETERMINATION OF THE SOCIAL RATE OF DISCOUNT
FOR LONG-RANGE ENERGY R&D EVALUATION

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1. INTRODUCTION AND SUMMARY

1.1 The Social Rate of Discount: Overview of Alternative Measures

Two different concepts play fundamental roles in discussions on the appropriate social rate of discount. The first is the social rate of time preference, which refers to how society in the aggregate is willing to trade off present consumption for future consumption. The earliest theorists proposed the use of this rate since any project with a rate of return in excess of this rate would lead to increased present value social welfare. Other theorists argued, however, that government investment withdraws resources from the private sector and thus tends to preclude private sector investment which has a marginal rate of return considerably in excess of the social rate of time preference,¹ as generally conceded by most economists. Measures of the private sector rate of return are typically the market interest rate(s), although some have used industry rate of return data. The private sector rate of return was put forth as an "opportunity cost" of public sector investment. In 1968, Baumol [2] noted that it was impossible to reconcile the discrepancy between arguments which favored one rate or the other. A middle-ground position which gained some acceptance was put forth by Krutilla and Eckstein [8]: Use a weighted average of the private rate of return and the social rate of time preference, with the weight determined by the relative amounts coming from private sector consumption and private sector investment. Although this position gained some popularity, it did not in essence resolve the dilemma.

In 1969, Stockfish [14] made some comments which appear to have in part motivated the Office of Management and Budget to specify the use of a 10 percent

¹This discrepancy is usually attributed to the existence of corporate income taxes and riskiness in ventures. See Section 2.2.

annual rate of discount on the evaluation of federal projects. He maintained that the appropriate discount rate should be the opportunity cost of capital (as evidenced in the private sector) and that "those who reject the technical opportunity cost answer are actually answering the following question: 'What should be the rate of capital accumulation, or some target for the future GNP?' " If capital is accruing too slowly, there are better means to stimulate it--appropriate combinations of monetary and fiscal policies--than to underwrite direct public sector investment.

One final contribution to the debate should be noted. Following work by Arrow and Kurz [1], Bradford [4] suggests that the correct approach in selecting a social rate of discount was to make explicit the optimization problem. The optimal solution, when the appropriate constraints are considered, would be the "correct" discount rate. As constraints, Bradford suggests that government investments are restricted to certain classes of activities and thus apparently attractive returns in the private sector do not represent government investment opportunities. The results of Bradford's work suggests that the social rate of time preference is the "optimal" discount rate, and that this conclusion is rather robust with respect to differing assumptions about the effect of government investment on the private sector. Bradford notes that an extension of this result is the takeover of private investments by the government, a conclusion which is precluded by the constraints on government investment; he emphasizes that investing in a government project with a rate of return of 5 percent in face of 10 percent prevailing in the private sector is rational "only if the private sector investment is not also an investment opportunity for the government."

If one is considering relevant constraints on government investment, it would seem important to consider constraints on the size of the budget for government

investments, constraints due to macroeconomic (for example, inflation-reducing) or political ("less government") objectives. It may in fact be possible to exhaust all the resources in an economy with investments having returns exceeding the social rate of time preference,² without even undertaking investments "reserved" for the private sector. Thus, it seems likely that not all projects with favorable rates of return by Bradford's criteria would be funded. If this is the case, the appropriate rate of discount to apply in evaluation of public investment projects is the rate of return on the funded project with the lowest rate of return.

In sum, opportunity cost measures do seem appropriate in recommending a social rate of discount to be applied to the evaluation of public projects. As these measures are the most strict of those put forth, rates of return in the private sector should at least provide an upper bound on the appropriate discount rate. The discussion turns to an examination of these rates of return.

1.2 Quantitative Data as Evidence

Private sector rates of return are published in corporate balance sheets. However, in times of inflation, reported corporate profit and loss records cannot be taken at face value because they contain large, fictitious components due in part to the set of accounting rules imposed upon their computation by the Internal Revenue Service. Thus, in order to obtain a true measure of the opportunity cost of capital, it is necessary to recompute these records, removing the effects of inflation and by using a set of accounting rules that does not distort the results. This has been done for 1,600 U.S. corporations with the data taken from Compustat files. The inflation impact analysis reported here adjusts earnings and assets to account for the following phenomena:

²Of course, the social rate of time preference will tend to rise as total investments increase and thus this is an unlikely result. However, analyses like Bradford's do not explicitly recognize this response.

1. Payments to the firm are made with dollars that have less purchasing power than the dollars outlaid to cover costs, due to lags between incurring costs and receiving revenues.
2. The value of corporate capital assets such as plant and machinery appreciate over time in current (nominal) dollars. Failure to correct for this leads to overstatement of the returns on assets.
3. Depreciation allows a firm to deduct the cost of a capital asset over the lifetime of its use. This depreciation allows corporations to treat as a cost assets withheld with which new capital equipment can be purchased to replace old worn equipment. Under current tax laws, however, the amount allowed for depreciation is based upon the original purchase price and not upon the inflated replacement cost. Thus, current tax laws allow for inadequate depreciation; firms end up "living off of" accumulated capital stock, paying taxes upon it and distributing fictitious profit from it, without this showing on the accounting records.
4. Firms hold cash assets and inventories which nominally appreciate over time due to inflation. These nominal gains are recorded as profits from which taxes must be paid, but they are not real, as nothing additional has been produced or gained in real terms.

All of these phenomena lead to overstatement of real private sector return rates reported by corporations.

Even accepting arguments favoring the opportunity cost of capital approach, a ten percent discount rate appears unwarranted. U.S. Treasury bonds have yielded extremely low real (inflation-adjusted) return rates, from -3 to 2 percent since 1974. Inflation has taken its toll on private industry, too. Not only are companies earning revenues in dollars that have increasingly little purchasing power, but they have been unable to fully depreciate their physical assets due to the fact that the allowable depreciation rates are based on uninflated, book-value purchase prices.

This study of the true rate of return in industry over the last several years indicates that reported nominal return rates greatly overstate the true cost of capital. Table 1.1 summarizes reported and actual performance records of 25 industries for 1977. Whereas reported returns on assets overstate the actual by about the inflation rate, returns on equity were ravaged by inflation: Average

TABLE 1.1 REPORTED AND ACTUAL (FULLY ADJUSTED FOR INFLATION) PERFORMANCE RECORDS BY INDUSTRY FOR 1977 FOR 1600 COMPANIES

INDUSTRY	PERFORMANCE RECORDS (MILLIONS OF DOLLARS OR PERCENT PER YEAR)					
	REPORTED EARNINGS (\$)	ACTUAL EARNINGS (\$)	REPORTED RETURN ON EQUITY (%)	ACTUAL RETURN ON EQUITY (%)	REPORTED RETURN ON ASSETS (%)	ACTUAL RETURN ON ASSETS (%)
AGRICULTURE	2.92	-0.75	5.69	-0.86	9.03	4.47
MINING	13.51	0.97	6.72	0.29	8.20	3.88
DRILLING AND EXPLORATION	24.89	7.10	14.47	2.40	17.96	9.97
BUILDERS AND CONSTRUCTION	17.33	7.01	16.55	4.27	12.69	7.59
FOOD	32.22	13.38	13.02	3.50	14.69	8.46
TOBACCO	129.11	92.12	14.44	8.37	15.38	12.21
TEXTILE AND LUMBER	17.56	1.38	11.83	0.49	12.59	4.84
PRINTING	18.53	9.73	14.59	5.72	18.47	12.02
CHEMICALS AND DRUGS	63.24	23.50	14.54	3.42	15.14	8.19
REFINING AND ROOFING	293.22	28.15	13.33	0.68	18.11	9.15
RUBBER AND PLASTIC	14.03	-4.90	9.25	-1.81	11.22	4.34
GLASS, CLAY AND CEMENT	22.84	2.58	12.70	0.76	11.99	4.87
IRON AND STEEL	11.08	-35.79	2.83	-4.00	3.56	-1.23
HARDWARE	8.08	1.09	14.15	1.13	15.19	6.92
MACHINERY	45.74	15.80	16.44	4.14	17.87	10.38
ELECTRIC	28.92	8.31	15.06	3.04	14.32	8.11
CARS, TRUCKS AND AIRCRAFT	79.13	32.12	16.43	4.38	16.19	9.41
INSTRUMENTS	35.53	19.00	14.70	6.03	18.52	11.96
JEWELRY AND TOYS	6.72	0.40	12.06	0.46	14.52	7.17
RAILS	84.22	15.82	8.64	0.72	7.61	3.08
TRANSPORTATION	17.29	-7.20	13.46	-2.41	9.54	2.19
COMMUNICATION	232.13	-30.51	12.00	-0.51	11.35	3.54
UTILITIES	49.98	16.04	11.28	1.37	9.70	4.81
WHOLESALE	10.05	3.73	14.60	3.80	12.68	7.92
RETAIL	20.34	6.90	12.80	2.69	12.81	7.16

reported return on equity was 12.1 percent, but the actual return was only 1.2 percent. Table 1.2 summarizes the actual return rates on equity, assets and Treasury bonds for 1974-77. Asset returns were approximately 6 percent, while U.S. Treasury bonds yielded less than 1 percent on average.

Based upon these considerations, the use of a 10 percent discount rate is clearly unwarranted for the evaluation of long-term projects, that is, projects for which the return on investment is realized many years into the future. High discount rates strongly favor the selection of short-term projects and nearly doom competing long-term projects, despite the potential benefits offered. When risks have not been properly accounted for (for example, the risk that a component may cost ten times as much as estimated, or the risk that the system will not work at all), it has been argued that the use of a high discount rate such as 10 percent is justified as a type of risk premium, accounting for the improper assessment. This point underscores the need for the use of proper risk assessments in the evaluation

TABLE 1.2 ACTUAL RETURNS ON ASSETS AND EQUITY AND REAL RETURNS ON TREASURY BONDS, 1974-77			
YEAR	PERCENT PER YEAR		
	RETURN ON ASSETS*	RETURN ON EQUITY*	RETURN ON TREASURY BONDS
1974	6.3	0.5	-3.0
1975	5.1	-0.6	0.3
1976	5.9	1.1	2.0
1977	6.1	1.2	0.4
* ASSET-WEIGHTED AVERAGES FOR 25 INDUSTRIES.			

of long-range energy R&D, for such projects cannot bear the burden of the higher discount rate.

The use of a discount rate higher than about five percent seems particularly unjustified in light of the emphasis current federal policy appears to place upon energy conservation. The consistent application (across energy consumption as well as research) of a higher discount rate than that found in the marketplace would promote the consumption of existing fuels beyond the rate at which market forces would otherwise be inclined, a result in complete contradiction with present federal policy.

2. A CONCEPTUAL BASIS FOR DETERMINING THE SOCIAL RATE OF DISCOUNT

Most economists favor a social rate of discount which reflects as accurately as possible the "social opportunity costs of displacing private resource use," that is, the public sector use of resources should at least balance the sacrifice borne by the private sector when economic resources are diverted from private to public uses. This is an intuitively appealing proposition, and one which has been strongly endorsed by the Joint Economic Committee's Subcommittee on Economy in Government [15, p. 12]. Unfortunately, it is extremely difficult in practice to define and to measure the "social opportunity costs" of public projects. And it is precisely this difficulty which has led to the disparity among the social discount rates recommended, at one time or another, by professional economists.

In principle, the social rate of discount should reflect simultaneously two quite distinct, private "interest rates": the so-called "rate of time preference" of consumers and the "rate of time productivity" of economic resources in the private sector.

The "consumers' rate of time preference" is a rate of interest which reflects consumers' subjective, relative evaluation of given quantities of consumables available at different points in time. For example, if, in year 0, consumers assign the same value to 100 units of consumables available immediately as they do to the certain prospect of receiving 110 units of consumables one year hence, then their rate of time preference is said to be $\left[\frac{\text{Value received next year}}{\text{Value received today}} - 1 \right] = \left[\frac{110}{100} - 1 \right] = 0.10 = 10 \text{ percent}$. Alternatively the "rate of time preference" may be defined as the rate of interest which consumers would have to be offered in order to persuade

them to sacrifice additional current consumption in favor of additional future consumption.

The "rate of time productivity of economic resources," on the other hand, is the rate of return which society is able to earn by sacrificing current consumption in favor of future consumption. In contrast to the subjective rate of time preference, the rate of time productivity is an objective, technical concept. The rate is sometimes called also the "technical rate of opportunity cost between present and future consumption."

These two "interest rates" are fundamental concepts in the theory of the social discount rate. Since the two concepts have sometimes been confused in the cost-benefit literature, it is important that their respective roles be examined with some care. This is done in Section 2.1 below and in Appendix A. For the sake of clarity, the discussion is developed in terms of a series of abstract models, which will focus exclusively on the major issues in social discount rate estimation.

2.1 The Rate of Time Preference, the Rate of Time Productivity and the Social Rate of Discount in a Riskless World Without Taxes

In a world characterized by perfect certainty, by perfect capital markets (in which all borrowing and lending occurs at a single interest rate), and by the absence of taxes, externalities³ and other market imperfections, society's rate of time preference would automatically be driven towards equality with the technical rate of time productivity of society's resources. To see why this is so, one need

³ An "externality" may be defined as a tangible or intangible cost or benefit which does not accrue to the decision-making unit under discussion and hence does not enter the unit's cost-benefit calculus. For example, the benefits from research and development may not always accrue fully to the economic unit undertaking it; the portion of benefits spilling over onto other beneficiaries would be called an externality. The costs of environmental pollution also tend to be externalities, since these costs are not suffered only by the polluters.

only imagine a situation in which some consumers' rate of time preference (say, 5 percent) is below the rate of time productivity (say, 7 percent) which some producers earn on projects not yet undertaken for lack of funds. The existence of a perfect capital market means, among other things, that both the consumers and the producers would be fully aware of this situation. One would therefore expect the producers to offer the consumers something more than a 5 percent rate (perhaps 6 percent) in return for added funds. The producers in question could earn a 7 percent return on these funds and, since the consumers in question have a time preference rate of only 5 percent, they would obviously be willing to relinquish some further, current consumption against the promise of a 6 percent return. Indeed, it should be intuitively obvious that potential lenders (savers) and borrowers would continue to bargain in the capital markets until, in equilibrium, the following conditions are met:

1. Each consumer will have distributed his planned expenditures on consumption over time in such a way that his marginal⁴ rate of time preference just equals the equilibrium market rate of interest
2. Each (profit maximizing) producer will have borrowed sufficient funds to undertake all investment projects offering a rate of return greater than the equilibrium market rate of interest. The rate of return obtainable on the next best investment project not yet undertaken is therefore less than the equilibrium market rate of interest.

⁴The term "marginal" refers to small changes from the equilibrium state. Thus the marginal rate of time preference is the rate of interest which must be offered to consumers for a small, additional increase in savings. Similarly, the marginal rate of time productivity is the rate of return which could be earned on the next, marginal project not yet undertaken. It is reasonable to assume that as the marginal rate of time preference increases, the larger the amount of present consumption becomes relative to the amount of future consumption. It is also reasonable to assume that the marginal rate of time productivity, at any point in time, decreases as more and more of the investment projects open to investors are undertaken.

It follows from conditions (1) and (2) that the perfect capital market in this hypothetical economy accomplishes two tasks at once:

- In each period, it allocates potentially available consumption between actual current consumption and future consumption (current savings), that is, it leads to an optimal rate of savings
- In each period, it channels available savings to the best combination of investment projects open to society.

Finally, conditions (1) and (2) above mean that, in equilibrium, all private investors face exactly the same marginal rate of time productivity and all consumers are characterized by exactly the same marginal rate of time preference, which, in turn, is equal to the producers' equilibrium marginal rate of time productivity. It is therefore meaningful to refer to these equilibrium rates as "social rates" of time preference or time productivity.

Introduce now the public sector into this picture. Specifically, suppose that the government wishes to undertake a public investment project requiring a marginal amount of productive resources. These resources will obviously have to come from the private sector. Depending upon the fiscal⁵ arrangement accompanying the project, the resource transfer will result either in a decrease in investment activity, or in a decrease in current consumption, or in both. But whichever private activity is curtailed, it is clear that the resource transfer will be justified only if the public project offers a marginal rate of time productivity greater than (or at least equal to) the equilibrium market rate of interest, which in turn will be equal to the society's marginal rate of time preference and to society's

⁵If the government finances the resource transfer by increasing personal income taxes, then the public project is likely to draw resources away mainly from consumer goods production. A corporate income tax, on the other hand, is likely to result in both a curtailment of investment activity and current consumption. Finally, it is generally assumed that financing through government bonds will displace mainly private investments, although federal borrowing could also affect the volume of consumer loans.

marginal rate of time productivity.⁶ For only on that condition can the public sector, in the future, compensate the private sector fully for the current and future consumption which was sacrificed when resources were withdrawn from private consumer-goods and capital-goods production. In other words, the equilibrium rate of interest determined in the private capital market of our hypothetical economy would also be the appropriate social rate of discount for public projects, and that social discount rate would simultaneously reflect society's (subjective) rate of time preference and its (technical) rate of time productivity.

It is probably a conclusion of this sort which has led the Department of Defense to describe its 10 percent discount rate as both a technical opportunity cost rate and a rate reflecting society's rate of time preference. But the conclusion is based on what economists call the "classical theory of interest," which, in turn, was developed on the basis of the highly stylized and unrealistic model described above. Although such a model is quite useful for the derivation of first, basic principles, one must now relax its stringent assumptions and examine the extent to which these principles apply to the real world context.

2.2 The Social Rate of Discount in a World with Taxes and with Uncertainty

In the real world, the equalization of consumers' marginal rates of time preference with the marginal rates of time productivity faced by producers will not normally occur. There are several reasons for this deviation from the classical model presented above. Among the most important factors are:

- The imposition of taxes on the private sector
- Differences in the degree of risk faced by private producers
- Imperfections in the product, factor and financial (capital) markets.

⁶See also Appendix A.

The imposition of taxes on the private sector has the effect of introducing a wedge between the rate of return actually earned by private investment projects and the after-tax rate of return effectively accruing to the private decision maker. For example, a corporation facing a flat 50 percent income tax rate and financed exclusively by equity must earn a pre-tax rate of return of at least 10 percent, if it wishes to offer private shareholders (savers) a return of at least 5 percent on their savings. Matters become particularly complicated when the tax rates faced by private producers vary with the legal form of the enterprise, as they do in the United States.

In the real world, it is usually impossible to predict the eventual outcome of an investment project with certainty. In deciding to undertake a given project, the investor almost always faces the risk that the eventual outcome of the project will not compensate him (or his shareholders) fully for the initial investment outlay. A producer who, on balance, tends to undertake relatively risky projects must be expected to offer a commensurately higher rate of return to prospective shareholders, which means that his pre-tax rate of return must also be higher than that required by a low-risk firm. Variability of risk among producers therefore introduces yet another set of wedges between the equilibrium rates of time productivity faced by producers. Further discussion of risk is found in Section 2.2.2.

A further source of divergence between marginal rates of time preference and between marginal rates of time productivity in the private sector are certain market imperfections, such as nonprice credit rationing in the capital market. In the U.S. economy, for example, it is simply not the case that borrowers and savers face identical interest rates. Not only do borrowing rates vary from investor to

investor--sometimes for rather obscure reasons-- but there is usually a spread of several percentage points between overall lending and borrowing rates.

As a result of the factors enumerated above, there does not exist in the U.S. economy a unique and observable equilibrium market rate of interest which can be taken as the appropriate social rate of discount for public projects. Instead, the social rate of discount can at least be estimated as a weighted average of observable market rates. Rates which have been recommended by economists, shown in Table 2.1, are such weighted averages. Unfortunately, the economics profession has not so far reached a theoretically sound consensus on the weighting scheme that should be adopted in estimating the discount rate; the weighting

TABLE 2.1 SOCIAL RATES OF DISCOUNT
RECOMMENDED BY VARIOUS ECONOMISTS

SOURCE	YEAR	RECOMMENDED RATE
KRUTILLA AND ECKSTEIN	1958	5 TO 6 PERCENT
HIRSCHLEIFER, DE HAVEN AND MILLIMAN	1960	10 PERCENT
*HUFSCMIDT, KRUTILLA AND MARGOLIS	1961	4 TO 5 PERCENT
*WEISBROD	1960	10 PERCENT
*FRIEDLAENDER	1965	5 PERCENT ⁺
BAIN, CAVES AND MARGOLIS	1966	5 TO 6 PERCENT
STOCKFISH	1967	13.5 PERCENT
*BAUMOL	1968	10 PERCENT
ECKSTEIN	1968	8 PERCENT
HARBERGER	1968	10.68 PERCENT
⁺ THE AUTHOR ADJUSTS FOR RISK BY ASSUMING A RELATIVELY SHORT USE LIFE FOR THE (HIGHWAY) INVESTMENT PROJECT BEING EVALUATED. *SOURCE: J. HIRSCHLEIFER AND D. L. SHAPIRO [6], TABLE 1, p. 517 FOR UNSTARRED ITEMS AND AUTHOR'S PUBLICATION FOR STARRED ITEMS.		

schemes implicit in Table 2.1 are based on a variety of different, conceptual approaches.

In the final analysis, it is the public policymaker (for example, the Office of Management and the Budget, or DOE) who must select a particular discount rate from the menu of choices offered by economists. It is therefore important that the public decision maker be aware of the differences in the conceptual constructs underlying that menu. For that reason the most important discount rate concepts offered by economists are reviewed below. It is not the intention here to offer a complete review of all work in this area. Instead the discussion concentrates on the more extreme views, since they tend to define the lower and upper limits of the range of discount rates recommended.

In order to keep the discussion simple, it shall proceed in terms of a set of assumptions which will enable the main methodological issues to be highlighted. The focus is first on the problems posed by the presence of taxes, and then proceeds to examine the role of risk. From that discussion it will become clear that the divergencies among market rates introduced by market imperfections require no additional comment.

2.2.1 Taxes and the Social Rate of Discount

The discussion in this section will proceed on the basis of the following set of assumptions:

1. There is no uncertainty or risk; all future returns on investment projects can be foreseen and measured perfectly.
2. All privately produced goods and services (including capital goods) are produced by corporations which pay a 50 percent profit-tax rate and which are financed solely by equity. This assumption enables one to abstract from the complexity introduced by differential tax rates and from the effect of debt on the corporation's cost of funds. A relaxation of this assumption yields little additional insight, but it complicates the analysis enormously.

3. Consumers invest their savings either in government bonds yielding a rate of return, r , or in corporate stock certificates.
4. All resources are fully employed and the capital market is perfect.
5. Without loss of generality, we can assume that all private and public investment projects yield a perpetual stream of equal benefits per year.

In this sort of economy, consumers will allocate the resources available to them between current and future consumption (current savings) so that their marginal rate of time preference is r , this being the certain return which can be earned on government bonds. Since corporate equity issues must compete with government bonds in the perfect capital (loanable funds) market, corporations also must offer their shareholders a rate of return of r after corporate taxes. This means that corporations must earn a rate of at least $2r$ on their marginal investment projects. Consequently, the equilibrium level of savings and investment in this economy is one at which the consumers' marginal rate of time preference (r) is not equal to the marginal rate of time productivity of society's resources ($2r$). Were it not for the corporate tax, society would attain a higher level of savings and investment. It is here where the present model deviates from the classical model presented in Section 2.1.

Now make one further assumption, namely

6. The government wishes to undertake an investment project requiring a set of resource inputs which, at private market prices, have a total value of \$2.00. Without specifying the fiscal arrangement accompanying the resource transfer, it is assumed that the private sector (that is, private corporations) would have used the resources as follows:

- \$1 worth of resources for consumers' goods production
- \$1 worth of resources for capital goods production.

The fundamental difference of drawing resources from consumer goods production as opposed to withdrawing them from capital goods production is that

the former results in a decrease in current consumption (but not of future consumption) while the latter decreases future consumption (but not current consumption). Therefore, the foregone private investment projects may be treated simply as the loss of a perpetual stream of future consumption, that is, the \$1 worth of resources withdrawn from capital goods production can be considered as the equivalent of a perpetual stream of consumption of $\$2r$ per year, this being the rate corporations would have earned on the foregone (marginal) projects. On this interpretation, the resource transfer can then be depicted on a time scale as shown in Table 2.2.

The problem now is to express the social opportunity cost of the public project, that is, the stream of foregone consumption, in the form of a social discount rate.

2.2.1.1 The Baumol-Ramsey Approach

In this approach, first suggested by William Baumol [2] and further elaborated by David Ramsey [11], the social rate of discount appropriate for the

TABLE 2.2 SOCIAL OPPORTUNITY COSTS OF HYPOTHETICAL PUBLIC PROJECT							
OPPORTUNITY COSTS	TIME PERIODS						
	0	1	2	...	N	N+1	...
CONSUMPTION LOST WITH THE ELIMINATION OF SOME CAPITAL-GOODS PRODUCTION	0	-2r	-2r	...	-2r	-2r	...
CONSUMPTION LOST WITH THE ELIMINATION OF SOME CONSUMER-GOODS PRODUCTION	-1	0	0	...	0	0	...
TIME STREAM OF TOTAL CONSUMPTION LOST DUE TO RESOURCE TRANSFER	-1	-2r	-2r	...	-2r	-2r	...

evaluation of the public project is deemed to be a rate of $2r$ percent, in spite of the fact that only 50 percent of the resources are withdrawn from capital goods production, with the rest coming from current consumption. The rationale underlying this approach is, in the words of the authors, that the rate of $2r$ represents not only society's marginal rate of time productivity, but also "the consumers' marginal valuation of (the consumer goods foregone)" [2, p. 792].

What this means is that the corporation, presumably, could have used the \$1 worth of resources actually intended for consumer goods production in an investment project yielding a perpetual stream of consumer goods of \$ $2r$ per year, and that consumers are perfectly aware of that fact. Now, a corporation is free to produce either consumer goods or capital goods, but whatever mix of the two it produces, it will no doubt insist on earning the same rate of return in either activity. The fact that consumers persuade the corporation (in the marketplace) to allocate the \$1 worth of resources to consumer goods production must therefore mean, so the argument goes, that consumers discount the perpetual consumption stream of \$ $2r$ per year at a rate of time preference of $2r$.⁷ Thus regardless of whether the public project displaces current consumption or private investment, the same opportunity cost rate of $2r$ will apply to both sacrifices, as long as the resource transfer "takes place through the agency of the corporation" [2, p. 792].

The argument can easily be generalized to allow for differences in the tax treatment of various sectors of producers, among whom one may even include

⁷ A perpetual stream of \$ $2r$ per year, discounted at a rate of $2r$ will have a present value of \$1, as may be seen from the formula

$$\$1 = \sum_{i=1}^{i=\infty} \frac{\$2r}{(1+2r)^i} = \frac{\$2r}{2r}$$

consumers engaged in do-it-yourself production. For the more general case, the Baumol-Ramsey rate will then be the following weighted average:

$$r_s = \sum_i (a_i r_i) \quad (2.1)$$

where r_s is the social discount rate, r_i is the observable pre-tax rate of return (including an allowance for risk⁸) for the i -th tax-class of producers and where a_i denotes the proportion of the total resource transfer coming from the i -th sector. (The rate r_s may also be viewed as the annual perpetuity which the public project must earn per dollar of resource transfer, where resources are valued at prices observable in the private market). Once again, no attention is paid to the capital goods--consumer goods production mix which would have been produced by the i -th sector. Moreover, the argument is said to hold whatever the origin in the differences among the pre-tax marginal rates of time productivity faced by the various producers [3, p. 495].⁹

2.2.1.2 The Krutilla-Eckstein Approach

The Baumol-Ramsey approach is radically different from the more conventional method of discount-rate estimation suggested earlier by Krutilla and Eckstein [8]. In their study of multiple-purpose river developments, the authors develop their weighting scheme by tracing the sources of federal funds to individual, private spending units. On the assumption that the funds for the public projects are raised by additional income taxes, Krutilla and Eckstein seek to determine the ultimate incidence of these taxes on various groups in the economy: consumers who are net savers, consumers who are net borrowers, corporate businesses, unincorporated businesses, etc. The social rate of discount is then

⁸This assertion will be discussed further in Section 2.2.2.

⁹Thus, interest rate divergencies arising out of market imperfections are taken account of in Equation 2.1.

obtained as a "weighted average of the relevant interest rates (lending or borrowing) and rates of return [faced by the various producers], ...with the weights determined by the distribution of incidence of the taxes among businesses and among households [consumers]."¹⁰

It is difficult to graft the Krutilla-Eckstein approach directly onto the hypothetical model presented here, since assumptions about the fiscal arrangement accompanying the resource transfer have not been made. After tracing the effects of whatever fiscal arrangement was used through the economy, the authors would presumably have arrived at the conclusion that 50 percent of the resource transfer was borne by consumers (having a marginal rate of time preference equal to r) and 50 percent of the transfer would have been borne by producer-investors facing a marginal rate of time productivity of $2r$. The social rate of discount would then have been computed as the weighted average:

$$\begin{aligned} r_s &= \frac{1}{2} (2r) + \frac{1}{2} (r) \\ &= 1.5 r \end{aligned} \tag{2.2}$$

which is obviously much lower than the rate ($2r$) suggested by the Baumol-Ramsey approach.

It is useful to restate the Krutilla-Eckstein approach in a slightly different form. Basically, the authors ask the question: What is the present value, calculated at the consumers' rate of time preference of r percent, of the present and future consumption foregone as a result of the resource transfer to the public sector? Referring back to the time profile of foregone consumption of Table 2.2, it is seen that this present value must be equal to

¹⁰As is shown in Table 2.1, the discount rates so derived varied between 5 and 6 percent, with the actual value depending on the assumed fiscal arrangement accompanying the resource transfer.

$$\$3 = \$1 + \frac{\$2r}{r} \quad (2.3)$$

The first \$1 on the right-hand side of Equation 2.3 is the net present value of foregone current consumption. The term $\frac{\$2r}{r} = \2 represents the net present value of future consumption, evaluated at r , which would have been earned by the foregone, private investment projects.¹¹ The total present value of foregone present and future consumption, in the eyes of consumers, is therefore \$3, and the public sector can compensate the private sector for this loss in present value only if the public project will yield a stream of benefits which, if discounted at r percent, has a present value of at least \$3. On the convenient assumption that the public project yields benefits in perpetuity, it will be seen that the levelized annual benefit it must earn can be no less than \$3r.¹² Expressed on the basis of the private market value of the transferred resources (\$2)--the usual procedure--it follows that the public project must earn an annual perpetuity of \$1.5r per dollar of resource transfer.

The difference between the Baumol-Ramsey and the Krutilla-Eckstein approaches should now be more obvious, especially if one assumes that the resource

¹¹ The reader should note the difference in the private market value (\$1) and the social net present value (\$2) of the resources originally intended for capital goods production. The difference arises from the fact that 50 percent of the future \$2r per year will be siphoned off by the government, so that only \$r per year effectively accrues to the private sector directly. And a perpetual stream of \$r per year, evaluated at r percent, has a net present value of only \$1. (The government will, of course, redistribute the remaining r to the private sector in the form of some public good. The crux is, however, that the private sector does not relate this distribution in any way to its evaluation of particular investment projects.)

¹² If the project yields benefits for only N years, then the annual benefit, X , must be such that

$$\$3 = \$X \cdot \left(\frac{1 - (1+r)^{-N}}{r} \right)$$

transfer will not displace any private capital formation at all, but draws resources solely from consumer goods production. Baumol and Ramsey then seem to ask the question (at least implicitly): What future consumption stream could these resources have earned in the private sector if corporations had actually used them for capital goods rather than consumer goods production?¹³ Krutilla and Eckstein, on the other hand, ask the question: Given the fact that the resources would have been used in consumer goods production, what equivalent perpetuity of future benefits, evaluated at the consumers' rate of time preference, would the public project have to yield in order to compensate consumers, in the future, for their sacrifice in current consumption?

These are entirely different questions which, not surprisingly, lead to different answers, that is, different estimated social discount rates. On the Baumol-Ramsey approach, it does not matter what particular consumer goods-capital goods mix is displaced in each tax class of producers; on the Krutilla-Eckstein approach that sort of information becomes crucial, as may be inferred from Figure 2.1, where it is assumed that the consumers' marginal rate of time preference is 5 percent.

Since, by virtue of the income taxes on producers, there is a wedge between the consumers' marginal rate of time preference and the pre-tax, marginal rate of time productivity faced by producers, the Baumol-Ramsey prescription will

¹³In a recent paper, Alan Nichols even goes as far as to say that the social rate of discount is the highest private marginal rate of time productivity. This prescription is based on the view that one should first reallocate resources from the low yield to high yield projects in the private sector, before any thought is given to the transfer of resources from the private to the public sector. One may expect that on Nichols' rule, the social discount rate would rarely fall below 20 percent. In this connection, see Alan Nichols "On the Social Rate of Discount: Comment," and W. J. Baumol "On the Social Rate of Discount: Reply," both in The American Economic Review, Vol. 59, December 1969, pp. 909-12 and p. 930.

KRUTILLA-ECKSTEIN RATE:

$$r_s = \frac{1}{10} (.12) + \frac{3}{10} (.08) + \frac{1}{10} (.06) + \frac{5}{10} (.05) = 0.036$$

BAUMOL-RAMSEY RATE:

$$r_s = \frac{4}{10} (.12) + \frac{4}{10} (.10) + \frac{2}{10} (.06) = 0.092$$

KEY TO SYMBOLS:

- C = MARKET VALUE OF RESOURCES WITHDRAWN FROM CONSUMER GOODS PRODUCTION
- K = MARKET VALUE OF RESOURCES WITHDRAWN FROM CAPITAL GOODS PRODUCTION
- r = PRE-TAX MARGINAL RATE OF TIME PRODUCTIVITY (RATE OF RETURN ON MARGINAL INVESTMENTS)

FIGURE 2.1 ALTERNATIVE EVALUATIONS OF THE SOCIAL DISCOUNT RATE

generally lead to somewhat higher, estimated social discount rates (perhaps in the 10-15 percent range) than will the Krutilla-Eckstein method (yielding estimates in the 5 to 8 percent range), as may be seen from Table 2.1. Which of these two approaches is the more appropriate one is, at the present time, still under debate among economists. At this point, one must therefore be content merely with pointing out the salient features of the approaches.

2.2.2 Risks and the Social Rate of Discount

Virtually all of the more recent publications on cost-benefit analysis include at least some discussion on the treatment of risk in public project evaluation, and, once again, there are a variety of views on the matter.

Before proceeding to an examination of the risk problem, it is important to be clear about what is meant by "risk" in this context. Assume, for example, that the actual outcome (measured in dollars) of an investment project X cannot be predicted with certainty, but that the probability distribution of possible future outcomes is known. Then the probability-weighted average outcome is called the expected value or the expected return of the project, and the dispersion of the outcomes about this expected value, for example, the standard deviation, can be taken as an index of the project's riskiness.¹⁴

It is generally assumed that the typical private investor is "risk averse." This means that if a private investor faces two projects, A and B, with the same expected values of outcomes but different standard deviations of outcomes, he will

¹⁴ Formally, if x_i is the numerical (dollar) value of the i -th possible outcome and P_i is the probability that the i -th outcome occurs, then the expected value of the outcomes (also called the mathematical expectation of the outcomes) is defined as the $\mu_x = \sum_i x_i P_i$ and the standard deviation of the outcomes is defined as

$$\sigma_x = [\sum_i (x_i - \mu_x)^2 P_i]^{1/2}$$

have a definite preference for the project with the lower standard deviation or "riskiness." Alternatively, he would rank the two projects equally only if the high-risk project also offered a somewhat higher expected value of outcomes. The minimum increase in expected value he requires, for example, $\Delta\mu$ in Figure 2.2, is the so-called "risk-aversion premium" or simply the "risk premium" he requires.

It is important to distinguish further between "social risk" and "private risk." A great number of investment projects involve uncertainties quite unrelated to their sponsor, whether private or public. For example, the successful outcome of a project may be contingent on certain technological developments whose actual attainment is uncertain. Both private and public investments face the possibility of destruction in war or by natural disasters. And both private and public projects are subject to unanticipated economic obsolescence. The risks arising out of these uncertainties are therefore both private and social risks. But some risks faced by private individuals are not social risks at all. Such risks arise out of uncertainties about the reaction of rival firms or the possibility of a firm's bankruptcy. The introduction of a new product, for example, may not involve any social risks at all, although an individual firm may well view the development of the new product line as a highly risky venture. It follows, then, that the risk premiums included in private rates of return cover some risks which are nonexistent from the point of view of society as a whole.

The specific questions which have been raised in connection with the problem of risk are the following:

- Should the government apply the same discount rate to all of its projects, or should relatively riskier public projects be discounted at commensurably higher social rates of discount?

FIGURE 2.2 REQUIRED RATE OF RETURN AS DEPENDENT UPON RISK

- In view of the fact that a good many private risks are not social risks at all, should the compensation (in the form of risk premiums) required by private individuals to cover such risks be subtracted from private, pre-tax rates of return before the latter are aggregated in the estimation of the social discount rate?¹⁵

These questions will be examined in turn.

2.2.2.1 Differentials in the Riskiness of Public Projects

In connection with the riskiness of public investment projects, the Subcommittee on Economy in Government proposed the following:

1. If explicit allowance for risk and uncertainty is made in the estimates of benefits and costs, a minimum-risk base interest rate can be used for discounting. In this case, the average current yield on government securities with long terms remaining to maturity is an appropriate minimum estimate of the opportunity cost of private spending....
2. If specific allowance for risk and uncertainty is not made in the benefit and cost estimates, an average allowance (risk premium) can be incorporated in the base interest rate. In this case, the opportunity cost of displaced private spending, as observed in the private capital markets, should be accepted as the base interest rate [15, p. 16].

These propositions clearly suggest that the public sector should penalize or favor individual public projects in accordance with their relative degrees of riskiness. This prescription, however, has been severely criticized by a number of prominent economists. These economists argue that, by virtue of its size, the public sector can pool the risks of its various projects just as an insurance company can pool the risks associated with each of its policies. As Baumol has put it:

The risk (dispersion of outcomes) for the investment in an individual project taken by itself does not necessarily correspond to the risk it contributes to society as a whole.... Because in the economy a very large number of projects are underway at any given time, the insurance principle, that is, the statistical law of large numbers, applies to them if their prospects for success are largely independent.... It can be shown that the larger the number of (independent) projects involved,

¹⁵It will be recalled that this issue arises whether one prefers the Baumol-Ramsey approach or the Krutilla-Eckstein approach.

the smaller the risk contributed to total social return by anyone of them. Taken as a whole, from the viewpoint of society, they become virtually riskless [3, p. 497].

The policy implication of the pooling argument is that the public sector should not tailor the discount rate for individual public projects to the varying degrees of riskiness of these projects. Instead, the proper procedure is to compute the expected values (mathematical expectations) of benefits and costs for each point in time and to discount these expected values at a discount rate uniformly applied to all public projects.

2.2.2.2 Private Risks and the Estimation of the Social Rate of Discount

Suppose that there are two corporations, X and Y, each financed entirely by equity.¹⁶ Corporation X engages in relatively low-risk activities and must earn a pre-tax rate of return of at least 10 percent on its investments in order to satisfy its shareholders. Corporation Y, on the other hand, engages in high-risk ventures and must earn a pre-tax rate of return of at least 15 percent to compensate its (risk averse) shareholders fully for the risk they take. Both X and Y evaluate potential investment projects by discounting the expected values of future benefits at discount rates of 10 percent and 15 percent respectively.

It has been shown in Section 2.2.1 that, whether one uses the Baumol-Ramsey or the Krutilla-Eckstein approach in estimating the social rate of discount, the social opportunity cost of displacing private investment is the pre-tax rate of return which producers face on their marginal investment projects. However, the question arises whether the pre-tax rates should be purged of their private-risk components before these rates are aggregated in the estimate of the (risk-free) social rate of discount. Specifically, the question is whether the 5 percent risk

¹⁶ Once again, the inclusion of corporate debt in the discussion would add no additional insights, but complicate the analysis.

premium should be deducted from Y's pre-tax rate of return or, alternatively, whether the social opportunity cost of displacing Y's marginal projects is 15 percent or 10 percent. It has been argued that society yields more from Y than from X. However, if an individual facing the high-risk project at 15 percent and the low-risk project at 10 percent is indifferent between the two, then so should society be. No one's utility is increased by the individual's selection of project Y over X; the added return (the risk premium) merely represents the cost of risk-bearing.

2.3 Collective Time Preference Rates and the Social Rate of Discount

There also exists another important school of thought which holds that any social rate of discount based on market-determined opportunity cost rates is likely to be too high.

This argument rests on the obvious fact that, at any given point in time, market-determined interest rates fail to reflect the time preferences of yet unborn, future generations. Since each generation is likely to act primarily in its own interest, so the argument goes, it must be expected that each living generation will tend to bias resource allocation in favor of current or near current consumption, which is the same thing as saying that, from a long-run, national point of view, each generation applies too high a discount rate to future net benefits. Consequently, it is argued, it is the duty of the government to interfere in the private sector with the aim of increasing available future consumption at the expense of current consumption. The most prominent economist associated with this essentially conservationist view is A. C. Pigou [10], who went as far as to advocate a discount rate of zero percent.

A somewhat different version of the argument has recently resurfaced in the literature on optimal savings. (See, for example, Sen [12], and Marglin [9].)

Thus, it is suggested that, as a collective body, consumers would probably vote for a more extensive distribution of consumption in favor of future generations than they do as private individuals in the private capital markets. In other words, it is argued that the individual citizen is more likely to contribute to the welfare of future generations when assured that his fellow citizens will match (or will be forced to match) his contribution; he will be discouraged from contributing to the future if he believes himself to be the only contributor. This school of thought does not, of course, suggest that, as a collective body, each living generation will be perfectly fair to all future generations. It simply maintains that, as a collective body, a group of citizens is likely to be somewhat fairer to future generations than each individual would be on his own.

Although, strictly speaking, the policy implication of the conserationist view is merely that the government should somehow encourage current rates of savings and investment (public and private), some have taken the step from that suggestion to the prescription that the resource transfer from the present to the future should be effected through investment in public projects, that is, that the social discount rate applied to public projects should be kept below observable private market rates. That prescription, however, would lead to a serious misallocation of resources. For, while it may be argued that the government should stimulate private savings--by fiscal measures or by moral suasion--it would clearly be unwise to channel the extra savings so generated to low-yield public projects when they could be used in private sector in far more productive ventures.

Secondly, one may question the empirical validity of the notion that collective rates of time preference are necessarily below private time-preference rates, or that living generations are necessarily biased against future, unborn generations. While there undoubtedly are instances in history in which a society

exploited resources in total disregard for future generations,¹⁷ it is also the case that our economy has been characterized, historically, by a sustained growth in output per man-hour. A public policy designed to increase current savings and investment therefore is likely to amount to a redistribution of consumption from relatively poorer, current generations to relatively wealthier, future generations. It is not immediately obvious that the average citizen, even as a member of the body-politic, will consider that sort of resource transfer fair. On the contrary, it is conceivable that the collective rate of time preference is actually below the (private) time-preference rates one observes in the market. In short, the proponents of an artificially low social rate of discount not only violate the tenets of efficient resource allocation, but their very hypothesis may well have no empirical foundation whatever.

2.4 Discount Rate with Government Investment Constraints

Bradford [4], following Arrow and Kurz [1], has suggested that there may be constraints which restrict government investment to certain classes of activity. He then develops a model of government investment impacts upon private sector consumption and capital formation, selecting the appropriate discount rate for public sector project selection as that rate which maximizes the present value of aggregate consumption by society. The central result of Bradford's work is that the optimal discount rate is the social rate of time preference, and further that

¹⁷ The deforestation of Dalmatia during Roman times may serve as an example. The closeness of the timber to the shipbuilding centers made Dalmatia a primary source of raw materials. With any collective time preference close to private time preferences, the decision to deforest Dalmatia would be made again today--after full knowledge of irreversible, detrimental effects in the future. The contention is, that, even under full knowledge of all negative side effects, the use of (higher) private time preferences in the context of cost benefit analysis does lead to the same decision, at large cost to future generations.

this conclusion is rather robust with respect to differing, reasonable assumptions about the impact of government investment upon the private sector. Consider the case where future increased output due to government investment contributes to increased private sector investment in the same proportion that the current-period investment financing reduces current private sector investment: the conclusion that the required rate of return on the government investment is independent of the private sector rate of return is due to the fact that for every dollar of reduced investment in period t , the government project puts back $(1 + \rho)$ dollars of increased investment in period $t+1$, where ρ is the rate of return on the government investment. So long as ρ exceeds the social rate of time preference, society should prefer the investment. Bradford stresses that the reason that a 5 percent rate-of-return project is justified in face of a 10 percent rate of return prevailing in the private sector is that the private sector investments, by the initial assumption, are not opportunities to the public sector. Thus, his results hold "only if the private sector investment is not also an investment opportunity for the government."

As another special case, Bradford notes that in a two-period world, there would be no increased private sector investment resulting in period $t+1$ since it makes no sense to invest in the second period. In this case, the rate of return on the government investment must equal or exceed the weighted average of the rate of return on private investment and the social rate of time preference, that is, the Krutilla-Eckstein approach of Section 2.2.

It seems, however, that if one were to really consider the relevant constraints on government investment, the first constraint which would come into consideration would be limitations to the size of the government budget for investments, due to macroeconomic (for example, inflation-controlling) or political

("less government") objectives. In such a case, funding of all projects with a rate of return greater than the social time preference rate is probably not feasible and the rate of return on the funded project with the lowest rate of return becomes an opportunity cost for funding any given project and should be used as the discount rate.

3. ANALYSIS OF PRIVATE SECTOR RATES OF RETURN

Although several theorists argue that the social rate of time preference is the relevant parameter in advocating the social rate of discount, most economists recognize private sector rates of return as opportunity costs for government investment. Such arguments have led to the recommended 10 percent rate by the Office of Management and Budget (OMB).

In light of recent private sector performance, however, a 10 percent rate appears considerably too high. Figures 3.1 and 3.2 show some bond yield and interest rate statistics for the 20th century (Figure 3.1) and over the last 13 years (Figure 3.2). The important point to notice is that the nominal rates in the late 1960s and early 1970s are high--higher than those which have prevailed historically--but the real rates have remained consistent with or lower than historical levels. In looking for a "true" measure of the cost of capital to government, as argued by Stockfish [14], it would be hard to find a better candidate than the return on treasury bonds, the vehicle by which the federal government finances its debt. Since 1965 the real rate of return on treasury bonds has not exceeded 2.5 percent per year.

Since OMB's recommended rate was based in part upon evidence of industry performance records, it is now appropriate to turn to an examination of this performance over the last several, inflation-ridden years.

3.1 Methodological Background

3.1.1 Depreciation, Capital Formation and Inflation: Nominal Versus Real Depreciation

Depreciation is an artificial accounting tool whereby the costs of physical assets acquired in one accounting period are spread over subsequent accounting

FIGURE 3.1 BASIC YIELDS OF CORPORATE BONDS BY MATURITY, 1900-1965
 (SOURCE: MALKIEL, BURTON GORDON, THE TERM STRUCTURE OF
 INTEREST RATES: EXPECTATIONS AND BEHAVIOR PATTERNS,
 PRINCETON UNIVERSITY PRESS, PRINCETON, NEW JERSEY,
 1966, p. 9)

FIGURE 3.2 NOMINAL INTEREST RATES, NOMINAL AND REAL TREASURY BOND YIELDS, 1965-77

periods equal to the useful lifetime of the assets. For example, a firm spends \$30 million in 1975 for new machinery that will be in use for ten years. The money is spent in 1975, but the machinery is not used up in the process of generating 1975 production. Depreciation allocates the \$30 million investment against the production revenues that will be obtained over the ten years the machinery is used.

Depreciation thus allows the recovery of funds to make up for the initial investment of resources. Depreciation is a valid "cost" in measuring corporate performance in a current year, whether or not the recovered funds are actually used to replace the asset at the end of its useful life. Asset values not yet depreciated are carried forward to future years. The concept of depreciation is recognized in U.S. tax law and procurement regulations, which define depreciation broadly as a "reasonable deduction" for the wear-and-tear on capital stock in a given accounting period. Funds recovered by such deductions should assure the corporation of the opportunity to make a similar investment at the end of the useful life of the asset.

Figure 3.3 describes the current accounting procedures involved in the acquisition of additional capital stock. In this example, a firm acquires \$30 million worth of new machinery. Of the total, \$10 million is funded through depreciation. The remaining \$20 million is funded half by debt (\$10 million) and half by issuing new shares to raise equity (\$10 million). Had there been no inflation over the past ten years, \$10 million worth of the newly acquired machinery would replace equivalent machinery bought ten years ago at a cost of \$10 million. The other \$20 million would be correctly measured as added capital stock, providing new capacity for corporate growth. This is the way U.S. accounting rules determine depreciation and new capital formation--without regard to inflation. Obviously, these

FIGURE 3.3 EXAMPLE OF CURRENT ACCOUNTING PROCEDURES FOR FUNDING
NEW CAPITAL ACQUISITIONS

accounting rules and regulations were formulated during a period of monetary stability.

When one looks at the same transaction and assumes a 10 percent annual rate of inflation, a completely different picture emerges. Table 3.1 illustrates the effect; it shows the follows:

Column A: The ten years of the asset history.

Column B: The annual nominal depreciation under existing U.S. accounting procedures. In this case the straight line depreciation methods is employed and depreciation is listed at \$1 million a year, or one-tenth of the original value of the \$10 million worth of machinery acquired ten years ago.

Column C: The reacquisition cost of the asset at the end of each year, assuming a 10 percent rate of inflation. After ten years it would cost \$25.9 million to replace the original \$10 million worth of machinery.

Column D: Depreciation computed on the basis of the reacquisition cost in Column C rather than on the original cost. (Other methods suggest that the price the corporation might realize for the machinery on the market could be used as a depreciation base.)

Column E: The overstatement of profits resulting from the use of nominal rather than real depreciation costs. Over the ten year period, the corporation will report a total of \$7.6 million in profits which are not really profits; they are in fact part of the cost of capital, that is, depreciation.

Column F: The corporate income taxes on that portion of the profit that has been overstated due to the use of nominal depreciation charges. Over the ten years the corporation will pay \$3.6 million in taxes on profits which in fact do not exist.

Column G: The dividend distributions that the corporation will make, based on overstated profits. The 27 percent figure roughly represents available dividend taxes and retained profits.

Column H: The retained portion of the overstated profit, amounting to a total of \$1.9 million over the ten-year span.

Had there been no inflation during the period covered in the table, each of the columns D through H would "zero out." The fact that positive entries are shown is due to the illusory effect of inflation when capital assets are evaluated in terms of original costs.

TABLE 3.1 FINANCIAL HISTORY OF A CAPITAL ASSET--TEN YEAR USELIFE (MILLIONS OF DOLLARS)							
ASSUMPTIONS: Acquisition price \$10 Expected useful life 10 years Rate of inflation 10 percent annually Corporate income tax 48 percent 25 percent of profits before taxes retained; balance distributed							
A	B	C	D	E	F	G	H
Year	Depreciation 10% Annually	Reacquisition Cost Calculation		Overstated Profit D-B	Corporate Income Tax 48% on E	Distributed Overstated Profit 27% on E	Retained Overstated Profit 25% on E
		Asset Price 10% Inflation	Depreciation 10% on C				
1	\$ 1.0	\$ 11.0	\$ 1.1	\$ 0.1	\$.048	\$.027	\$.025
2	1.0	12.1	1.2	0.2	.096	.054	.050
3	1.0	13.3	1.3	0.3	.144	.081	.075
4	1.0	14.6	1.5	0.5	.240	.135	.125
5	1.0	16.1	1.6	0.6	.288	.162	.150
6	1.0	17.7	1.8	0.8	.384	.216	.200
7	1.0	19.5	2.0	1.0	.480	.270	.250
8	1.0	21.4	2.1	1.1	.528	.297	.275
9	1.0	23.6	2.4	1.4	.672	.373	.350
10	1.0	25.9	2.6	1.6	.763	.432	.400
Σ	\$10.0	\$ na	\$ na	\$ 7.6	\$3.600	\$2.100	\$1.900
TEN YEAR SUMMARY: Reacquisition price \$25.9 Total overstated profit \$7.6 Tax paid on overstated profit \$3.6 Distributed overstated profit \$2.1 Total cash outflow due to overstated profits \$5.7							

na Not applicable.

In summary, the table shows:

- An overstated profit of \$7.6 million
- Payment of \$3.6 million in corporate income tax on the overstated profit
- Distribution of \$2.1 million in dividends
- "Equity" amounting to \$1.9 million in retained profits.

Figure 3.4 shows the new picture of the transaction that emerges when real cost accounting, which considers the 10 percent inflation factor, is employed. To maintain its productive base by replacing the original \$10 million worth of machinery, the corporation now has to lay out \$25.9 million. Thus, in investing the

FIGURE 3.4 EXAMPLE OF REAL COST ACCOUNTING PROCEDURES FOR FUNDING NEW CAPITAL ACQUISITIONS (ASSUMING 10% INFLATION AND 10-YEAR USELIFE)

earlier-mentioned \$30 million, the corporation incurs \$10 million in new debt and has to issue new shares for \$10 million, but \$25.9 million of the \$30 million goes to replace the original \$10 million worth of 1965 vintage machinery. Only \$4.1 million is net added investment. The new financing needed in addition to available depreciation funds to replace the 1965 machinery--\$15.9 million--represents an erosion of corporate assets. Clearly, under current U.S. accounting rules, inflation introduces a strong disincentive to any investment of funds in equipment, machinery or other depreciable assets. Additionally, where the prices of products are also determined by "historical" costs, or by government-regulated pricing procedures (exemplified by public utilities, Department of Defense, the National Aeronautics and Space Administration, and the Department of Energy), investments for maintaining the capital base for the production of these products cannot be continued for long.

The current U.S. practice of historical depreciation is inequitable and causes extensive distortion in the accounting process. Real depreciation, based on reacquisition costs, is a method more firmly founded on economic considerations to insure a correct reflection of market principles and prices.

3.1.2 Monetary and Real Capital

In the minds of the public and also of some economists, the term capital denotes wealth, possessions, money, plant and equipment. However, in the context of capital and capital formation in an economic system, two fundamentally different terms of "capital" have to be distinguished:

- Real capital denotes physical goods in the form of machinery, plant and equipment which are used with labor to produce goods and services. Since these items are quite often used beyond a single accounting period--say one year--the term durable goods is often used synonymously for real (production) capital.

- Monetary capital denotes simply any accumulation of paper bills or entries on banking accounts which convey purchasing power or potential title to dispose of resources, that is, labor, equipment, plant or consumer goods.

Even though in market economies, except in times of crisis, monetary capital can readily be exchanged into real capital through purchases, the two terms are strictly different. When account entries cannot be changed into paper bills and paper bills cannot be transformed into goods and services, the crucial distinction between real capital and monetary capital is clearly discernible.

Monetary capital can instantly be transferred worldwide at little cost. On the other hand, real capital in the form of equipment, plants, transport fleets and networks may take months, years or decades to transfer, and some forms of real capital, such as interstate highways and other "fixed" investments, can never be transferred. This distinction is most apparent today in the Organization of Petroleum Exporting Countries. While highly endowed with financial capital amounting to billions of dollars, it is extremely difficult--if not impossible--for them to obtain real capital within their boundaries. During the years in which this transfer of real capital is taking place, they hold only paper or account entries.

These distinctions between monetary and real capital are emphasized because of their importance in understanding real capital formation in any economic system. Monetary savings in an economic system is not the same as real capital. Real capital is formed only if new plants and equipment are produced, procured and put into productive use. While accumulation of monetary capital can be equated with savings, there is no reason why such savings must lead to the creation of real capital--an assumption all too readily made by macroeconomists. Such savings may be diverted into the public sector and may be used instead for defense expenditures, local, state or federal government services or lost by inefficiencies in nonmarket services.

It is quite feasible that monetary savings--forced through inflation or voluntarily--are directly expended in government services expenditures without noticeably increasing services delivered. Yet most macroeconomic models since John Maynard Keynes have been built on the assumption that the balance between monetary savings and real capital formation is somehow automatic. Not so; an example with an "apparent" infinite capital formation opportunity and guaranteed full employment is the "circular hole concept." Machinery, labor and know-how are needed in the production of an ideal circular hole. A circular hole is ideal to solve the waste disposal problem as well as possible limitations to land resources. With our accumulation of circular hole assets on national income accounts, it is possible to expend any amount of monetary savings in an economic system without one dollar of real, that is, productive, capital being formed. The labor expended in drilling a circular hole is accumulated on books as capital; the waste is disposed within the hole itself, other than the initial volume needed for work. As unemployment in the rest of the economy increases, circular hole activities are expanded under the guise of "full employment," and the effort expended is defined to be "capital formation;" the savings needed in the rest of the economic system has to equate to the "real" capital formed--in circular holes. While macro-economists accumulating data for National Income Accounts would be overjoyed with the ensuing statistics, the state of the economy would be left where it was before, i.e., in a sorry and inefficient state.

3.1.3 Interest, Debt, Equity and the Cost of Capital

The economic meaning of "interest" and its function in the allocation of resources in economic systems has been discussed above. However, in the context of determining the "true" profitability of firms in an economy with inflation,

several additional factors have to be considered before such interfirm comparability of real rates of return are possible--in addition to the depreciation cost adjustment.

First, the debt to equity ratio between firms can vary widely. While the debt and equity structure of the firm simply has to do with the ownership of the enterprise--a matter of book entries and legal documents having little if anything to do with the substantive flow of resources and revenues to the firm--this differing ownership structure is recognized in a totally distorted and misleading way in today's U.S. accounting and tax practices: interest paid on debt, that is the cost of outside financing, is recognized as a cost, while the interest cost on the equity portion is treated as profit--that is, as if provided to the firm "free of charge." This leads to seriously distorted profit and loss reports from firms that in fact (that is, in substance, real flow of resources) show identical performances. A firm financed 100 percent by equity may show a profit of 9 or 10 percent on his account while the identical firm financed 100 percent by debt could show zero profit--or even a loss--depending on the conditions at which it can obtain financing. In the former case the firm would have the "privilege" of paying corporate income tax on its "profit," while in the latter case no tax liability to the firm arises. This in turns leads to an overdue emphasis of "self-financing" through retained profits as well as an overexpansion of investments by firms that are heavily equity financed.

The economically correct way of accounting for profit is to allow also for an interest cost for the equity portion of a firm's financing, something long and widely advocated and implemented, for example, in German Cost Accounting Standards. To correct for this arbitrary distortion in U.S. accounting procedures, the total fixed charges (that is, interest payments and related expenses) are added back into gross profits before calculating rates of return on assets irrespective of the

financial structure of firms. Through this method, the real gross rate of return on total assets for each firm, and for each sector of U.S. industry, is calculated in the program used in this study.

Second, in addition to depreciation cost adjustment and the adjustment for fixed charges, other losses occur to any firm in an inflationary economy: to the extent that any firm needs a minimum of monetary assets to conduct its business these nominal, monetary holdings are subject to the erosion of inflation. In the calculations performed it is assumed that the monetary asset structure of firms is efficient in the sense that no substantial reduction could be obtained in those monetary assets without endangering the conduct of business by that firm. This simplifying assumption has to be made for purposes of this analysis; otherwise each firm would have to be analyzed case by case to determine the optimum monetary asset balances needed and it would only be on those optimum balances that losses due to inflation could and should be computed. This task is clearly beyond the purposes of this exercise.

Third, additional losses through inflation occur to the firm on inventories held by the firm again in the conduct of its business: the acquisition of inventories two or three months in advance of sales again leads to arbitrary, fictitious profits included in today's profit and loss account which would not be shown were it not for inflation. To determine the inventory-related fictitious profit a detailed analysis of each firm and its inventory structure would be needed. A fair approximation of the inventory-related fictitious profits can, however, be obtained by determining the turn-over rate of sales to inventories: the higher the turn-over rate, the smaller the inventory in relation to total sales transacted by a firm, and the smaller the inflation-related distortion of profits. With the adjustments of inventory losses by the turn-over rate of inventory, fictitious profits due to

inventory valuation were also adjusted for under the "fully impacted" earnings calculations for each firm, and for each sector of U.S. industry.

3.2 Results

The results of the inflation impact analysis show clearly that reported (nominal) returns by industry significantly overstate the real returns being earned. For example, in 1977 while reported annual returns on assets (ROA) were 12.9 percent (asset-weighted average for 1600 corporations in 25 industries), the actual return on assets was only 6.1 percent. Further, it was the asset owners, those who held equity in the corporations, who suffered the most due to inability to depreciate properly: while adjustments for inflation dropped ROA by 6.7 percent (roughly equal to the increase in the consumer price index), returns on equity fell from 12.1 percent down to 1.2 percent when adjusted for inflation. Clearly the lenders are only feeling the first-order effects of inflation while the equity holders are bearing the brunt of the inadequate asset-depreciation burden. The disturbing results found in terms of real rates of return on equity is an additional finding that for purposes of this analysis can be ignored but which in a larger context has to be addressed in economic accounting and tax practices. One should not, however, advocate such low or even negative rates of return for purposes of evaluating public investment projects. The rates of return on assets are the relevant results and these indicate real interest rates of about 6 percent, as stated.

Table 3.2 shows actual and reported earnings and returns on assets and equity for 25 industries for 1977. In general, nominal returns on assets deviate from the actual by approximately the rate of inflation, while returns on equity were more severely affected. Table 3.3 shows actual returns on assets and equity for the 25 industries for 1974-77 and real return rates on treasury bonds for those same years. Detailed industry-by-industry statistics can be found in Appendix B.

TABLE 3.2 REPORTED AND ACTUAL (FULLY ADJUSTED FOR INFLATION) PERFORMANCE RECORDS BY INDUSTRY FOR 1977 FOR 1600 COMPANIES

INDUSTRY	PERFORMANCE RECORDS (MILLIONS OF DOLLARS OR PERCENT PER YEAR)					
	REPORTED EARNINGS (\$)	ACTUAL EARNINGS (\$)	REPORTED RETURN ON EQUITY (%)	ACTUAL RETURN ON EQUITY (%)	REPORTED RETURN ON ASSETS (%)	ACTUAL RETURN ON ASSETS (%)
AGRICULTURE	2.92	-0.75	5.69	-0.86	9.03	4.47
MINING	13.51	0.97	6.72	0.29	8.20	3.88
DRILLING AND EXPLORATION	24.89	7.10	14.47	2.40	17.96	9.97
BUILDERS AND CONSTRUCTION	17.33	7.01	16.55	4.27	12.69	7.59
FOOD	32.22	13.38	13.02	3.50	14.69	8.46
TOBACCO	129.11	92.12	14.44	8.37	15.38	12.21
TEXTILE AND LUMBER	17.56	1.38	11.83	0.49	12.59	4.84
PRINTING	18.53	9.73	14.59	5.72	18.47	12.02
CHEMICALS AND DRUGS	63.24	23.50	14.54	3.42	15.14	8.19
REFINING AND ROOFING	293.22	28.15	13.33	0.68	18.11	9.15
RUBBER AND PLASTIC	14.03	-4.90	9.25	-1.81	11.22	4.34
GLASS, CLAY AND CEMENT	22.84	2.58	12.70	0.76	11.99	4.87
IRON AND STEEL	11.08	-35.79	2.83	-4.00	3.56	-1.23
HARDWARE	8.08	1.09	14.15	1.13	15.19	6.92
MACHINERY	45.74	15.80	16.44	4.14	17.87	10.38
ELECTRIC	28.92	8.31	15.06	3.04	14.32	8.11
CARS, TRUCKS AND AIRCRAFT	79.13	32.12	16.43	4.38	16.19	9.41
INSTRUMENTS	35.53	19.00	14.70	6.03	18.52	11.96
JEWELRY AND TOYS	6.72	0.40	12.06	0.46	14.52	7.17
RAILS	84.22	15.82	8.64	0.72	7.61	3.08
TRANSPORTATION	17.29	-7.20	13.46	-2.41	9.54	2.19
COMMUNICATION	232.13	-30.51	12.00	-0.51	11.35	3.54
UTILITIES	49.98	16.04	11.28	1.37	9.70	4.81
WHOLESALE	10.05	3.73	14.60	3.80	12.68	7.92
RETAIL	20.34	6.90	12.80	2.69	12.81	7.16

TABLE 3.3 ACTUAL RETURNS ON ASSETS, EQUITY AND REAL RETURNS ON TREASURY BONDS, 1974-77

	RETURN ON ASSETS*	RETURN ON EQUITY*	RETURN ON TREASURY BONDS
	PERCENT PER YEAR		
1974	6.3	0.5	-3.0
1975	5.1	-0.6	0.3
1976	5.9	1.1	2.0
1977	6.1	1.2	0.4

*ASSET-WEIGHTED AVERAGES FOR 25 INDUSTRIES.

4. IMPLICATIONS FOR THE EVALUATION OF ENERGY RESEARCH

Based upon these considerations, the use of a 10 percent discount rate is clearly unwarranted for the evaluation of long-term projects; that is, projects for which the return on investment is realized many years into the future. High discount rates strongly favor the selection of short-term projects and nearly doom competing long-term projects, despite the potential benefits offered. When risks have not been properly accounted for (for example, the risk that a component may cost ten times as much as estimated, or the risk that the system will not work at all), it has been argued that the use of a high discount rate such as 10 percent is justified as a type of risk premium, accounting for the improper assessment. This point underscores the need for the use of proper risk assessments in the evaluation of long-range energy R&D, for such projects cannot bear the burden of the higher discount rate.

Given that the 1 to 6 percent range is rather wide, where within this range would one advocate as "the" social rate of discount? As treasury bonds are very liquid and compete with regulated bank interest rates, their rates of return might be somewhat too low. On the other hand, return rates on corporate assets contain substantial risk premiums, probably beyond that which is appropriate for public project evaluation. Von Neumann [16] gave a mathematical proof that in an expanding, linear, economic system the real rate of interest is less than or equal to the real rate of technological growth of that system. As that proof has remained unrefuted since 1937, it stands as an argument for advocating a discount rate approximately equal to the growth rate of the economy, between 3 and 4 percent.

In the evaluation of energy research, the benefits which result, particularly from research into the long-range technologies, are realized several decades from now. The use of high discount rates almost totally denies any value to pursuing such research, not only today but also in the future since the long lead times between the earliest development and implementation will remain. As an example of the limitations which a high discount rate places upon energy R&D, consider two hypothetical projects, A and B. For both projects, the cost is \$25 million and is incurred immediately. Project A begins to yield an immediate flow of benefits at \$5 million per year for the next 10 years. Project B yields \$15 million for 30 years, however the benefit stream does not begin until 20 years from the present. As shown in Table 4.1, the use of a 10 percent discount rate would clearly cause the selection of Project A (net present value of \$10.7 million) and the abandonment of Project B (net present value of -\$4.0 million), even though the latter yields an annual benefit rate three times as large for three times as long. This is a crucial issue for, unless the benefit rate were somehow to increase or the cost to decrease, Project B would never be funded if evaluated at a 10 percent discount rate. A reevaluation of the projects at the more reasonable discount rate of 5 percent changes the project comparison considerably. Project B is now worth \$61.9 million compared to only \$13.6 million for Project A, the former being clearly preferred.

TABLE 4.1 EVALUATION OF TWO HYPOTHETICAL PROJECTS AT DIFFERENT DISCOUNT RATES			
PROJECT	PRESENT VALUE OF PROJECT (MILLIONS OF \$, NET OF COSTS) AT ANNUAL DISCOUNT RATE OF		
	10%	5%	2%
A	10.7	13.6	19.9
B	-4.0	61.9	201.1

The use of high discount rates in energy policy is particularly inconsistent with the emphasis placed on conservation of existing, conventional energy resources. Pursuit of policies which result in increases in the discount rate beyond that already present in the economy would also result in increased consumption rates of the available, nonrenewable resources. The emphasis in federal policy on energy conservation above and beyond that amount which would already be realized by the market economy implies a special role to energy commodities (for national security or macroeconomic reasons, perhaps) in the form of a lower discount rate. If this is indeed warranted, it should be applied to evaluation of energy R&D as well.

Given the long lead times involved in energy R&D, it is essential that the risks be dealt with explicitly so as to justify the use of a lower, more risk-free, discount rate. This will require the use of a risk and programmatic analysis to compute the "expected value" of a research program. An initial step toward this end was taken in ECON's first phase of study.¹⁸

In summation, the evidence and arguments presented here indicate a discount rate in the range of 3 to 5 percent be used in the evaluation of long-term energy R&D programs.

¹⁸Reported in "The Economics of Fusion Research," ERDA Report No. C00/4 181-1, ECON Report No. 77-158-2, October 15, 1977.

5. REFERENCES

1. Arrow, K. J. and M. Kurz, Public Investment, the Rate of Return and Optimal Fiscal Policy, Baltimore: Johns Hopkins Press, 1970.
2. Baumol, W. J., "On the Social Rate of Discount, American Economic Review, 58, September 1968.
3. Baumol, W. J., "On the Discount Rate for Public Projects," in Joint Economic Committee, Subcommittee on Economy in Government, The Analysis and Evaluation of Public Expenditures: The PBB System, 91st Congress, 1st Session, Vol. I, Part III.
4. Bradford, D. F., "Constraints on Government Investment Opportunities and the Choice of the Discount Rate," American Economic Review, 65, December 1975.
5. Friedlaender, A. F., The Interstate Highway System, Amsterdam: North-Holland Publishing Co., 1965.
6. Hirshleifer, J. and D. F. Shapiro, "The Treatment of Risk and Uncertainty," in Joint Economic Committee, op. cit.
7. Hufschmidt, M. M., J. Krutilla and J. Margolis, "Standards and Criteria for Formulating and Evaluating Federal Water Resources Developments," Joint Economic Committee, Subcommittee on Economy in Government, Hearings on Guidelines for Estimating the Benefits of Public Expenditures, 91st Congress, 1st Session, 1969.
8. Krutilla, J. V. and O. Eckstein, Multiple Purpose River Development, Baltimore: Johns Hopkins Press, 1958.
9. Marglin, S. A., "The Social Rate of Discount and the Optimal Rate of Investment," Quarterly Journal of Economics, 77, February 1963.
10. Pigou, A. C., The Economics of Welfare, 4th Edition, New York: MacMillan, 1932.
11. Ramsey, D. D., "On the Social Rate of Discount: Comment," American Economic Review, 59, December 1969.
12. Sen, A. K., "On Optimizing the Rate of Saving," Economics Journal, 71, September 1961.
13. Stockfish, J. A., Prepared Statement before Joint Economic Committee, Subcommittee on Economy in Government, Hearings on the Planning-Programming Budget System: Program and Potentials, 90th Congress, 1st Session, 1968.

14. Stockfish, J. A., "The Social Rate of Discount: Some Issues in the Theories of Cost and Public Finance," Institute for Defense Analysis Research Paper P-536, October 1969.
15. U.S. Congress, Joint Economic Committee, Subcommittee on Economy in Government, Interest Rate Guidelines for Federal Decision-Making, 90th Congress, 2nd Session, 1968.
16. Von Neumann, John, "A Model of General Equilibrium," reprinted in P. Newnan (ed.), Readings in Mathematical Economics, Baltimore: Johns Hopkins Press, 1968.

APPENDIX A

ON THE DETERMINANTS OF THE SOCIAL RATE OF DISCOUNT

In principle, the social rate of discount, r_s , should reflect both

1. Society's marginal rate of time preference
2. The marginal productivity of society's economic resources (also called the social "opportunity cost" rate, for reasons which will be brought out shortly).

The separate roles of these two factors, and their interaction, have often been confused in the cost-benefit literature. Their definitions will, therefore, be developed here with some care. To that end, assume initially that "society" can be represented by one individual (for example, a Robinson Crusoe) who is endowed with a given and predictable time stream of "consumables" available to him. It is assumed that the individual can alter this initial time stream of consumables by not consuming (saving) a portion of the consumables in Period t and by investing the savings, in Period t , in some project which will yield him, with certainty, added "consumables" in a future period $(t + n)$. Finally, we shall assume that the general commodity "consumables" can readily be converted also into productive capital.

For the sake of simplicity, consider only the elementary case of choosing between consumption now (Period 0) and consumption one year hence (Period 1). Assume that the individual's initial endowment for these two periods can be represented by Point $A = (C_0, C_1) = (100 \text{ units of "consumables" in Period 0, } 100 \text{ units of "consumables" in Period 1})$ in Figure A.1. Further assume that the individual is faced with a set of investment projects which, when ranked in

FIGURE A.1 TECHNICAL TRADEOFF OF PRESENT CONSUMPTION FOR FUTURE CONSUMPTION

descending order of profitability, can be expressed in the form of the investment opportunity locus AI.¹⁹

The opportunity locus AI indicates, for example, that the individual, at Point A, could assure himself of an extra 20 units of "consumables" ($\Delta C_1 = 12$) in Period 1 by saving and investing only 10 units of "consumables" ($-\Delta C_0 = 10$) in Period 0, thus consuming only 90 units in Period 0. The marginal rate of time productivity of investments²⁰ is then defined as

$$m = - \frac{\Delta C_1}{\Delta C_0} - 1 \quad (A.1)$$

It is a rate which expresses the individual's (or society's) technical ability to transform potential present consumption into future consumption. It is clear from the curvature of AI that this rate varies with C_0 . Between Points A and B, for example, the rate has an average of 1.0; between Points B and C, it has an average of only 0.5. This diminishing in the marginal rate of time productivity (m) reflects the assumption that the individual will allocate his savings to projects in descending order of profitability.

The question arises whether the individual, endowed with the initial consumption pattern $A = (C_0, C_1) = (100, 100)$, will choose to remain at A or whether he will prefer to move to some other point, such as B, or even C? His choice in this respect will obviously depend on the relative values he attaches to the availability of extra "consumables" in Period 1, (ΔC_1) and to the sacrifice of "consumables" in Period 0, ($-\Delta C_0$). It is convenient here to depict the individual's preferences in this

¹⁹ If the individual is at Point A, the segment I'A will be a relevant part of the opportunity locus only if the individual can also disinvest, that is, borrow against the future.

²⁰ Strictly speaking, the term "marginal" suggests that the $-\Delta C_0$ should be a small decrement in consumption in Period 0 (that is, one unit rather than 10 units of consumables).

respect by a so-called preference map. Such a map consists of the set of indifference curves, $S_1, S_2, S_3, \dots$ in Figure A.2.

An indifference curve, such as S_2 , depicts the set of alternative combinations (C_0, C_1) between which the individual is indifferent, that is, which he values equally in Period 0. The curve, S_3 , is a similar curve of indifference, although any point on S_3 is preferred to any point on S_2 . Similarly, any point on S_4 is preferred to any point on S_3 , although all points on S_4 are ranked equally.

If the individual is initially endowed with Point A = (100, 100) and S_2 includes Point A, the individual would consider himself equally well off by consuming only 90 units of "consumables" in Period 0, if he were assured of 112 units of consumables in Period 1, Point D. Now define the expression the individual's marginal rate of time preference.²¹

$$p = - \frac{\Delta C_1}{\Delta C_0} \quad (A.2)$$

In contrast to the marginal rate of time productivity, m , which is a technical datum, the rate of time preference is an expression of the individual's (or society's) willingness to sacrifice units of current consumption for units of future consumption; it is a subjective datum. For any given point on the two-period indifference curve, p may be defined as the "rate of interest," so to speak, which the individual would have to be promised in order to induce him to save one extra unit of "consumables" in Period 0.

Now combine Figures A.1 and A.2 in one diagram and examine the interaction between the technical rate (m) and the subjective rate of time preference (p). This is done in Figure A.3.

²¹ It is reasonable to assume that as more present consumption is sacrificed for the sake of increasing future consumption, the time preference rate (p) increases. For that reason the indifference curves in Figure A.2 are convex to the origin.

FIGURE A.2 PREFERENCE TRADEOFF OF PRESENT CONSUMPTION FOR FUTURE CONSUMPTION

FIGURE A.3 EQUILIBRIUM IN INTERTEMPORAL ALLOCATION

If S_2 and S_3 , in Figure A.3, are a portion of the individual's preference map and AI is his investment opportunity locus, then he will obviously not be satisfied with his initial endowment $A = (100, 100)$. For, by saving and investing 10 units of "consumables" in Period 0, he could assure himself of 20 additional units in Period 1 (Point B in Figure A.3). His indifference curve, S_2 , however, indicates that he would consider a mere 12 extra units in Period 1 adequate compensation for the sacrifice of 10 units in Period 0. In other words, since, at Point A, the marginal rate of time productivity is far greater than the consumer's rate of time preference, the individual would certainly prefer the consumption program $B = (C_0, C_1) = (90, 120)$ to position $A = (C_0, C_1) = (100, 100)$.

Similar reasoning concludes that Point B is, in fact, the individual's most preferred, or "equilibrium," point. For, consider a move from $B = (C_0, C_1) = (90, 120)$ to $E = (C_0, C_1) = (92, 113)$. This move would require the individual to sacrifice 10 extra units in Period 0, for which he would regard a minimum of 23 extra units in Period 1 as adequate compensation. But the remaining investment opportunities, at Point B, promise him at most 15 extra units in Period 1. Clearly then, the individual would judge Point E to be inferior to Point B.

It will be noted that, at Point B, the individual's indifference curve S_2 is tangent to his opportunity locus, AI. Hence, the slope of the individual's indifference curve, S_2 --the highest indifference curve he can attain--is just equal to the slope of the investment opportunity locus he faces. At Point B, his (subjective) marginal rate of time preference, (p) will therefore be equal to the (technical) marginal rate of time productivity (m) he faces. This is, in fact, the condition which must be satisfied in equilibrium. In the context of a one-person "society," one may view this equilibrium rate $r_e = m = p$ as the "social rate of interest," r_s .

Although the above discussion was developed in terms of a single individual, the conclusions obtained can easily be generalized to a two-member society. But in so doing it is necessary to assume that there exists a capital market in which individuals can borrow and/or lend "consumables." Assume further that there are no monopolistic elements in this capital market and that the borrowing and lending rates are always identical, that is, that the capital market is a perfect one.

Consider two individuals, A and B, who, in the absence of a capital market, would reach equilibrium positions such that, for A, $m_A = p_A = 10$ percent while for B, $m_B = p_B = 5$ percent. If A and B were allowed to meet in this perfect capital market, then it would clearly be advantageous for A to offer B an "interest rate" of, say 6 percent or 7 percent in return for some of B's savings. Given B's marginal rate of time preference ($p_B = 5$ percent), he would surely view this as an attractive proposition. And since A can invest such borrowed funds at the marginal rate of $m_A = 10$ percent, he clearly benefits as well. Indeed, it is intuitively obvious that A and B will continue to negotiate in the capital market until they reach a point at which the market rate of interest, r_e , satisfies the condition $r_e = m_A = m_B = p_A = p_B$, and A is willing to borrow from B exactly the amount of savings B is willing to offer.

The argument can be further extended to an n-member society with a perfect capital market. In that society, there will also be negotiations between potential borrowers and lenders until, in equilibrium, every individual's rate of time preference and the marginal time-productivity rate of investments he faces are just equal to the equilibrium market rate, r_e . This equilibrium market rate of interest, r_e , would then be the social rate of discount.

It is easy to see the sense in which the equilibrium market rate, r_e , may be viewed as an opportunity cost rate. As seen above, the division of society's initial

endowment with "consumables," at time 0, into investment and consumption in that period is treated implicitly in the determination of the rate r_e .

Suppose one now introduces the public sector into that picture, and suppose further that the government intends to undertake an investment project requiring some marginal amount of resources ("consumables"). These resources will obviously have to be taken from the private sector, either from private investors or from consumers, or from both. If the resources are taken away from the private investment sector, then that sector must abandon some marginal projects on which, in equilibrium, the marginal rate of productivity is just equal to $m = r_e$. The rate r_e is therefore the opportunity cost of the public project: it is the rate of return that the resources utilized by the public sector could have earned in the private sector. And from that possibility follows the rule that a government bent on maximizing society's welfare should never take resources out of a use where it could have earned more than will be earned on the public project. In terms of the familiar net present value criterion, this simply means that the public project should not be accepted unless its net present value, calculated at the social discount rate $r_s = r_e$, is positive.

The question remains whether the same accept/reject test should be used when the public project is financed with resources withdrawn from consumption in Period $t=0$. From the equilibrium condition $m=r_e$ we know that, in the eyes of consumers, $(1+r_e)$ units of "consumables" in Period 1 are the equivalent in value of 1 unit of "consumables" in Period 0. Obviously, then, the withdrawal of resources for the public project would make consumers better off, or at least no worse off, only if it could provide them with at least $(1+r_e)$ in "consumables" one year hence. Once again, r_e is clearly seen to be the appropriate discount rate for the public project.

In sum, then, in the imaginary world modeled above--a world characterized by perfect certainty and a perfect capital market--the equilibrium market rate, r_e , would, in fact, also be the social rate of discount appropriate for the evaluation of public projects, whether the resources for the projects are withdrawn from consumers, from private investors or from both sectors. This is precisely what is implicit in the statement that, in principle, the social rate of discount should reflect, at once, society's rate of time preference and the marginal productivity of society's resources. The phrase "in principle" is used because the model depicted above differs in important respects from the real world context in which public projects must typically be evaluated. Prominent among these differences are:

- The absence of perfect capital markets in the real world
- The presence of differential tax rates in the real world
- The absence of certainty about the future benefits and costs in the real world.

The economic implications of these factors are discussed in Chapter 2.

APPENDIX B

INDUSTRY-BY-INDUSTRY RETURNS FOR 1600 CORPORATIONS

The data analyzed came from 1600 corporations, the records of which are contained in COMPUSTAT data files. Presented in this appendix are the industry-by-industry performance summaries for the 25 industries into which the corporations have been classified. The outputs shown provide reported and actual performance records annually from 1977 ("current") back through 1968 ("T-9"). "Historical" records refer to those reported by the corporations. "Adjusted" or "impacted" entries are those numbers adjusted simply for the depreciation effect, while "fully adjusted" or "fully impacted" entries have the inflationary effects on inventories and cash holdings netted out as well. R.O.E. and R.O.A. refer to returns on equity and assets, respectively.

INDUSTRY 1 AGRICULTURE

INDUSTRY 1 AGRICULTURE

05/31/78

	DOLLAR DATA IN MILLIONS OF DOLLARS, RATIO DATA IN PERCENT PER YEAR									
	CURRENT	T-1	T-2	T-3	T-4	T-5	T-6	T-7	T-8	T-9
EARNINGS (HISTORICAL)	2.921	2.133	9.376	10.525	5.069	2.137	3.002	3.464	3.973	3.110
EARNINGS (IMPACTED)	.671	.336	7.777	9.313	4.101	1.423	2.389	2.888	3.406	2.773
EARNINGS (FULLY ADJUSTED)	-.750	-1.075	5.186	6.415	3.286	.820	1.581	2.196	2.779	2.403
DEPRECIATION ADJUSTMENT	2.250	1.798	1.599	1.212	.907	.714	.613	.576	.566	.345
FIXED CHARGES	3.680	4.070	3.600	3.767	2.725	2.122	1.687	1.746	.917	.803
GROSS PLANT (HISTORICAL)	68.916	69.296	65.554	58.656	49.203	43.323	36.962	36.900	33.193	29.352
NET PLANT (HISTORICAL)	50.797	52.641	49.429	44.430	36.765	32.373	26.369	24.658	22.206	19.549
ASSET LIFE (YEARS)	25.614	24.724	24.398	25.460	25.439	27.033	24.988	25.727	27.902	22.142
PHYSICAL ASSET PRICE INDEX	1.769	1.616	1.574	1.516	1.481	1.496	1.491	1.458	1.529	1.382
SALES	129.420	130.354	96.410	94.161	60.827	40.530	40.744	42.622	32.039	27.779
INVENTORIES (HISTORICAL)	18.249	18.173	14.457	14.668	12.975	9.739	7.439	7.553	8.548	5.546
INVENTORIES (ADJUSTED)	18.392	18.306	14.659	14.897	13.135	9.836	7.508	7.625	8.662	5.596
TOTAL ASSETS (HISTORICAL)	114.224	121.455	111.988	105.955	82.248	74.059	66.878	64.765	59.324	39.810
TOTAL ASSETS (ADJUSTED)	150.369	154.012	140.560	129.093	100.080	90.218	79.893	76.134	71.181	47.324
ADJUSTED PRICE INDEX	1.316	1.268	1.255	1.218	1.217	1.218	1.195	1.176	1.200	1.189
FULLY ADJUSTED ASSETS	148.948	152.601	137.969	126.194	99.265	89.616	79.085	75.442	70.553	46.954
FULLY ADJ. PRICE INDEX	1.304	1.256	1.232	1.191	1.207	1.210	1.183	1.165	1.189	1.179
R.O.E. (REPORTED)	5.69	4.05	17.53	21.86	12.69	6.00	8.75	9.36	11.58	N/A
R.O.E. (IMPACTED)	.77	.39	9.50	13.11	7.18	2.75	5.06	5.98	7.40	N/A
R.O.E. (FULLY IMPACTED)	-.86	-1.26	6.33	9.03	5.75	1.59	3.35	4.55	6.03	N/A
R.O.A. (REPORTED)	3.03	7.48	19.08	23.32	14.47	7.93	10.29	12.03	12.72	15.95
R.O.A. (IMPACTED)	5.37	4.73	14.08	18.24	11.01	5.72	7.85	9.48	9.82	12.70
R.O.A. (FULLY IMPACTED)	4.47	3.85	12.47	16.36	10.27	5.09	6.91	8.65	9.01	12.01
GROSS MARGIN (REPORTED)	7.97	6.98	22.16	26.25	19.57	14.49	16.89	18.54	23.54	22.86
GROSS MARGIN (IMPACTED)	6.23	5.60	20.50	24.96	18.08	12.73	15.39	17.17	21.78	21.62
GROSS MARGIN (FULL IMPACT)	5.14	4.52	17.82	21.88	16.74	11.24	13.40	15.52	19.82	20.28
G.N.P. DEFLATOR	141.290	133.880	127.250	116.410	105.800	100.000	96.020	91.360	86.720	82.570

INDUSTRY 2 MINING

INDUSTRY 2 MINING

05/31/78

	DOLLAR DATA IN MILLIONS OF DOLLARS, RATIO DATA IN PERCENT PER YEAR									
	CURRENT	T-1	T-2	T-3	T-4	T-5	T-6	T-7	T-8	T-9
EARNINGS (HISTORICAL)	13.512	22.741	25.286	30.334	20.768	10.608	9.966	19.342	13.217	12.211
EARNINGS (IMPACTED)	4.293	14.502	17.517	23.990	15.615	6.142	5.163	9.338	7.349	5.767
EARNINGS (FULLY ADJUSTED)	.969	11.179	11.909	18.328	12.898	4.767	3.661	7.582	5.640	4.356
DEPRECIATION ADJUSTMENT	9.219	8.200	7.769	6.344	5.152	4.466	4.803	6.004	5.868	6.444
FIXED CHARGES	11.204	9.068	7.283	6.187	5.574	4.563	3.628	2.733	2.225	1.827
GROSS PLANT (HISTORICAL)	328.349	298.607	259.267	218.336	195.322	180.019	166.089	143.612	119.389	106.087
NET PLANT (HISTORICAL)	227.141	206.156	176.880	144.732	127.548	116.806	108.606	91.108	72.475	62.565
ASSET LIFE (YEARS)	28.201	28.907	30.000	29.847	30.000	30.000	30.000	30.000	30.000	30.000
PHYSICAL ASSET PRICE INDEX	1.580	1.569	1.626	1.592	1.561	1.563	1.674	1.981	2.158	2.367
SALES	262.423	257.223	236.971	230.600	169.785	132.267	114.705	120.834	103.215	94.445
INVENTORIES (HISTORICAL)	70.327	62.122	54.028	42.862	34.448	33.817	34.070	27.504	23.593	22.951
INVENTORIES (ADJUSTED)	71.371	62.904	55.175	43.661	34.854	34.175	34.586	27.839	23.864	23.201
TOTAL ASSETS (HISTORICAL)	405.756	375.671	333.894	291.567	245.610	218.635	201.868	181.736	160.156	144.377
TOTAL ASSETS (ADJUSTED)	538.525	493.145	445.743	377.535	316.981	284.699	275.498	271.470	244.331	230.151
ADJUSTED PRICE INDEX	1.327	1.315	1.335	1.297	1.294	1.302	1.365	1.494	1.526	1.594
FULLY ADJUSTED ASSETS	535.202	489.823	440.135	371.873	314.264	283.324	273.996	269.714	242.621	228.741
FULLY ADJ. PRICE INDEX	1.319	1.306	1.318	1.278	1.283	1.296	1.358	1.484	1.515	1.584
R.O.E. (REPORTED)	6.72	11.39	13.56	18.05	14.63	8.41	8.48	13.40	12.46	12.38
R.O.E. (IMPACTED)	1.29	4.58	5.89	9.46	7.31	3.20	2.71	4.58	3.87	3.13
R.O.E. (FULLY IMPACTED)	.29	3.53	4.01	7.22	6.04	2.49	1.92	3.72	2.97	2.37
R.O.A. (REPORTED)	8.20	12.11	14.70	19.78	14.91	9.15	8.66	15.15	13.72	13.65
R.O.A. (IMPACTED)	4.47	7.56	9.29	13.60	9.91	5.47	4.61	7.94	6.60	5.77
R.O.A. (FULLY IMPACTED)	3.88	6.93	8.13	12.28	9.13	5.31	4.09	7.34	5.94	5.19
GROSS MARGIN (REPORTED)	12.68	17.66	20.71	24.97	21.52	15.13	15.24	22.79	21.29	20.87
GROSS MARGIN (IMPACTED)	9.16	14.47	17.43	22.21	18.48	11.75	11.06	17.82	15.60	14.04
GROSS MARGIN (FULL IMPACT)	7.90	13.18	15.06	19.76	16.88	10.71	9.75	16.36	13.95	12.55
G.N.P. DEFLATOR	141.290	133.880	127.250	116.410	105.800	100.000	96.020	91.360	86.720	82.570

INDUSTRY 3-DRILLING + EXPLORE INDUSTRY 3 DRILLING + EXPLORE 05/31/78

	DOLLAR DATA IN MILLIONS OF DOLLARS, RATIO DATA IN PERCENT PER YEAR									
	CURRENT	T-1	T-2	T-3	T-4	T-5	T-6	T-7	T-8	T-9
EARNINGS (HISTORICAL)	24.886	22.122	19.157	22.830	10.534	6.166	5.249	0.665	9.452	8.929
EARNINGS (IMPACTED)	11.257	11.033	9.844	15.128	4.586	1.076	.179	4.419	6.056	3.350
EARNINGS (FULLY ADJUSTED)	7.096	7.269	3.158	9.334	2.137	-3.13	-1.331	2.786	4.579	2.063
DEPRECIATION ADJUSTMENT	13.629	11.089	10.113	7.672	5.948	5.090	5.070	4.246	3.396	5.579
FIXED CHARGES	7.419	6.328	5.557	5.278	4.193	3.112	2.962	2.739	2.311	1.893
GROSS PLANT (HISTORICAL)	366.899	315.068	272.581	238.231	202.028	178.039	163.497	155.697	146.279	134.479
NET PLANT (HISTORICAL)	241.608	204.700	174.327	149.247	123.451	109.681	99.147	94.901	88.752	79.796
ASSET LIFE (YEARS)	25.905	25.960	26.133	27.156	28.024	28.243	27.492	27.192	27.919	30.000
PHYSICAL ASSET PRICE INDEX	1.509	1.516	1.531	1.489	1.465	1.483	1.473	1.446	1.448	1.759
SALES	293.867	263.683	237.152	219.673	136.143	106.341	104.584	98.795	90.974	84.263
INVENTORIES (HISTORICAL)	22.297	21.230	19.040	17.790	13.290	10.019	10.730	10.626	8.525	7.937
INVENTORIES (ADJUSTED)	22.391	21.319	19.182	17.935	13.365	10.059	10.786	10.688	8.566	7.970
TOTAL ASSETS (HISTORICAL)	370.882	327.009	281.543	250.073	203.341	175.609	161.544	158.308	148.601	134.735
TOTAL ASSETS (ADJUSTED)	493.991	432.718	374.224	323.204	260.852	228.334	208.457	200.670	188.365	195.319
ADJUSTED PRICE INDEX	1.332	1.323	1.329	1.292	1.283	1.300	1.290	1.268	1.268	1.450
FULLY ADJUSTED ASSETS	489.830	428.954	368.338	317.410	258.403	226.945	206.947	199.036	186.889	194.032
FULLY ADJ. PRICE INDEX	1.321	1.312	1.308	1.269	1.271	1.292	1.281	1.257	1.258	1.440
R.O.E. (REPORTED)	14.47	15.26	15.11	19.43	10.50	7.15	6.35	10.64	12.92	13.87
R.O.E. (IMPACTED)	3.82	4.40	4.12	7.95	2.91	.77	.14	3.57	5.26	2.68
R.O.E. (FULLY IMPACTED)	2.40	2.90	1.44	4.90	1.35	-2.23	-1.03	2.25	3.97	1.65
R.O.A. (REPORTED)	17.96	17.58	17.57	20.98	13.64	11.98	12.77	13.73	13.88	13.10
R.O.A. (IMPACTED)	10.73	10.73	10.52	13.86	8.36	6.98	7.46	8.72	9.15	6.18
R.O.A. (FULLY IMPACTED)	9.97	9.94	9.09	12.29	7.49	6.42	6.79	7.97	8.43	5.56
GROSS MARGIN (REPORTED)	22.67	21.81	20.85	23.88	20.37	19.78	19.72	22.01	22.67	20.95
GROSS MARGIN (IMPACTED)	18.03	17.60	16.59	20.39	16.61	14.99	14.87	17.71	18.93	14.33
GROSS MARGIN (FULL IMPACT)	16.61	16.17	14.11	17.75	14.21	13.69	13.43	16.05	17.31	12.80
G.N.P. DEFLATOR	141.290	133.880	127.250	116.410	105.800	100.000	96.020	91.360	86.720	82.970

INDUSTRY 4 BUILDERS + CONST. INDUSTRY 4 BUILDERS + CONST. 05/31/78

DOLLAR DATA IN MILLIONS OF DOLLARS; RATIO DATA IN PERCENT PER YEAR										
	CURRENT	T-1	T-2	T-3	T-4	T-5	T-6	T-7	T-8	T-9
EARNINGS (HISTORICAL)	17.326	14.231	9.588	8.167	6.252	5.006	2.998	2.612	4.642	4.373
EARNINGS (IMPACTED)	12.127	9.529	5.271	4.281	3.748	2.941	1.127	.999	3.144	2.793
EARNINGS (FULLY ADJUSTED)	7.008	5.166	-1.183	-1.822	.707	1.229	-.855	-1.129	1.305	1.194
DEPRECIATION ADJUSTMENT	5.200	4.703	4.317	3.887	2.504	2.066	1.871	1.613	1.498	1.580
FIXED CHARGES	6.372	6.151	6.316	5.551	3.183	2.477	2.413	2.694	2.087	1.467
GROSS PLANT (HISTORICAL)	156.379	135.278	118.210	97.922	81.808	80.638	73.618	69.702	67.192	59.815
NET PLANT (HISTORICAL)	108.669	93.964	82.220	66.494	54.375	54.737	49.706	47.200	45.462	38.033
ASSET LIFE (YEARS)	26.815	27.006	28.726	30.000	26.092	26.002	25.170	23.872	24.607	26.118
PHYSICAL ASSET PRICE INDEX	1.546	1.558	1.580	1.618	1.508	1.444	1.429	1.374	1.358	1.423
SALES	419.652	395.095	353.249	279.567	226.294	189.433	180.358	160.851	148.705	126.660
INVENTORIES (HISTORICAL)	52.679	47.554	45.001	44.901	33.349	24.247	20.473	16.345	14.305	12.970
INVENTORIES (ADJUSTED)	53.045	47.852	45.535	45.624	33.641	24.376	20.592	16.434	14.375	13.030
TOTAL ASSETS (HISTORICAL)	283.036	247.970	218.317	193.120	159.103	138.360	127.729	119.970	109.503	96.697
TOTAL ASSETS (ADJUSTED)	342.734	300.664	266.521	234.905	187.006	162.805	149.196	137.725	125.864	112.836
ADJUSTED PRICE INDEX	1.211	1.213	1.221	1.216	1.175	1.177	1.168	1.148	1.149	1.167
FULLY ADJUSTED ASSETS	337.616	296.301	260.067	228.803	183.966	161.093	147.215	135.597	124.025	111.237
FULLY ADJ. PRICE INDEX	1.193	1.195	1.191	1.185	1.156	1.164	1.153	1.130	1.133	1.150
R.O.E. (REPORTED)	16.55	16.21	12.79	12.17	10.74	9.61	6.60	5.88	10.91	10.88
R.O.E. (IMPACTED)	7.39	6.80	4.30	3.96	4.37	3.85	1.69	1.61	5.35	4.96
R.O.E. (FULLY IMPACTED)	4.27	3.68	-.97	-1.68	.82	1.61	-1.28	-1.82	2.22	2.12
R.O.A. (REPORTED)	12.69	12.34	9.99	10.40	9.41	8.16	6.48	6.45	9.44	9.42
R.O.A. (IMPACTED)	8.97	8.62	6.58	6.92	6.67	5.67	4.30	4.45	7.03	6.87
R.O.A. (FULLY IMPACTED)	7.59	7.27	4.25	4.43	5.13	4.67	3.01	2.95	5.65	5.33
GROSS MARGIN (REPORTED)	8.56	7.74	6.17	7.19	6.79	5.96	4.59	4.81	6.95	7.19
GROSS MARGIN (IMPACTED)	7.32	6.55	4.95	5.80	5.66	4.87	3.55	3.81	5.95	5.94
GROSS MARGIN (FULL IMPACT)	6.10	5.45	3.12	3.61	4.28	3.97	2.45	2.49	4.71	4.68
G.N.P. DEFLATOR	141.290	133.880	127.250	116.410	105.800	100.000	96.020	91.360	86.720	82.570

INDUSTRY-5 FOOD

INDUSTRY 5 FOOD

05/31/78

	DOLLAR DATA IN MILLIONS OF DOLLARS					RATIO DATA IN PERCENT PER YEAR				
	CURRENT	T-1	T-2	T-3	T-4	T-5	T-6	T-7	T-8	T-9
EARNINGS (HISTORICAL)	32.222	31.756	26.603	23.963	21.494	18.520	17.304	15.876	14.462	14.099
EARNINGS (IMPACTED)	20.017	20.696	16.305	15.181	14.159	11.995	11.051	9.360	7.646	7.467
EARNINGS (FULLY ADJUSTED)	13.380	14.885	6.694	5.756	9.185	8.866	7.557	5.997	4.749	5.006
DEPRECIATION ADJUSTMENT	12.205	11.060	10.298	8.782	7.335	6.524	6.253	6.517	6.816	6.632
FIXED CHARGES	9.302	8.591	9.635	8.330	6.014	5.149	5.232	5.094	3.668	2.862
GROSS PLANT (HISTORICAL)	297.004	270.581	247.465	225.938	208.420	194.257	184.482	172.498	157.882	145.588
NET PLANT (HISTORICAL)	178.885	162.381	147.268	133.210	121.812	112.789	107.243	99.529	88.850	80.594
ASSET LIFE (YEARS)	30.000	30.000	30.000	30.000	30.000	30.000	30.000	30.000	30.000	30.000
PHYSICAL-ASSET-PRICE INDEX	1.752	1.750	1.776	1.747	1.672	1.650	1.667	1.754	1.852	1.889
SALES	919.861	857.568	812.39	741.861	610.055	524.948	481.369	451.269	390.921	355.570
INVENTORIES (HISTORICAL)	130.817	123.441	116.149	114.570	89.979	77.529	71.183	67.128	59.654	54.757
INVENTORIES (ADJUSTED)	131.846	124.367	117.696	116.344	90.749	78.033	71.720	67.662	60.112	55.136
TOTAL ASSETS (HISTORICAL)	476.329	438.615	406.306	380.739	334.287	301.550	282.436	263.380	234.541	212.427
TOTAL ASSETS (ADJUSTED)	611.905	561.361	522.079	482.081	416.894	375.303	354.556	338.918	310.696	284.498
ADJUSTED PRICE INDEX	1.285	1.280	1.285	1.266	1.247	1.245	1.255	1.287	1.325	1.339
FULLY ADJUSTED ASSETS	605.268	555.549	512.469	472.657	411.921	372.174	351.063	335.555	307.798	282.029
FULLY ADJ. PRICE INDEX	1.271	1.267	1.261	1.241	1.232	1.234	1.243	1.274	1.312	1.328
R.O.E. (REPORTED)	13.02	13.99	12.93	12.81	12.44	11.56	11.57	11.29	11.22	11.49
R.O.E. (IMPACTED)	5.24	5.93	5.10	5.30	5.56	5.14	5.00	4.34	3.74	3.83
R.O.E. (FULLY IMPACTED)	3.50	4.27	2.69	2.31	3.61	3.80	3.42	2.78	2.32	2.57
R.O.A. (REPORTED)	14.69	15.72	15.12	14.31	14.12	13.49	14.00	14.17	14.41	14.82
R.O.A. (IMPACTED)	9.45	10.33	9.83	9.51	9.58	9.11	9.40	9.10	8.70	8.74
R.O.A. (FULLY IMPACTED)	8.46	9.39	8.13	7.70	8.49	8.34	8.50	8.19	7.84	7.95
GROSS MARGIN (REPORTED)	7.61	8.04	7.57	7.34	7.74	7.75	8.21	8.27	8.65	8.85
GROSS MARGIN (IMPACTED)	6.28	6.75	6.30	6.16	6.54	6.50	6.91	6.83	6.90	6.99
GROSS MARGIN (FULL IMPACT)	5.56	6.08	5.12	4.89	5.72	5.91	6.19	6.08	6.16	6.29
G.N.P. DEFLATOR	141.290	133.880	127.250	116.410	105.800	100.000	96.020	91.360	86.720	82.570

INDUSTRY 6 TOBACCO

INDUSTRY 6 TOBACCO

05/31/78

	DOLLAR DATA IN MILLIONS OF DOLLARS, RATIO DATA IN PERCENT PER YEAR									
	CURRENT	T-1	T-2	T-3	T-4	T-5	T-6	T-7	T-8	T-9
EARNINGS (HISTORICAL)	129.105	107.957	82.652	80.075	68.957	62.276	57.564	49.999	42.882	41.168
EARNINGS (IMPACTED)	113.259	93.332	70.597	71.902	64.161	58.148	53.868	47.164	40.443	39.352
EARNINGS (FULLY ADJUSTED)	92.121	77.780	54.481	55.437	56.207	52.931	48.092	41.379	35.541	35.394
DEPRECIATION ADJUSTMENT	18.846	14.625	12.055	8.174	4.796	4.128	3.696	2.832	2.440	1.754
FIXED CHARGES	40.609	41.506	36.052	32.067	20.217	15.547	15.357	13.825	10.883	6.488
GROSS PLANT (HISTORICAL)	814.341	759.975	540.442	494.847	450.744	353.573	290.187	262.090	210.701	161.412
NET PLANT (HISTORICAL)	535.949	505.952	352.416	321.839	294.803	214.524	169.890	153.228	122.715	88.869
ASSET LIFE (YEARS)	21.074	21.577	19.597	18.785	18.848	18.173	17.226	17.777	20.674	17.831
PHYSICAL ASSET PRICE INDEX	1.385	1.342	1.404	1.318	1.230	1.225	1.224	1.193	1.196	1.182
SALES	2215.245	2014.327	1426.582	1246.158	1008.604	945.603	874.208	788.766	702.946	648.965
INVENTORIES (HISTORICAL)	716.658	684.978	514.412	464.141	375.558	347.190	315.928	304.925	286.359	295.109
INVENTORIES (ADJUSTED)	729.490	697.115	531.684	481.477	383.669	352.473	321.752	311.232	292.222	301.137
TOTAL ASSETS (HISTORICAL)	1892.085	1798.028	1305.624	1174.554	1010.781	881.664	789.961	750.314	655.044	575.461
TOTAL ASSETS (ADJUSTED)	2111.411	1983.015	1465.121	1294.270	1086.707	935.244	833.799	786.203	684.932	597.700
ADJUSTED PRICE INDEX	1.116	1.103	1.122	1.102	1.075	1.061	1.055	1.048	1.046	1.039
FULLY ADJUSTED ASSETS	2093.273	1967.462	1449.006	1277.805	1078.754	930.027	828.012	780.419	680.031	593.742
FULLY ADJ. PRICE INDEX	1.106	1.094	1.110	1.088	1.067	1.055	1.048	1.040	1.038	1.032
R.O.E. (REPORTED)	14.44	12.70	13.17	14.95	14.25	13.32	13.05	12.33	11.47	12.03
R.O.E. (IMPACTED)	10.02	9.12	9.17	11.27	11.63	11.27	11.24	10.84	10.16	10.99
R.O.E. (FULLY IMPACTED)	8.37	7.60	7.08	8.69	10.19	10.26	10.04	9.51	8.93	9.89
R.O.A. (REPORTED)	15.38	14.40	17.12	17.15	14.84	15.76	16.88	15.63	15.75	15.68
R.O.A. (IMPACTED)	12.97	12.39	14.60	15.14	13.46	14.50	15.66	14.67	14.84	14.95
R.O.A. (FULLY IMPACTED)	12.21	11.70	13.64	14.03	12.82	14.02	15.06	14.03	14.22	14.38
GROSS MARGIN (REPORTED)	13.13	12.85	15.67	16.17	14.87	14.69	15.25	14.86	14.68	13.90
GROSS MARGIN (IMPACTED)	12.28	12.13	14.82	15.51	14.40	14.26	14.83	14.50	14.33	13.63
GROSS MARGIN (FULL IMPACT)	11.46	11.35	13.69	14.19	13.61	13.71	14.17	13.77	13.64	13.02
G.N.P. DEFLATOR	141.290	133.880	127.250	116.410	105.800	100.000	96.020	91.360	86.720	82.570

INDUSTRY 7-TEXTILE + LUMBER

INDUSTRY 7-TEXTILE + LUMBER

05/31/78

	DOLLAR DATA IN MILLIONS OF DOLLARS, RATIO DATA IN PERCENT PER YEAR									
	CURRENT	T-1	T-2	T-3	T-4	T-5	T-6	T-7	T-8	T-9
EARNINGS (HISTORICAL)	17.559	15.947	11.737	15.396	14.360	9.512	7.014	7.700	9.713	0.554
EARNINGS (IMPACTED)	4.981	3.939	-0.611	2.479	2.696	-0.832	-2.964	-2.818	-1.565	-2.466
EARNINGS (FULLY ADJUSTED)	1.375	0.721	-5.837	-3.099	-0.347	-2.721	-5.114	-4.970	-3.580	-3.996
DEPRECIATION ADJUSTMENT	12.578	12.008	12.348	12.917	11.664	10.344	9.977	10.526	11.278	11.021
FIXED CHARGES	6.338	5.912	6.439	6.234	4.880	3.953	4.236	4.036	3.255	2.688
GROSS PLANT (HISTORICAL)	245.387	223.425	209.503	191.660	172.519	161.090	160.368	155.591	148.720	137.559
NET PLANT (HISTORICAL)	141.976	128.986	120.877	109.841	96.939	90.757	91.175	89.292	85.790	78.245
ASSET LIFE (YEARS)	30.000	30.000	30.000	30.000	30.000	30.000	30.000	30.000	30.000	30.000
PHYSICAL ASSET PRICE INDEX	1.944	1.998	2.120	2.283	2.251	2.224	2.214	2.330	2.528	2.595
SALES	383.960	347.680	301.807	317.329	281.421	238.562	220.417	210.101	208.056	181.171
INVENTORIES (HISTORICAL)	61.126	57.527	52.320	55.534	45.720	42.514	41.863	39.716	39.066	35.768
INVENTORIES (ADJUSTED)	61.563	58.023	53.164	56.506	49.209	42.828	42.269	40.118	39.434	36.085
TOTAL ASSETS (HISTORICAL)	290.093	269.424	251.716	243.969	218.818	199.155	197.420	191.284	184.826	161.486
TOTAL ASSETS (ADJUSTED)	424.584	398.607	387.946	385.822	340.573	310.568	308.518	310.419	316.278	286.634
ADJUSTED PRICE INDEX	1.464	1.479	1.541	1.581	1.556	1.559	1.563	1.623	1.711	1.775
FULLY ADJUSTED ASSETS	420.978	395.389	382.721	380.244	337.526	308.679	306.367	308.268	314.263	285.184
FULLY ADJ. PRICE INDEX	1.451	1.468	1.520	1.559	1.542	1.550	1.552	1.612	1.700	1.766
R.O.E. (REPORTED)	11.83	11.65	9.45	13.07	13.34	9.64	7.12	8.12	10.29	10.25
R.O.E. (IMPACTED)	1.76	1.48	-0.24	0.96	1.18	-0.40	-1.42	-1.32	-0.69	-1.18
R.O.E. (FULLY IMPACTED)	0.49	0.27	-2.25	-1.20	-0.15	-1.30	-2.45	-2.33	-1.59	-1.92
R.O.A. (REPORTED)	12.59	12.66	10.74	13.57	13.52	10.40	8.68	9.38	11.35	11.40
R.O.A. (IMPACTED)	5.64	5.55	3.79	5.25	5.27	3.34	2.33	2.39	3.07	2.58
R.O.A. (FULLY IMPACTED)	4.84	4.78	2.48	3.85	4.41	2.75	1.64	1.71	2.45	2.05
GROSS MARGIN (REPORTED)	9.51	9.81	8.96	10.42	10.51	8.68	7.78	8.54	10.08	10.16
GROSS MARGIN (IMPACTED)	6.23	6.36	4.87	6.35	6.37	4.35	3.25	3.53	4.66	4.07
GROSS MARGIN (FULL IMPACT)	5.30	5.43	3.13	4.60	5.29	3.56	2.27	2.50	3.69	3.23
G.N.P. DEFLATOR	141.290	133.880	127.250	116.410	105.800	100.000	96.020	91.360	86.720	82.570

INDUSTRY 8 PRINTING

INDUSTRY 8 PRINTING

05/31/78

DOLLAR DATA IN MILLIONS OF DOLLARS, RATIO DATA IN PERCENT PER YEAR										
	CURRENT	T-1	T-2	T-3	T-4	T-5	T-6	T-7	T-8	T-9
EARNINGS (HISTORICAL)	18.533	13.154	11.816	11.428	11.217	9.251	7.857	7.464	7.495	7.374
EARNINGS (IMPACTED)	13.652	9.045	8.127	8.278	8.868	7.355	6.015	5.641	5.504	4.867
EARNINGS (FULLY ADJUSTED)	9.730	5.812	3.161	3.267	6.051	5.451	3.803	3.519	3.633	3.317
DEPRECIATION ADJUSTMENT	4.881	4.109	3.689	3.150	2.349	1.896	1.841	1.823	1.991	2.508
FIXED CHARGES	2.548	2.262	2.673	2.923	2.092	1.865	1.879	1.939	1.575	1.133
GROSS PLANT (HISTORICAL)	110.281	100.152	94.681	87.486	75.032	68.099	65.537	60.388	94.336	49.487
NET PLANT (HISTORICAL)	64.398	58.754	55.615	52.704	45.814	41.662	39.686	37.123	33.317	30.059
ASSET LIFE (YEARS)	28.875	28.264	28.154	30.000	28.943	27.606	28.093	30.000	30.000	30.000
PHYSICAL ASSET PRICE INDEX	1.670	1.652	1.612	1.587	1.508	1.468	1.477	1.537	1.648	1.887
SALES	266.668	231.199	210.350	195.178	166.273	149.565	141.761	133.629	125.384	110.747
INVENTORIES (HISTORICAL)	28.334	26.359	26.315	27.057	19.642	17.797	17.870	16.832	16.340	14.425
INVENTORIES (ADJUSTED)	29.108	26.516	26.622	27.433	19.777	17.885	17.985	16.945	16.447	14.510
TOTAL ASSETS (HISTORICAL)	209.677	184.833	171.902	165.716	147.234	135.669	129.564	118.002	109.224	96.830
TOTAL ASSETS (ADJUSTED)	252.992	223.278	206.257	197.009	170.640	155.272	148.619	138.038	130.936	123.567
ADJUSTED PRICE INDEX	1.207	1.208	1.200	1.189	1.159	1.144	1.147	1.170	1.199	1.276
FULLY ADJUSTED ASSETS	249.069	220.045	201.291	191.998	167.822	153.369	146.407	135.916	129.065	122.017
FULLY ADJ.PRICE INDEX	1.188	1.191	1.171	1.159	1.140	1.130	1.130	1.152	1.182	1.260
R.O.E. (REPORTED)	14.59	11.78	11.22	11.76	12.89	11.69	10.59	11.42	11.81	12.91
R.O.E. (IMPACTED)	8.02	6.03	5.83	6.46	8.04	7.45	6.46	6.61	6.47	5.81
R.O.E. (FULLY IMPACTED)	5.72	3.88	2.27	2.55	5.49	5.53	4.08	4.13	4.27	3.96
R.O.A. (REPORTED)	18.47	16.04	15.08	15.34	16.29	14.70	13.43	14.27	15.57	16.46
R.O.A. (IMPACTED)	13.39	11.45	10.79	11.32	12.69	11.63	10.48	10.89	11.48	10.88
R.O.A. (FULLY IMPACTED)	12.02	10.15	8.59	9.01	11.22	10.53	9.13	9.50	10.19	9.74
GROSS MARGIN (REPORTED)	14.55	12.83	12.32	13.02	14.42	13.34	12.28	12.60	13.56	14.39
GROSS MARGIN (IMPACTED)	12.72	11.05	10.57	11.41	13.01	12.07	10.98	11.24	11.97	12.13
GROSS MARGIN (FULL IMPACT)	11.25	9.65	8.21	8.84	11.32	10.79	9.42	9.65	10.48	10.73
G.N.P. DEFLATOR	141.290	133.880	127.250	116.410	105.800	100.000	96.020	91.360	86.720	82.570

INDUSTRY 9 CHEMICALS + DRUGS

INDUSTRY 9 CHEMICALS + DRUGS

05/31/78

DOLLAR DATA IN MILLIONS OF DOLLARS, RATIO DATA IN PERCENT PER YEAR										
	CURRENT	T-1	T-2	T-3	T-4	T-5	T-6	T-7	T-8	T-9
EARNINGS (HISTORICAL)	63.239	61.611	53.888	55.438	45.659	36.153	30.081	27.496	28.458	27.258
EARNINGS (IMPACTED)	36.260	38.246	32.185	35.178	29.686	21.796	16.633	14.494	15.984	15.891
EARNINGS (FULLY ADJUSTED)	23.495	26.998	13.857	18.142	20.281	16.142	10.824	9.052	11.104	11.615
DEPRECIATION ADJUSTMENT	26.980	23.365	21.303	20.260	15.973	14.357	13.448	12.996	12.474	11.366
FIXED CHARGES	18.102	15.801	14.342	11.362	8.723	7.250	7.032	6.546	5.737	5.150
GROSS PLANT (HISTORICAL)	674.636	601.174	543.284	481.322	425.186	397.726	378.517	357.392	334.683	317.246
NET PLANT (HISTORICAL)	368.107	329.321	293.377	251.621	215.586	200.916	193.917	183.892	171.522	163.672
ASSET LIFE (YEARS)	29.985	29.981	30.000	30.000	30.000	30.000	30.000	30.000	30.000	30.000
PHYSICAL ASSET PRICE INDEX	1.686	1.683	1.718	1.739	1.655	1.623	1.618	1.631	1.638	1.609
SALES	1021.309	917.151	823.111	770.606	616.026	527.746	477.638	445.328	425.375	396.043
INVENTORIES (HISTORICAL)	175.690	159.623	143.778	147.871	103.333	91.099	87.537	82.693	74.052	67.155
INVENTORIES (ADJUSTED)	177.363	161.071	146.117	150.716	104.338	91.751	88.356	83.515	74.700	67.666
TOTAL ASSETS (HISTORICAL)	854.643	775.879	695.497	625.660	530.967	473.661	437.140	407.327	379.026	357.184
TOTAL ASSETS (ADJUSTED)	1108.771	1002.095	908.533	814.561	673.145	599.550	557.846	524.209	489.187	457.391
ADJUSTED PRICE INDEX	1.297	1.292	1.306	1.302	1.268	1.266	1.276	1.287	1.291	1.281
FULLY ADJUSTED ASSETS	1096.007	990.848	890.305	797.525	663.739	593.896	552.037	518.767	484.307	453.116
FULLY ADJ. PRICE INDEX	1.282	1.277	1.280	1.275	1.250	1.254	1.263	1.274	1.278	1.269
R.O.E. (REPORTED)	14.54	15.46	15.10	17.25	15.89	13.95	12.63	12.50	13.75	13.90
R.O.E. (IMPACTED)	5.28	6.14	5.65	6.93	6.93	5.67	4.64	4.31	5.05	5.37
R.O.E. (FULLY IMPACTED)	3.42	4.33	2.44	3.58	4.73	4.20	3.02	2.69	3.51	3.93
R.O.A. (REPORTED)	15.14	15.83	15.62	17.49	16.99	15.19	14.01	14.10	16.06	16.41
R.O.A. (IMPACTED)	9.25	9.94	9.58	10.98	11.05	9.61	8.58	8.49	9.91	10.34
R.O.A. (FULLY IMPACTED)	8.19	8.92	7.72	9.07	9.79	8.75	7.62	7.53	9.00	9.49
GROSS MARGIN (REPORTED)	12.67	13.39	13.20	14.20	14.65	13.63	12.82	12.90	14.31	14.80
GROSS MARGIN (IMPACTED)	10.02	10.85	10.55	11.57	12.05	10.91	10.01	9.98	11.38	11.93
GROSS MARGIN (FULL IMPACT)	8.77	9.62	8.33	9.36	10.53	9.84	8.79	8.76	10.23	10.85
G.N.P. DEFLATOR	141.290	133.880	127.250	116.410	105.800	100.000	96.020	91.360	86.720	82.570

INDUSTRY 10 REFINING +POOFING INDUSTRY 10 REFINING +ROOFING 05/31/78

	DOLLAR DATA IN MILLIONS OF DOLLARS, RATIO DATA IN PERCENT PER YEAR									
	CURRENT	T-1	T-2	T-3	T-4	T-5	T-6	T-7	T-8	T-9
EARNINGS (HISTORICAL)	293.223	270.183	232.005	320.711	232.292	139.244	143.157	128.671	139.378	142.716
EARNINGS (IMPACTED)	95.111	94.577	56.147	175.303	127.554	53.469	61.541	58.668	79.548	85.622
EARNINGS (FULLY ADJUSTED)	28.145	32.829	-43.933	65.024	81.299	28.433	34.685	31.762	55.196	63.929
DEPRECIATION ADJUSTMENT	198.111	175.606	175.858	145.408	104.738	85.775	81.616	70.004	55.830	57.094
FIXED CHARGES	82.816	69.153	56.666	46.532	39.145	34.931	31.820	27.868	24.213	19.645
GROSS PLANT (HISTORICAL)	4247.481	3744.593	3378.412	3190.198	2879.892	2730.294	2575.837	2401.692	2327.206	2257.744
NET PLANT (HISTORICAL)	2602.394	2264.750	1998.538	1820.583	1602.172	1515.932	1430.099	1330.915	1288.053	1240.065
ASSET LIFE (YEARS)	30.000	30.000	30.000	30.000	30.000	29.743	30.000	28.771	27.367	28.516
PHYSICAL ASSET PRICE INDEX	1.749	1.771	1.784	1.745	1.637	1.600	1.611	1.564	1.491	1.507
SALES	6217.349	5417.246	4762.613	4682.224	2653.844	2113.038	1922.022	1684.906	1599.085	1538.592
INVENTORIES (HISTORICAL)	658.658	573.375	510.958	510.790	275.727	223.588	218.051	197.272	181.787	177.934
INVENTORIES (ADJUSTED)	662.520	576.537	516.062	506.161	277.388	224.569	219.313	198.508	182.826	178.859
TOTAL ASSETS (HISTORICAL)	4878.778	4389.716	3934.402	3712.178	2952.835	2615.143	2430.210	2249.246	2164.969	2088.733
TOTAL ASSETS (ADJUSTED)	6830.914	6138.130	5507.053	5074.434	3974.990	3526.070	3305.324	3001.284	2798.818	2718.430
ADJUSTED PRICE INDEX	1.400	1.398	1.400	1.367	1.346	1.348	1.360	1.334	1.293	1.301
FULLY ADJUSTED ASSETS	6763.947	6076.381	5406.973	4964.155	3928.735	3501.034	3278.468	2974.378	2774.466	2696.738
FULLY ADJ. PRICE INDEX	1.386	1.384	1.374	1.337	1.330	1.339	1.349	1.322	1.282	1.291
R.O.E. (REPORTED)	13.33	13.68	12.70	18.16	15.16	10.06	10.94	10.56	11.33	11.79
R.O.E. (IMPACTED)	2.29	2.54	1.65	5.61	5.00	2.33	2.82	2.98	4.35	4.66
R.O.E. (FULLY IMPACTED)	.68	.88	-1.29	2.98	3.18	1.24	1.59	1.61	3.02	3.48
R.O.A. (REPORTED)	18.11	17.93	19.75	25.13	18.81	14.08	13.59	11.78	11.97	12.35
R.O.A. (IMPACTED)	10.04	9.97	10.92	15.54	11.35	8.01	7.53	6.50	7.26	7.39
R.O.A. (FULLY IMPACTED)	9.15	9.05	9.27	13.66	10.30	7.35	6.77	5.65	6.45	6.65
GROSS MARGIN (REPORTED)	14.21	14.53	16.31	19.92	20.93	17.42	17.19	15.73	16.20	16.77
GROSS MARGIN (IMPACTED)	11.02	11.29	12.62	16.82	16.99	13.36	12.94	11.57	12.71	13.06
GROSS MARGIN (FULL IMPACT)	9.94	10.15	10.52	14.46	15.24	12.18	11.54	9.98	11.19	11.65
G.N.P. DEFLATOR	141.290	133.880	127.250	116.410	105.830	100.000	96.020	91.360	86.720	82.570

INDUSTRY 11-RUBBER + PLASTIC INDUSTRY 11 RUBBER + PLASTIC 05/31/78

	DOLLAR DATA IN MILLIONS OF DOLLARS, RATIO DATA IN PERCENT PER YEAR									
	CURRENT	T-1	T-2	T-3	T-4	T-5	T-6	T-7	T-8	T-9
EARNINGS (HISTORICAL)	14.028	12.849	11.289	12.752	13.716	12.503	10.501	8.482	18.535	11.249
EARNINGS (IMPACTED)	.487	-.185	-1.646	.672	3.127	2.626	.791	-1.438	-.200	-.159
EARNINGS (FULLY ADJUSTED)	-4.901	-4.771	-9.249	-7.070	-1.195	-.404	-2.751	-5.188	-3.301	-2.748
DEPRECIATION ADJUSTMENT	13.542	12.954	12.936	12.383	10.589	9.897	9.710	10.320	10.735	11.409
FIXED CHARGES	9.330	8.709	9.859	10.011	7.108	6.318	6.089	6.186	5.380	3.667
GROSS PLANT (HISTORICAL)	245.451	231.691	227.844	216.221	198.961	182.543	170.883	161.693	147.332	135.531
NET PLANT (HISTORICAL)	121.427	116.351	118.493	114.466	104.440	94.815	87.451	83.753	75.937	68.558
ASSET LIFE (YEARS)	30.000	30.000	30.000	30.000	30.000	30.000	30.000	30.000	30.000	30.000
PHYSICAL ASSET PRICE INDEX	1.985	1.981	1.991	2.005	1.959	1.966	2.011	2.135	2.303	2.480
SALES	522.645	472.593	439.253	428.046	379.797	337.560	305.856	285.203	280.035	263.361
INVENTORIES (HISTORICAL)	104.169	94.989	94.847	98.834	85.875	77.827	72.481	67.794	64.501	59.448
INVENTORIES (ADJUSTED)	105.257	95.984	95.922	101.123	87.002	78.571	73.357	68.656	65.248	60.043
TOTAL ASSETS (HISTORICAL)	347.312	325.531	318.090	313.144	285.158	263.765	243.563	226.903	214.099	197.525
TOTAL ASSETS (ADJUSTED)	468.843	440.716	437.341	433.518	386.424	356.136	332.855	322.825	313.777	299.569
ADJUSTED PRICE INDEX	1.348	1.354	1.375	1.375	1.355	1.350	1.367	1.423	1.466	1.517
FULLY ADJUSTED ASSETS	462.655	436.051	429.738	422.778	382.112	353.125	329.314	319.475	310.677	296.981
FULLY ADJ. PRICE INDEX	1.332	1.340	1.351	1.350	1.340	1.339	1.352	1.408	1.451	1.504
R.O.E. (REPORTED)	9.25	8.93	8.27	9.72	11.18	10.72	9.83	8.39	10.91	12.06
R.O.E. (IMPACTED)	.18	-.04	-.64	.27	1.40	1.25	.40	-.94	-.10	-.08
R.O.E. (FULLY IMPACTED)	-1.81	-1.85	-3.62	-2.87	-.54	-.19	-1.41	-2.65	-1.69	-1.41
R.O.A. (REPORTED)	11.22	10.57	10.05	10.81	11.51	11.52	11.15	9.99	12.24	13.08
R.O.A. (IMPACTED)	5.44	4.88	4.37	5.08	5.77	5.77	5.25	3.84	4.94	4.83
R.O.A. (FULLY IMPACTED)	4.34	3.86	2.67	3.34	4.70	4.96	4.23	2.82	3.99	4.00
GROSS MARGIN (REPORTED)	7.45	7.28	7.28	7.91	8.64	9.00	8.88	7.95	9.36	9.81
GROSS MARGIN (IMPACTED)	4.86	4.54	4.33	5.08	5.85	6.07	5.70	4.33	5.53	5.48
GROSS MARGIN (FULL IMPACT)	3.83	3.56	2.60	3.28	4.72	5.18	4.54	3.16	4.42	4.50
G.N.P. DEFATOR	141.290	133.880	127.250	116.410	105.800	100.000	96.820	91.360	86.720	82.570

INDUSTRY 12 GLASS,CLAY CEMENT INDUSTRY 12 GLASS,CLAY CEMENT 05/31/78

	DOLLAR DATA IN MILLIONS OF DOLLARS; RATIO DATA IN PERCENT PER YEAR									
	CURRENT	T-1	T-2	T-3	T-4	T-5	T-6	T-7	T-8	T-9
EARNINGS (HISTORICAL)	22.840	19.120	14.227	15.960	15.556	13.272	11.324	10.804	11.794	11.224
EARNINGS (IMPACTED)	7.535	4.584	.040	2.982	4.660	3.659	1.645	.197	.969	.142
EARNINGS (FULLY ADJUSTED)	2.575	.255	-6.339	-3.115	1.312	1.493	-7.779	-2.153	-1.100	-1.562
DEPRECIATION ADJUSTMENT	15.306	14.536	14.186	12.978	10.896	9.613	9.679	10.607	10.826	11.083
FIXED CHARGES	6.935	6.676	7.065	6.234	5.021	3.928	3.866	3.709	2.976	2.499
GROSS PLANT (HISTORICAL)	325.611	297.066	283.346	269.181	250.089	232.658	225.619	211.007	194.811	184.912
NET PLANT (HISTORICAL)	178.615	158.930	152.812	147.026	135.661	124.247	123.630	119.487	111.004	104.677
ASSET LIFE (YEARS)	30.000	30.000	30.000	30.000	30.000	30.000	30.000	30.000	30.000	30.000
PHYSICAL ASSET PRICE INDEX	1.891	1.912	1.936	1.932	1.876	1.853	1.882	2.024	2.164	2.271
SALES	506.870	449.856	398.432	387.861	329.734	283.310	261.166	243.491	224.161	202.625
INVENTORIES (HISTORICAL)	78.175	66.324	61.609	66.784	51.332	43.388	42.648	41.437	34.929	32.867
INVENTORIES (ADJUSTED)	78.842	66.834	62.496	67.937	51.795	43.663	43.003	41.814	35.203	33.106
TOTAL ASSETS (HISTORICAL)	390.278	340.380	313.132	306.909	271.458	244.546	234.738	224.188	205.370	191.634
TOTAL ASSETS (ADJUSTED)	550.151	485.889	457.008	445.133	390.726	350.746	344.158	346.900	334.832	324.911
ADJUSTED PRICE INDEX	1.410	1.427	1.459	1.450	1.439	1.434	1.466	1.547	1.630	1.695
FULLY ADJUSTED ASSETS	545.192	481.559	450.628	439.035	387.378	348.580	341.734	344.550	332.763	323.207
FULLY ADJ.PRICE INDEX	1.397	1.415	1.439	1.431	1.427	1.425	1.456	1.537	1.620	1.687
R.O.E. (REPORTED)	12.70	11.82	9.71	11.32	11.83	11.78	9.41	9.58	11.00	10.97
R.O.E. (IMPACTED)	2.22	1.49	.01	1.07	1.86	1.60	.72	.08	.41	.06
R.O.E. (FULLY IMPACTED)	.76	.08	-2.19	-1.12	.52	.65	-.34	-.92	-.47	-.66
R.O.A. (REPORTED)	11.99	12.16	10.17	11.26	12.14	11.58	10.82	11.02	12.88	12.86
R.O.A. (IMPACTED)	5.73	5.53	3.87	4.86	5.65	5.33	4.57	4.07	4.67	4.18
R.O.A. (FULLY IMPACTED)	4.87	4.68	2.50	3.54	4.83	4.75	3.89	3.42	4.08	3.67
GROSS MARGIN (REPORTED)	9.23	9.20	7.99	8.91	9.99	9.99	9.72	10.15	11.80	12.16
GROSS MARGIN (IMPACTED)	6.21	5.97	4.43	5.57	6.69	6.60	6.02	5.79	6.97	6.59
GROSS MARGIN (FULL IMPACT)	5.24	5.01	2.83	3.99	5.67	5.84	5.09	4.83	6.05	5.85
G.N.P. DEFLATOR	141.290	133.880	127.250	116.410	105.800	100.000	96.020	91.360	86.720	82.570

INDUSTRY 13-IRON + STEEL - INDUSTRY 13-IRON + STEEL - 05/31/78

	DOLLAR DATA IN MILLIONS OF DOLLARS			RATIO DATA IN PERCENT PER YEAR						
	CURRENT	T-1	T-2	T-3	T-4	T-5	T-6	T-7	T-8	T-9
EARNINGS (HISTORICAL)	11.080	26.602	29.195	52.133	29.513	17.545	13.876	18.878	24.393	24.336
EARNINGS (IMPACTED)	-27.353	-9.997	-9.382	8.966	-8.425	-16.862	-19.218	-17.303	-14.089	-14.860
EARNINGS (FULLY ADJUSTED)	-35.791	-16.614	-20.417	-7.218	-15.711	-20.932	-23.539	-21.866	-18.517	-18.785
DEPRECIATION ADJUSTMENT	38.432	36.599	38.576	43.173	37.938	34.407	33.095	36.181	38.482	39.196
FIXED CHARGES	17.511	15.796	14.026	13.010	12.156	11.019	11.072	9.822	8.255	6.899
GROSS PLANT (HISTORICAL)	884.796	838.186	786.848	754.581	722.877	693.198	683.871	654.163	618.654	603.194
NET PLANT (HISTORICAL)	441.413	411.565	381.730	360.337	343.673	334.244	337.150	325.143	309.273	297.026
ASSET LIFE (YEARS)	30.000	30.000	30.000	30.000	30.000	30.000	30.000	30.000	30.000	30.000
PHYSICAL ASSET PRICE INDEX	2.142	2.190	2.355	2.464	2.357	2.309	2.337	2.527	2.668	2.818
SALES	872.649	783.563	705.444	819.410	630.935	498.649	456.454	442.983	435.939	408.667
INVENTORIES (HISTORICAL)	159.359	156.256	139.474	122.293	98.728	99.480	98.620	98.210	87.540	83.874
INVENTORIES (ADJUSTED)	160.969	157.879	142.043	124.124	99.624	100.303	99.707	99.375	88.423	84.648
TOTAL ASSETS (HISTORICAL)	850.481	795.102	730.500	714.266	630.674	592.301	582.744	566.413	538.787	519.753
TOTAL ASSETS (ADJUSTED)	1355.991	1286.571	1250.455	1243.640	1097.807	1030.701	1034.747	1064.010	1055.509	1060.485
ADJUSTED PRICE INDEX	1.594	1.618	1.712	1.741	1.741	1.740	1.776	1.879	1.959	2.040
FULLY ADJUSTED ASSETS	1347.552	1279.955	1239.420	1227.462	1090.521	1026.631	1030.427	1059.447	1051.881	1056.560
FULLY ADJ. PRICE INDEX	1.584	1.610	1.697	1.718	1.729	1.733	1.768	1.870	1.951	2.033
R.O.E. (REPORTED)	2.83	6.85	7.93	14.86	9.52	6.84	4.85	6.74	8.95	9.02
R.O.E. (IMPACTED)	-3.06	-1.14	-1.06	1.02	-1.09	-2.32	-2.61	-2.23	-1.79	-1.84
R.O.E. (FULLY IMPACTED)	-4.00	-1.89	-2.31	-0.82	-2.02	-2.87	-3.19	-2.82	-2.35	-2.32
R.O.A. (REPORTED)	3.56	6.50	7.72	14.48	9.73	6.56	5.56	6.80	8.83	8.99
R.O.A. (IMPACTED)	-0.60	1.17	1.43	4.85	2.14	.43	-0.07	.22	.86	.71
R.O.A. (FULLY IMPACTED)	-1.23	.66	.55	3.60	1.48	.04	-.49	-.21	.44	.34
GROSS MARGIN (REPORTED)	3.47	6.59	7.99	12.62	9.73	7.79	7.10	8.70	10.91	11.43
GROSS MARGIN (IMPACTED)	-0.93	1.92	2.52	7.35	3.72	.89	-0.16	.53	2.08	1.84
GROSS MARGIN (FULL IMPACT)	-1.90	1.08	.96	5.38	2.56	.08	-1.10	-.50	1.07	.88
G.N.P. DEFLATOR	141.290	133.880	127.250	116.410	105.800	100.000	96.020	91.360	86.720	82.570

INDUSTRY 14 HARDWARE

INDUSTRY 14 HARDWARE

05/31/78

	DOLLAR DATA IN MILLIONS OF DOLLARS, RATIO DATA IN PERCENT PER YEAR									
	CURRENT	T-1	T-2	T-3	T-4	T-5	T-6	T-7	T-8	T-9
EARNINGS (HISTORICAL)	8.083	7.256	5.862	6.112	4.953	3.701	2.627	2.602	3.283	3.058
EARNINGS (IMPACTED)	3.894	2.210	-1.188	-1.202	-1.677	-1.755	-2.934	-3.826	-4.589	-6.211
EARNINGS (FULLY ADJUSTED)	1.092	.455	-2.919	-2.879	-2.113	-2.700	-4.009	-4.907	-5.587	-6.943
DEPRECIATION ADJUSTMENT	4.988	5.046	5.850	6.314	5.630	5.456	5.361	6.428	7.872	9.266
FIXED CHARGES	2.381	2.224	2.463	2.584	1.849	1.591	1.802	1.905	1.509	.977
GROSS PLANT (HISTORICAL)	64.701	60.586	56.991	55.284	51.504	48.011	46.939	45.692	42.950	33.647
NET PLANT (HISTORICAL)	33.210	30.522	28.737	28.237	26.126	23.734	23.422	23.684	21.632	16.511
ASSET LIFE (YEARS)	30.000	30.000	30.000	30.000	30.000	30.000	30.000	30.000	30.000	30.000
PHYSICAL ASSET PRICE INDEX	2.178	2.291	2.565	2.811	2.861	2.864	2.984	3.382	4.317	5.361
SALES	170.889	153.609	143.037	142.644	123.439	107.215	97.570	94.244	89.314	74.611
INVENTORIES (HISTORICAL)	32.856	29.952	29.113	31.537	25.404	21.449	20.942	20.628	19.849	19.773
INVENTORIES (ADJUSTED)	33.206	30.256	29.561	32.236	25.707	21.627	21.172	20.870	20.071	15.923
TOTAL ASSETS (HISTORICAL)	115.598	106.124	97.634	97.229	87.366	76.686	74.525	73.665	69.858	55.602
TOTAL ASSETS (ADJUSTED)	155.052	145.821	143.022	149.066	134.726	121.114	121.234	130.322	141.822	127.764
ADJUSTED PRICE INDEX	1.341	1.374	1.465	1.533	1.542	1.579	1.627	1.769	2.030	2.298
FULLY ADJUSTED ASSETS	193.050	144.066	140.291	146.388	133.290	120.170	120.159	129.241	140.824	127.032
FULLY ADJ. PRICE INDEX	1.324	1.358	1.437	1.506	1.526	1.567	1.612	1.754	2.016	2.285
R.O.E. (REPORTED)	14.15	13.94	12.06	14.05	12.95	10.52	8.18	8.16	10.55	10.87
R.O.E. (IMPACTED)	3.22	2.42	-1.20	-1.21	-1.79	-2.21	-3.73	-4.33	-4.46	-6.20
R.O.E. (FULLY IMPACTED)	1.13	.50	-3.18	-3.04	-2.48	-3.40	-5.10	-5.56	-5.43	-6.93
R.O.A. (REPORTED)	15.19	15.35	14.12	14.22	12.96	11.93	9.94	9.97	11.93	13.15
R.O.A. (IMPACTED)	8.13	7.73	5.57	5.06	4.23	3.35	1.53	.71	.33	-1.53
R.O.A. (FULLY IMPACTED)	6.92	6.60	3.73	3.32	3.20	2.29	.64	-.13	-.38	-2.12
GROSS MARGIN (REPORTED)	10.28	10.61	9.64	9.69	9.17	8.53	7.59	7.79	9.33	9.80
GROSS MARGIN (IMPACTED)	7.36	7.32	5.55	5.26	4.61	3.44	1.89	.97	.52	-2.62
GROSS MARGIN (FULL IMPACT)	6.19	6.18	3.64	3.39	3.45	2.56	.79	-.18	-.60	-3.60
G.N.P. DEFLATOR	141.290	133.880	127.250	116.410	105.800	100.000	96.020	91.360	86.720	82.570

INDUSTRY 15 MACHINERY

INDUSTRY 15 MACHINERY

05/31/76

DOLLAR DATA IN MILLIONS OF DOLLARS, RATIO DATA IN PERCENT PER YEAR										
	CURRENT	T-1	T-2	T-3	T-4	T-5	T-6	T-7	T-8	T-9
EARNINGS (HISTORICAL)	45.742	39.774	33.774	27.822	24.665	18.878	15.604	15.317	16.494	14.803
EARNINGS (IMPACTED)	26.074	22.715	18.127	16.073	14.955	11.421	9.388	9.964	11.855	10.616
EARNINGS (FULLY ADJUSTED)	15.796	13.751	4.944	3.601	8.676	7.700	5.243	5.981	8.277	7.576
DEPRECIATION ADJUSTMENT	19.667	17.059	14.948	11.749	9.111	7.457	6.216	5.353	4.640	4.187
FIXED CHARGES	9.602	9.328	10.296	8.440	5.851	4.815	5.263	5.263	3.933	3.095
GROSS PLANT (HISTORICAL)	330.176	304.495	287.294	259.245	225.438	199.564	190.128	176.146	151.110	133.683
NET PLANT (HISTORICAL)	169.945	155.267	148.036	133.820	113.560	101.401	97.784	91.872	77.776	68.268
ASSET LIFE (YEARS)	25.213	24.359	23.943	24.084	23.641	22.600	22.030	23.102	22.594	22.550
PHYSICAL ASSET PRICE INDEX	1.607	1.572	1.529	1.459	1.391	1.362	1.333	1.316	1.296	1.284
SALES	666.502	544.326	503.426	437.910	362.174	296.924	267.034	255.447	243.434	224.174
INVENTORIES (HISTORICAL)	117.946	105.802	106.101	101.910	76.307	61.668	60.023	60.673	54.864	46.759
INVENTORIES (ADJUSTED)	119.216	106.873	108.183	104.288	77.239	62.199	60.711	61.444	55.486	47.197
TOTAL ASSETS (HISTORICAL)	527.949	479.520	439.299	399.348	334.234	283.875	265.379	250.840	222.610	195.303
TOTAL ASSETS (ADJUSTED)	632.427	569.436	519.749	463.116	379.546	321.140	298.585	280.110	246.237	215.163
ADJUSTED PRICE INDEX	1.193	1.188	1.183	1.160	1.136	1.131	1.125	1.117	1.106	1.102
FULLY ADJUSTED ASSETS	622.150	560.472	506.566	450.843	373.268	317.419	294.440	276.127	242.660	212.123
FULLY ADJ. PRICE INDEX	1.178	1.169	1.153	1.128	1.117	1.118	1.110	1.101	1.090	1.086
R.O.E. (REPORTED)	16.44	15.56	14.63	14.02	13.67	12.33	11.14	11.81	13.64	13.64
R.O.E. (IMPACTED)	6.84	6.60	5.95	6.19	6.78	6.02	5.44	6.30	8.24	8.30
R.O.E. (FULLY IMPACTED)	4.14	3.99	1.62	1.39	3.94	4.06	3.04	3.78	5.75	5.92
R.O.A. (REPORTED)	17.87	17.15	16.00	14.96	15.17	14.23	13.42	14.59	17.36	17.29
R.O.A. (IMPACTED)	11.83	11.47	10.69	10.37	10.99	10.27	9.87	11.18	13.85	13.78
R.O.A. (FULLY IMPACTED)	10.38	10.05	8.36	7.87	9.49	9.22	8.60	9.90	12.57	12.54
GROSS MARGIN (REPORTED)	15.56	15.11	13.96	13.59	14.00	13.60	13.34	14.32	15.88	15.06
GROSS MARGIN (IMPACTED)	12.32	11.98	10.99	10.91	11.49	11.09	11.01	12.23	13.97	13.20
GROSS MARGIN (FULL IMPACT)	10.62	10.33	8.37	8.06	9.75	9.84	9.46	10.67	12.50	11.84
G.N.P. DEFLATOR	141.290	133.880	127.250	116.410	105.800	100.000	96.020	91.360	86.720	82.570

INDUSTRY 16-ELECTRIC

INDUSTRY 16 ELECTRIC

05/31/78

	DOLLAR DATA IN MILLIONS OF DOLLARS; RATIO DATA IN PERCENT PER YEAR									
	CURRENT	T-1	T-2	T-3	T-4	T-5	T-6	T-7	T-8	T-9
EARNINGS (HISTORICAL)	28.922	23.775	15.253	16.437	16.187	15.439	11.943	10.709	11.933	10.497
EARNINGS (IMPACTED)	16.638	12.466	4.242	6.014	9.388	6.703	3.246	.792	.326	-2.392
EARNINGS (FULLY ADJUSTED)	8.312	5.661	-5.766	-3.951	3.926	3.106	-6.626	-2.834	-2.924	-4.925
DEPRECIATION ADJUSTMENT	12.284	11.315	11.012	10.423	8.799	8.736	8.696	9.917	11.607	12.889
FIXED CHARGES	7.271	6.572	7.297	7.920	5.474	4.567	4.543	4.561	3.598	2.853
GROSS PLANT (HISTORICAL)	201.133	181.677	163.552	158.088	142.262	129.388	119.588	110.259	105.308	91.972
NET PLANT (HISTORICAL)	104.901	94.491	84.557	84.013	74.958	67.101	62.775	58.372	54.762	47.076
ASSET LIFE (YEARS)	30.000	30.000	30.000	30.000	30.000	30.000	30.000	30.000	30.000	30.000
PHYSICAL ASSET PRICE INDEX	1.779	1.810	1.866	1.864	1.836	1.876	1.970	2.093	2.367	2.738
SALES	574.728	499.396	435.257	437.474	387.087	340.527	299.298	284.216	276.214	242.426
INVENTORIES (HISTORICAL)	106.573	94.562	87.493	91.866	77.613	64.722	60.393	59.617	54.681	46.988
INVENTORIES (ADJUSTED)	107.667	95.495	89.131	93.800	78.516	65.232	61.015	60.286	55.226	47.397
TOTAL ASSETS (HISTORICAL)	427.559	374.375	328.752	321.962	289.313	258.820	235.353	216.664	199.991	170.314
TOTAL ASSETS (ADJUSTED)	517.330	451.841	403.654	396.506	352.900	318.082	296.882	281.129	275.378	252.551
ADJUSTED PRICE INDEX	1.194	1.207	1.228	1.232	1.220	1.229	1.261	1.298	1.377	1.483
FULLY ADJUSTED ASSETS	502.004	445.042	393.647	386.541	347.437	314.484	293.010	277.533	272.129	250.018
FULLY ADJ. PRICE INDEX	1.174	1.189	1.197	1.201	1.201	1.215	1.245	1.281	1.361	1.468
R.O.E. (REPORTED)	15.06	14.32	10.58	11.78	13.97	12.97	11.39	11.08	13.14	13.35
R.O.E. (IMPACTED)	6.08	5.14	1.95	2.83	4.87	3.77	1.96	.49	.20	-1.49
R.O.E. (FULLY IMPACTED)	3.04	2.33	-2.65	-1.86	2.04	1.75	-3.38	-1.77	-1.76	-3.07
R.O.A. (REPORTED)	14.32	13.92	10.96	11.93	13.71	13.16	11.57	11.76	13.85	14.08
R.O.A. (IMPACTED)	9.61	9.05	6.23	7.09	8.77	7.98	6.26	5.55	5.86	4.40
R.O.A. (FULLY IMPACTED)	8.11	7.65	3.83	4.69	7.33	6.92	5.01	4.31	4.73	3.43
GROSS MARGIN (REPORTED)	10.65	10.43	8.28	8.78	10.25	10.01	9.10	8.96	10.03	9.89
GROSS MARGIN (IMPACTED)	8.52	8.17	5.75	6.40	7.98	7.44	6.19	5.47	5.83	4.58
GROSS MARGIN (FULL IMPACT)	7.07	6.81	3.45	4.12	6.56	6.38	4.90	4.20	4.65	3.53
G.N.P. DEFLATOR	141.290	133.880	127.250	116.410	105.800	100.000	96.020	91.360	86.720	82.570

INDUSTRY 17 CARS, TRUCKS, AIRCRA INDUSTRY 17 CARS, TRUCKS, AIRCRA 05/31/78

	DOLLAR DATA IN MILLIONS OF DOLLARS, RATIO DATA IN PERCENT PER YEAR									
	CURRENT	T-1	T-2	T-3	T-4	T-5	T-6	T-7	T-8	T-9
EARNINGS (HISTORICAL)	79.132	65.912	28.222	31.060	54.496	46.634	37.581	19.630	36.265	41.377
EARNINGS (IMPACTED)	47.698	36.506	.279	4.843	31.713	25.785	17.492	-.665	15.366	20.742
EARNINGS (FULLY ADJUSTED)	32.115	23.549	-18.077	-11.967	21.446	18.834	9.285	-6.581	8.736	14.711
DEPRECIATION ADJUSTMENT	31.234	29.406	27.943	26.217	22.779	21.848	20.089	20.295	20.899	20.635
FIXED CHARGES	16.230	16.455	19.606	16.920	10.546	9.196	8.835	8.725	5.981	5.482
GROSS PLANT (HISTORICAL)	626.863	577.876	559.864	530.799	488.816	455.483	444.955	422.769	393.833	367.421
NET PLANT (HISTORICAL)	275.336	249.820	249.506	239.466	217.374	202.583	203.354	199.189	188.922	177.979
ASSET LIFE (YEARS)	30.000	30.000	30.000	30.000	30.000	30.000	30.000	30.000	30.000	30.000
PHYSICAL ASSET PRICE INDEX	1.913	1.917	1.914	1.900	1.825	1.772	1.750	1.789	1.855	1.882
SALES	1915.967	1654.471	1386.200	1316.357	1260.387	1062.988	964.485	840.916	898.881	888.399
INVENTORIES (HISTORICAL)	299.042	273.188	262.573	284.904	235.597	198.970	191.516	190.265	176.990	155.612
INVENTORIES (ADJUSTED)	301.625	275.539	267.205	291.888	238.152	200.514	193.455	192.569	178.742	156.836
TOTAL ASSETS (HISTORICAL)	1021.944	912.909	844.288	824.916	755.153	680.426	662.396	601.692	584.210	543.232
TOTAL ASSETS (ADJUSTED)	1276.019	1144.274	1076.933	1046.517	936.941	838.436	816.710	761.135	747.509	701.509
ADJUSTED PRICE INDEX	1.249	1.253	1.276	1.269	1.241	1.232	1.233	1.265	1.280	1.291
FULLY ADJUSTED ASSETS	1260.236	1131.318	1058.577	1029.707	926.669	831.485	808.503	755.218	740.880	695.478
FULLY ADJ. PRICE INDEX	1.233	1.239	1.254	1.248	1.227	1.222	1.221	1.255	1.268	1.280
R.O.E. (REPORTED)	16.43	15.30	7.20	8.20	14.54	13.50	11.55	6.38	11.83	13.91
R.O.E. (IMPACTED)	6.53	5.53	.05	.81	5.72	5.14	3.66	-.14	3.28	4.56
R.O.E. (FULLY IMPACTED)	4.38	3.57	-2.92	-2.01	3.87	3.75	1.94	-1.42	1.87	3.24
R.O.A. (REPORTED)	16.19	15.39	8.91	8.70	14.64	14.70	12.36	7.27	13.53	16.66
R.O.A. (IMPACTED)	10.54	9.73	4.41	4.37	9.39	9.46	7.58	3.09	7.80	9.98
R.O.A. (FULLY IMPACTED)	9.41	8.69	2.74	2.80	8.39	8.70	6.64	2.33	6.97	9.19
GROSS MARGIN (REPORTED)	8.63	8.49	5.42	5.45	8.77	9.41	8.49	5.20	8.79	10.19
GROSS MARGIN (IMPACTED)	7.00	6.71	3.41	3.46	6.96	7.45	6.41	2.79	6.47	7.86
GROSS MARGIN (FULL IMPACT)	6.18	5.93	2.08	2.18	6.15	6.79	5.55	2.08	5.73	7.18
G.N.P. DEFLATOR	141.290	133.880	127.250	116.410	105.800	100.000	96.020	91.360	86.720	82.570

INDUSTRY 18 INSTRUMENTS

INDUSTRY 18 INSTRUMENTS

05/31/78

DOLLAR DATA IN MILLIONS OF DOLLARS, RATIO DATA IN PERCENT PER YEAR

	CURRENT	T-1	T-2	T-3	T-4	T-5	T-6	T-7	T-8	T-9
EARNINGS (HISTORICAL)	35.525	30.775	26.782	26.282	25.233	21.429	17.585	16.213	16.686	15.389
EARNINGS (IMPACTED)	26.304	22.836	20.997	20.536	20.887	17.382	13.594	11.896	11.484	10.229
EARNINGS (FULLY ADJUSTED)	19.003	16.993	11.182	12.100	15.884	14.091	10.223	8.838	8.779	8.112
DEPRECIATION ADJUSTMENT	9.220	7.939	6.684	5.726	4.346	4.047	3.992	4.317	5.202	5.080
FIXED CHARGES	4.185	3.779	4.344	3.765	2.256	1.650	1.593	1.610	1.257	.902
GROSS PLANT (HISTORICAL)	221.084	201.270	184.594	164.342	140.262	127.116	116.229	104.732	93.120	82.077
NET PLANT (HISTORICAL)	123.026	114.157	106.430	94.716	78.479	70.621	66.047	60.234	53.193	46.293
ASSET LIFE (YEARS)	27.531	27.255	27.651	29.643	28.078	28.518	30.000	30.000	30.000	30.000
PHYSICAL ASSET PRICE INDEX	1.598	1.580	1.565	1.539	1.473	1.481	1.538	1.658	1.886	1.978
SALES	440.143	385.936	345.151	318.530	268.300	233.767	202.941	188.759	179.516	162.385
INVENTORIES (HISTORICAL)	99.272	89.948	83.248	84.599	63.012	51.834	46.838	44.452	41.432	35.471
INVENTORIES (ADJUSTED)	100.511	91.041	85.118	86.852	63.871	52.310	47.359	45.012	41.913	35.819
TOTAL ASSETS (HISTORICAL)	372.901	334.193	302.193	279.503	242.245	213.315	188.379	169.833	156.343	136.203
TOTAL ASSETS (ADJUSTED)	447.727	401.509	364.219	332.761	280.196	247.761	224.486	210.051	203.947	181.813
ADJUSTED PRICE INDEX	1.201	1.201	1.205	1.191	1.157	1.161	1.192	1.237	1.304	1.335
FULLY ADJUSTED ASSETS	440.426	395.666	355.304	324.326	275.193	244.470	221.115	206.993	201.242	179.696
FULLY ADJ. PRICE INDEX	1.181	1.184	1.176	1.160	1.136	1.146	1.174	1.219	1.287	1.319
R.O.E. (REPORTED)	14.70	14.25	13.74	14.96	15.98	14.82	13.98	14.38	15.70	16.54
R.O.E. (IMPACTED)	8.34	8.09	7.88	9.07	10.71	9.74	8.43	7.80	7.49	7.42
R.O.E. (FULLY IMPACTED)	6.03	6.02	4.38	5.34	8.14	7.89	6.34	5.80	5.72	5.88
R.O.A. (REPORTED)	18.52	17.96	17.10	18.23	20.16	19.54	18.65	19.56	22.65	23.89
R.O.A. (IMPACTED)	13.40	13.61	12.42	13.69	15.93	15.22	13.91	13.79	14.85	15.13
R.O.A. (FULLY IMPACTED)	11.96	11.72	10.21	11.43	14.39	14.07	12.59	12.52	13.70	14.13
GROSS MARGIN (REPORTED)	15.69	15.55	14.97	16.00	18.20	17.83	17.32	17.59	19.73	20.04
GROSS MARGIN (IMPACTED)	13.60	13.50	13.04	14.20	16.58	16.10	15.35	15.31	16.83	16.91
GROSS MARGIN (FULL IMPACT)	11.94	11.98	10.45	11.55	14.72	14.69	13.69	13.69	15.32	15.60
G.N.P. DEFLATOR	141.290	133.880	127.250	116.410	105.800	100.000	96.020	91.360	86.720	82.570

INDUSTRY 19 JEWELRY, TOYS

INDUSTRY 19 JEWELRY, TOYS

05/31/78

	DOLLAR DATA IN MILLIONS OF DOLLARS, RATIO DATA IN PERCENT PER YEAR									
	CURRENT	T-1	T-2	T-3	T-4	T-5	T-6	T-7	T-8	T-9
EARNINGS (HISTORICAL)	6.717	6.360	4.479	4.187	5.658	4.632	3.040	3.587	3.224	3.000
EARNINGS (IMPACTED)	2.465	2.054	-0.521	-1.423	.368	-0.723	-2.303	-2.609	-3.872	-6.057
EARNINGS (FULLY ADJUSTED)	.396	.239	-3.452	-4.552	-1.382	-1.847	-3.539	-3.919	-5.023	-7.053
DEPRECIATION ADJUSTMENT	4.252	4.307	5.000	5.610	5.289	5.355	5.343	6.196	7.096	9.057
FIXED CHARGES	3.042	2.810	3.537	3.862	2.237	1.610	1.609	1.722	1.340	1.237
GROSS PLANT (HISTORICAL)	51.236	46.045	43.803	40.650	35.727	32.024	28.557	27.286	26.167	24.175
NET PLANT (HISTORICAL)	28.612	25.682	24.322	23.550	20.313	17.866	15.638	14.974	14.207	12.564
ASSET LIFE (YEARS)	30.000	30.000	30.000	30.000	30.000	30.000	30.000	30.000	30.000	30.000
PHYSICAL ASSET PRICE INDEX	2.053	2.195	2.447	2.824	2.955	3.223	3.593	4.189	4.872	5.543
SALES	168.415	148.505	131.691	128.241	114.124	102.605	83.429	80.297	74.453	67.808
INVENTORIES (HISTORICAL)	35.067	32.588	29.615	34.150	28.252	23.080	19.442	19.262	18.115	15.026
INVENTORIES (ADJUSTED)	35.472	32.961	30.236	35.062	28.658	23.295	19.673	19.510	18.336	15.176
TOTAL ASSETS (HISTORICAL)	113.438	104.736	97.115	99.920	89.988	76.643	65.872	64.887	59.784	52.554
TOTAL ASSETS (ADJUSTED)	143.976	135.799	133.786	143.776	130.103	116.569	106.659	112.893	115.018	109.781
ADJUSTED PRICE INDEX	1.269	1.297	1.378	1.439	1.446	1.521	1.619	1.740	1.924	2.089
FULLY ADJUSTED ASSETS	141.907	133.985	130.955	140.647	128.353	115.445	105.423	111.584	113.867	108.785
FULLY ADJ. PRICE INDEX	1.251	1.279	1.347	1.408	1.426	1.506	1.600	1.720	1.905	2.070
R.O.E. (REPORTED)	12.06	12.69	9.84	9.91	14.23	12.64	9.62	11.82	11.62	11.98
R.O.E. (IMPACTED)	2.87	2.54	-0.64	-1.67	.46	-0.95	-3.19	-3.34	-4.68	-7.38
R.O.E. (FULLY IMPACTED)	.46	.30	-4.23	-5.34	-1.74	-2.42	-4.90	-5.02	-6.07	-8.59
R.O.A. (REPORTED)	14.52	15.18	13.04	12.28	14.62	14.20	11.64	13.64	13.30	13.62
R.O.A. (IMPACTED)	8.51	8.56	5.76	4.67	6.06	4.75	2.18	2.36	.74	-1.73
R.O.A. (FULLY IMPACTED)	7.17	7.32	3.63	2.53	4.78	3.02	1.03	1.21	.26	-2.67
GROSS MARGIN (REPORTED)	9.78	10.71	9.62	9.57	11.52	10.59	9.19	11.02	10.68	10.55
GROSS MARGIN (IMPACTED)	7.25	7.81	5.82	5.20	6.89	5.38	2.79	3.31	1.15	-2.80
GROSS MARGIN (FULL IMPACT)	6.02	6.59	3.59	2.76	5.36	4.28	1.30	1.68	-0.40	-4.27
G.N.P. DEFULATOR	141.290	133.880	127.250	116.410	105.800	100.000	96.020	91.360	86.720	82.570

INDUSTRY 20 RAILS

INDUSTRY 20 RAILS

05/31/78

	DOLLAR DATA IN MILLIONS OF DOLLARS, RATIO DATA IN PERCENT PER YEAR									
	CURRENT	T-1	T-2	T-3	T-4	T-5	T-6	T-7	T-8	T-9
EARNINGS (HISTORICAL)	84.221	73.811	56.959	67.557	50.212	47.032	37.694	28.933	34.729	31.886
EARNINGS (IMPACTED)	32.283	30.190	19.279	39.781	29.261	30.048	24.355	18.429	26.934	26.298
EARNINGS (FULLY ADJUSTED)	15.816	16.404	-2.576	17.640	17.972	23.726	16.389	10.839	20.424	20.832
DEPRECIATION ADJUSTMENT	51.938	43.621	37.681	27.776	20.951	16.984	13.339	10.505	7.795	5.588
FIXED CHARGES	51.680	48.524	44.416	37.757	30.659	29.007	27.685	25.038	21.514	19.633
GROSS PLANT (HISTORICAL)	2472.644	2376.502	2262.878	2138.293	1913.563	1737.179	1623.913	1791.591	1678.739	1626.047
NET PLANT (HISTORICAL)	1732.321	1669.916	1604.626	1513.691	1357.204	1236.427	1299.744	1249.677	1206.464	1172.949
ASSET LIFE (YEARS)	18.764	17.812	16.904	16.242	15.649	14.110	13.117	12.131	11.061	10.976
PHYSICAL ASSET PRICE INDEX	1.706	1.643	1.593	1.492	1.407	1.368	1.297	1.246	1.193	1.142
SALES	1370.258	1217.334	1074.771	1026.665	801.148	680.270	620.035	567.239	525.421	479.394
INVENTORIES (HISTORICAL)	107.882	94.933	87.724	71.323	45.090	32.168	34.903	30.449	25.625	23.406
INVENTORIES (ADJUSTED)	108.353	95.319	88.391	71.819	45.237	32.231	35.003	30.536	25.688	23.457
TOTAL ASSETS (HISTORICAL)	2326.494	2207.390	2083.325	1951.691	1717.738	1550.908	1616.801	1537.726	1468.350	1419.204
TOTAL ASSETS (ADJUSTED)	3549.550	3282.109	3035.366	2696.768	2269.797	2006.426	2003.133	1845.611	1700.833	1585.569
ADJUSTED PRICE INDEX	1.526	1.487	1.457	1.382	1.321	1.294	1.239	1.200	1.158	1.117
FULLY ADJUSTED ASSETS	3533.083	3268.322	3013.912	2674.587	2258.509	2000.103	1995.187	1837.421	1694.323	1580.103
FULLY ADJ. PRICE INDEX	1.519	1.481	1.446	1.370	1.315	1.290	1.234	1.195	1.154	1.113
R.O.E. (REPORTED)	8.64	7.98	6.24	7.69	5.77	5.66	4.46	3.48	N/A	N/A
R.O.E. (IMPACTED)	1.47	1.51	1.03	2.45	2.06	2.34	1.98	1.62	N/A	N/A
R.O.E. (FULLY IMPACTED)	.72	.82	-.14	1.09	1.26	1.85	1.33	.95	N/A	N/A
R.O.A. (REPORTED)	7.61	7.02	6.24	7.46	6.44	6.47	5.39	4.76	5.15	4.84
R.O.A. (IMPACTED)	3.52	3.39	3.04	4.37	3.95	4.15	3.69	3.40	3.99	3.98
R.O.A. (FULLY IMPACTED)	3.08	2.98	2.34	3.57	3.47	3.85	3.30	3.00	3.62	3.65
GROSS MARGIN (REPORTED)	12.92	12.72	12.09	14.17	13.82	14.74	14.06	12.90	14.39	14.32
GROSS MARGIN (IMPACTED)	9.13	9.14	8.58	11.47	11.20	12.25	11.91	11.05	12.91	13.15
GROSS MARGIN (FULL IMPACT)	7.93	8.01	6.55	9.31	9.79	11.32	10.63	9.71	11.67	12.01
G.N.P. DEFLATOR	141.290	133.880	127.250	116.410	105.800	100.000	96.020	91.360	86.720	82.570

INDUSTRY-21-TRANSPORTATION

INDUSTRY 21 TRANSPORTATION

05/31/78

	DOLLAR DATA IN MILLIONS OF DOLLARS, RATIO DATA IN PERCENT PER YEAR									
	CURRENT	T-1	T-2	T-3	T-4	T-5	T-6	T-7	T-8	T-9
EARNINGS (HISTORICAL)	17.293	11.436	2.390	8.465	6.475	6.336	3.766	.436	5.201	6.595
EARNINGS (IMPACTED)	-2.087	-5.664	-12.597	-3.212	-2.500	-1.982	-2.531	-4.944	.751	1.950
EARNINGS (FULLY ADJUSTED)	-7.199	-9.915	-19.027	-9.849	-5.866	-2.982	-4.823	-7.062	-1.205	.408
DEPRECIATION ADJUSTMENT	19.380	17.100	14.987	11.677	8.975	7.318	6.299	5.381	4.450	4.645
FIXED CHARGES	10.652	10.078	10.871	10.938	8.579	7.233	7.927	7.707	6.459	5.028
GROSS PLANT (HISTORICAL)	406.108	362.642	356.171	344.222	321.660	294.801	280.954	267.140	244.127	218.462
NET PLANT (HISTORICAL)	238.421	213.896	218.672	217.367	207.514	194.246	187.352	185.101	172.128	156.364
ASSET LIFE (YEARS)	27.326	25.654	24.576	23.916	23.563	22.640	21.731	21.571	22.186	25.806
PHYSICAL ASSET PRICE INDEX	1.714	1.702	1.628	1.511	1.410	1.368	1.331	1.293	1.266	1.326
SALES	466.997	405.201	361.732	350.942	296.826	251.385	227.467	206.759	199.446	178.064
INVENTORIES (HISTORICAL)	17.856	16.390	15.751	17.178	13.843	12.318	11.263	11.747	10.045	9.105
INVENTORIES (ADJUSTED)	17.894	16.425	15.815	17.262	13.881	12.343	11.292	10.777	10.071	9.126
TOTAL ASSETS (HISTORICAL)	382.344	345.793	337.152	331.410	309.549	281.064	267.243	254.663	237.276	212.361
TOTAL ASSETS (ADJUSTED)	552.521	495.935	474.616	442.378	394.566	352.522	329.301	308.922	283.649	263.298
ADJUSTED PRICE INDEX	1.445	1.434	1.408	1.335	1.275	1.254	1.232	1.213	1.193	1.240
FULLY ADJUSTED ASSETS	547.409	491.684	468.185	435.742	391.201	350.522	327.909	306.804	281.093	261.756
FULLY ADJ. PRICE INDEX	1.432	1.422	1.389	1.315	1.264	1.247	1.224	1.205	1.185	1.233
R.O.E. (REPORTED)	13.46	10.10	2.32	8.28	6.88	7.22	4.57	.61	7.17	9.81
R.O.E. (IMPACTED)	-1.70	-2.15	-5.24	-1.51	-1.40	-1.62	-1.75	-3.95	.63	1.65
R.O.E. (FULLY IMPACTED)	-2.41	-3.77	-7.91	-4.62	-3.28	-1.87	-3.34	-5.64	-1.02	.35
R.O.A. (REPORTED)	9.54	8.14	4.79	7.88	6.77	6.37	5.41	3.74	6.41	7.80
R.O.A. (IMPACTED)	3.09	2.23	.24	3.27	3.04	3.01	2.48	1.34	3.81	4.53
R.O.A. (FULLY IMPACTED)	-2.19	-1.38	-1.13	-1.79	-2.21	-2.45	-1.79	.66	-3.14	-3.96
GROSS MARGIN (REPORTED)	7.81	6.95	4.46	7.44	7.07	7.13	6.35	4.60	7.63	9.30
GROSS MARGIN (IMPACTED)	3.66	2.73	.32	4.12	4.14	4.21	3.59	2.66	5.40	6.69
GROSS MARGIN (FULL IMPACT)	2.56	1.68	-1.46	2.23	2.91	3.42	2.58	.98	4.42	5.83
G.N.P. DEFLATOR	141.290	133.880	127.250	116.410	105.830	100.000	96.020	91.360	86.720	82.570

INDUSTRY 22 COMMUNICATION

INDUSTRY 22 COMMUNICATION

05/31/78

	DOLLAR DATA IN MILLIONS OF DOLLARS, RATIO DATA IN PERCENT PER YEAR									
	CURRENT	T-1	T-2	T-3	T-4	T-5	T-6	T-7	T-8	T-9
EARNINGS (HISTORICAL)	232.128	195.169	158.295	155.234	143.957	125.953	112.467	108.590	112.636	104.312
EARNINGS (IMPACTED)	-9.731	-29.482	-69.706	-72.358	-64.982	-77.404	-106.458	-134.278	-168.285	-177.672
EARNINGS (FULLY ADJUSTED)	-30.505	-47.716	-98.515	-101.006	-80.159	-87.140	-116.861	-144.841	-177.859	-185.373
DEPRECIATION ADJUSTMENT	241.859	224.651	227.994	228.191	268.939	203.357	218.925	242.868	280.921	281.983
FIXED CHARGES	140.702	137.876	137.798	126.586	104.990	89.063	75.849	63.402	46.684	38.004
GROSS PLANT (HISTORICAL)	5485.662	5075.369	4728.890	4375.270	3964.556	3559.378	3215.877	2862.771	2699.718	2411.934
NET PLANT (HISTORICAL)	4344.959	4019.213	3747.755	3464.302	3113.496	2781.672	2500.622	2224.996	2058.401	1869.426
ASSET LIFE (YEARS)	30.000	30.000	30.000	30.000	30.000	30.000	30.000	30.000	30.000	30.000
PHYSICAL ASSET PRICE INDEX	1.872	1.905	2.010	2.124	2.138	2.236	2.472	2.812	3.218	3.437
SALES	2199.271	1965.602	1733.528	1584.626	1413.584	1224.258	1086.510	1004.576	964.551	859.217
INVENTORIES (HISTORICAL)	109.949	100.532	93.586	98.049	83.921	66.075	61.078	58.911	52.794	46.095
INVENTORIES (ADJUSTED)	110.153	101.800	94.556	98.657	84.210	66.223	61.251	59.096	52.939	46.206
TOTAL ASSETS (HISTORICAL)	5073.889	4692.683	4360.856	4040.542	3644.486	3267.065	2942.834	2640.718	2432.767	2206.275
TOTAL ASSETS (ADJUSTED)	8864.026	8330.135	8147.222	7936.041	7187.541	6704.725	6623.104	6672.657	6999.163	6762.506
ADJUSTED PRICE INDEX	1.747	1.775	1.868	1.964	1.972	2.052	2.251	2.527	2.877	3.065
FULLY ADJUSTED ASSETS	8843.252	8311.902	8118.406	7907.994	7172.363	6694.989	6612.702	6662.094	6989.589	6754.805
FULLY ADJ. PRICE INDEX	1.743	1.771	1.862	1.957	1.968	2.049	2.247	2.523	2.873	3.062
R.O.E. (REPORTED)	12.00	11.18	9.80	10.26	10.05	9.35	8.88	9.10	9.41	9.11
R.O.E. (IMPACTED)	-1.17	-5.55	-1.29	-1.35	-1.31	-1.62	-2.15	-2.57	-2.92	-3.12
R.O.E. (FULLY IMPACTED)	-5.53	-8.89	-1.82	-1.87	-1.61	-1.82	-2.36	-2.77	-3.09	-3.25
R.O.A. (REPORTED)	11.35	10.99	10.22	10.61	10.37	9.87	9.39	9.83	11.06	11.36
R.O.A. (IMPACTED)	3.77	3.49	2.67	2.53	2.35	1.78	.87	.25	-.17	-.46
R.O.A. (FULLY IMPACTED)	3.54	3.28	2.33	2.18	2.14	1.64	.71	.09	-.31	-.58
GROSS MARGIN (REPORTED)	26.19	26.23	25.71	27.06	26.73	26.35	25.43	25.83	27.90	29.17
GROSS MARGIN (IMPACTED)	15.19	14.81	12.55	12.66	11.95	9.74	5.28	1.65	-1.23	-3.65
GROSS MARGIN (FULL IMPACT)	14.25	13.88	10.89	11.89	11.87	8.94	4.33	.60	-2.22	-4.54
G.N.P. DEFLATOR	141.290	133.880	127.250	116.410	105.800	100.000	96.020	91.360	86.720	82.570

INDUSTRY-23-UTILITIES

INDUSTRY 23 UTILITIES

5/31/78

	DOLLAR DATA IN MILLIONS OF DOLLARS, RATIO DATA IN PERCENT PER YEAR									
	CURRENT	T-1	T-2	T-3	T-4	T-5	T-6	T-7	T-8	T-9
EARNINGS (HISTORICAL)	49.983	43.948	37.903	32.536	31.507	28.988	25.654	23.673	22.413	21.088
EARNINGS (IMPACTED)	25.046	22.298	19.046	18.300	21.065	20.354	18.089	17.162	17.017	16.476
EARNINGS (FULLY ADJUSTED)	16.638	14.331	8.355	8.321	16.067	17.780	15.159	14.207	14.458	14.018
DEPRECIATION ADJUSTMENT	24.936	21.650	18.857	14.237	10.442	8.634	7.566	6.511	5.396	4.612
FIXED CHARGES	44.250	40.501	37.792	34.279	27.244	23.204	20.519	18.031	14.820	12.202
GROSS PLANT (HISTORICAL)	1518.703	1375.656	1253.082	1155.305	1056.473	951.743	865.609	792.332	719.340	660.320
NET PLANT (HISTORICAL)	1171.463	1063.436	970.965	898.171	822.956	738.267	667.550	608.114	550.170	503.586
ASSET LIFE (YEARS)	25.304	24.709	24.306	23.612	23.556	23.139	22.746	23.030	22.703	22.832
PHYSICAL ASSET PRICE INDEX	1.618	1.596	1.575	1.488	1.398	1.370	1.355	1.331	1.299	1.276
SALES	598.753	495.274	425.454	352.349	281.759	252.304	224.682	201.925	183.207	168.521
INVENTORIES (HISTORICAL)	70.375	51.314	50.245	40.800	30.563	24.217	23.161	22.552	19.804	18.333
INVENTORIES (ADJUSTED)	70.833	51.591	50.798	41.273	30.755	24.313	23.283	22.687	19.912	18.423
TOTAL ASSETS (HISTORICAL)	1396.491	1257.786	1139.164	1042.746	927.834	825.791	742.833	673.926	608.415	556.535
TOTAL ASSETS (ADJUSTED)	2121.162	1891.754	1697.651	1481.129	1255.578	1099.056	980.111	875.178	773.004	695.507
ADJUSTED PRICE INDEX	1.519	1.504	1.490	1.420	1.353	1.331	1.319	1.299	1.271	1.250
FULLY ADJUSTED ASSETS	2112.154	1883.788	1686.960	1471.150	1250.580	1096.482	977.182	872.223	770.445	693.050
FULLY ADJ. PRICE INDEX	1.512	1.498	1.481	1.411	1.348	1.328	1.315	1.294	1.266	1.245
R.O.E. (REPORTED)	11.28	11.12	10.70	10.20	10.58	11.12	10.90	11.05	11.29	11.41
R.O.E. (IMPACTED)	2.15	2.17	2.09	2.42	3.37	3.81	3.83	4.13	4.69	5.09
R.O.E. (FULLY IMPACTED)	1.37	1.39	.92	1.16	2.57	3.33	3.21	3.42	3.98	4.33
R.O.A. (REPORTED)	9.70	9.52	9.14	8.42	8.40	8.41	8.22	8.22	8.67	8.81
R.O.A. (IMPACTED)	5.21	5.18	5.02	4.97	5.38	5.53	5.46	5.59	6.12	6.39
R.O.A. (FULLY IMPACTED)	4.81	4.78	4.42	4.33	5.00	5.31	5.18	5.27	5.81	6.05
GROSS MARGIN (REPORTED)	22.63	24.17	24.46	24.93	27.67	27.51	27.19	27.44	28.78	29.09
GROSS MARGIN (IMPACTED)	18.47	19.80	20.03	20.89	23.96	24.09	23.82	24.21	25.84	26.35
GROSS MARGIN (FULL IMPACT)	16.96	18.19	17.52	18.06	22.19	23.07	22.52	22.75	24.44	24.89
G.N.P. DEFLATOR	141.290	133.880	127.250	116.416	105.802	100.000	96.020	91.360	86.720	82.570

INDUSTRY 24 WHOLESALE

INDUSTRY 24 WHOLESALE

05/31/78

	DOLLAR DATA IN MILLIONS OF DOLLARS, RATIO DATA IN PERCENT PER YEAR									
	CURRENT	T-1	T-2	T-3	T-4	T-5	T-6	T-7	T-8	T-9
EARNINGS (HISTORICAL)	10.049	8.994	7.567	7.159	5.976	4.662	3.955	3.747	3.833	3.851
EARNINGS (IMPACTED)	6.969	6.293	5.221	5.062	4.193	3.114	2.463	2.237	2.304	1.784
EARNINGS (FULLY ADJUSTED)	3.729	3.700	1.295	.755	1.920	1.689	.880	.713	.918	.682
DEPRECIATION ADJUSTMENT	3.179	2.741	2.346	2.498	1.783	1.548	1.492	1.510	1.529	2.067
FIXED CHARGES	3.275	2.885	3.272	3.187	2.152	1.657	1.732	1.769	1.480	1.378
GROSS PLANT (HISTORICAL)	64.840	58.184	55.890	52.902	47.174	43.736	43.733	41.488	38.917	37.190
NET PLANT (HISTORICAL)	39.163	34.940	33.819	31.685	27.608	25.500	25.137	24.298	22.445	21.478
ASSET LIFE (YEARS)	29.844	29.212	29.559	30.000	30.000	30.000	30.000	30.000	30.000	30.000
PHYSICAL ASSET PRICE INDEX	1.749	1.740	1.692	1.651	1.624	1.565	1.546	1.594	1.646	1.945
SALES	472.844	418.703	378.028	363.596	282.384	236.699	227.390	214.433	198.041	184.313
INVENTORIES (HISTORICAL)	63.928	58.771	51.904	52.358	41.047	34.531	35.104	32.727	29.629	26.975
INVENTORIES (ADJUSTED)	64.406	59.201	52.568	53.115	41.393	34.710	35.380	32.995	29.848	27.152
TOTAL ASSETS (HISTORICAL)	176.102	152.942	136.739	135.366	115.551	101.559	98.887	93.156	85.402	77.682
TOTAL ASSETS (ADJUSTED)	205.921	179.237	165.795	156.733	133.126	116.173	112.879	107.848	100.120	98.154
ADJUSTED PRICE INDEX	1.169	1.172	1.176	1.158	1.152	1.144	1.141	1.158	1.172	1.264
FULLY ADJUSTED ASSETS	202.681	176.644	156.869	152.431	130.853	114.746	111.297	106.325	98.734	97.052
FULLY ADJ. PRICE INDEX	1.151	1.155	1.147	1.126	1.132	1.130	1.125	1.141	1.156	1.249
R.O.E. (REPORTED)	14.60	15.09	13.95	14.39	13.44	11.50	9.78	9.94	10.90	11.96
R.O.E. (IMPACTED)	7.10	7.36	6.73	7.19	6.79	5.67	4.55	4.29	4.64	3.40
R.O.E. (FULLY IMPACTED)	3.80	4.33	1.67	1.07	3.11	3.07	1.63	1.37	1.85	1.30
R.O.A. (REPORTED)	12.68	13.34	13.04	12.93	11.95	10.48	9.76	10.19	10.93	11.56
R.O.A. (IMPACTED)	9.37	9.90	9.67	9.87	9.06	7.85	7.25	7.42	7.81	7.05
R.O.A. (FULLY IMPACTED)	7.92	8.57	7.40	7.31	7.47	6.70	5.93	6.09	6.52	6.08
GROSS MARGIN (REPORTED)	4.72	4.87	4.72	4.81	4.89	4.50	4.25	4.43	4.71	4.87
GROSS MARGIN (IMPACTED)	4.07	4.23	4.10	4.24	4.26	3.84	3.59	3.72	3.96	3.75
GROSS MARGIN (FULL IMPACT)	3.39	3.61	3.06	3.05	3.45	3.24	2.89	3.01	3.24	3.15
G.N.P. DEFLATOR	141.290	133.880	127.250	116.410	115.800	100.000	96.020	91.360	86.720	82.570

INDUSTRY 25 RETAIL

INDUSTRY 25 RETAIL

05/31/78

DOLLAR DATA IN MILLIONS OF DOLLARS, RATIO DATA IN PERCENT PER YEAR										
	CURRENT	T-1	T-2	T-3	T-4	T-5	T-6	T-7	T-8	T-9
EARNINGS (HISTORICAL)	20.344	17.029	13.020	12.283	13.114	12.119	11.250	10.227	9.993	10.273
EARNINGS (IMPACTED)	11.661	8.999	4.952	4.616	6.439	5.763	4.882	2.703	2.266	2.074
EARNINGS (FULLY ADJUSTED)	6.695	4.999	-1.787	-1.896	2.920	3.344	2.078	-0.204	-0.305	-0.218
DEPRECIATION ADJUSTMENT	8.683	8.029	8.168	7.667	6.675	6.357	6.368	7.523	7.728	8.200
FIXED CHARGES	8.336	7.041	7.609	8.026	5.876	4.175	4.187	4.334	3.418	2.779
GROSS PLANT (HISTORICAL)	187.036	162.316	149.646	138.249	124.868	113.236	105.772	99.817	87.840	85.919
NET PLANT (HISTORICAL)	124.410	107.869	99.231	92.775	83.490	75.122	69.435	65.121	56.873	54.883
ASSET LIFE (YEARS)	30.000	30.000	30.000	30.000	30.000	30.000	30.000	30.000	30.000	30.000
PHYSICAL ASSET PRICE INDEX	1.782	1.836	1.906	1.969	1.955	2.003	2.083	2.351	2.528	2.563
SALES	839.219	753.438	693.809	625.048	553.304	493.516	461.970	440.944	401.552	404.906
INVENTORIES (HISTORICAL)	110.039	96.804	87.470	84.606	77.312	67.115	60.280	56.569	50.542	49.643
INVENTORIES (ADJUSTED)	111.837	97.452	88.497	85.755	77.938	67.493	60.681	56.958	50.862	49.917
TOTAL ASSETS (HISTORICAL)	355.223	311.945	288.133	270.600	247.429	221.907	204.554	194.895	172.768	169.627
TOTAL ASSETS (ADJUSTED)	453.279	402.723	379.085	361.608	327.827	297.628	288.145	283.272	260.008	255.706
ADJUSTED PRICE INDEX	1.276	1.291	1.316	1.336	1.325	1.341	1.370	1.453	1.505	1.507
FULLY ADJUSTED ASSETS	448.513	398.723	372.346	355.096	324.308	295.210	277.340	280.365	257.437	253.414
FULLY ADJ. PRICE INDEX	1.263	1.278	1.292	1.312	1.311	1.330	1.356	1.439	1.490	1.494
R.O.E. (REPORTED)	12.80	11.83	9.97	9.97	11.34	11.46	11.46	11.19	11.99	12.13
R.O.E. (IMPACTED)	4.55	3.85	2.25	2.17	3.30	3.18	2.82	1.51	1.33	1.22
R.O.E. (FULLY IMPACTED)	2.69	2.14	-0.81	-0.89	1.49	1.85	1.20	-0.11	-0.18	-0.13
R.O.A. (REPORTED)	12.81	12.46	11.68	11.50	12.12	11.78	12.37	12.30	13.45	13.43
R.O.A. (IMPACTED)	8.14	7.67	6.77	6.51	7.12	6.66	6.77	5.82	5.97	5.71
R.O.A. (FULLY IMPACTED)	7.16	6.74	5.07	4.79	6.12	5.89	5.83	4.84	5.03	4.86
GROSS MARGIN (REPORTED)	5.42	5.16	4.85	4.98	5.42	5.30	5.48	5.44	5.79	5.63
GROSS MARGIN (IMPACTED)	4.39	4.09	3.69	3.75	4.21	4.01	4.10	3.73	3.86	3.60
GROSS MARGIN (FULL IMPACT)	3.82	3.56	2.72	2.71	3.58	3.52	3.49	3.07	3.22	3.04
G.N.P. DEFLATOR	141.290	133.880	127.250	116.410	105.800	100.000	96.020	91.360	86.720	82.570

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VBIL49* //// END OF LIST ////

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APPENDIX C
CORPORATIONS INCLUDED IN SAMPLE

The following is a list of the 1600 corporations included in this study.

06/30/78 JUNNAME 3 SETS, VSNS ARE A42681/Q42270 A42532/Q42251 A42621/Q41765

0 NAMES READ FROM LAST MONTHS INDEX.

AGR	AMERICAN AGRONOMICS	AGRICULTURE	PRODUCTION-CROPS
AGP	AMERICAN GARDEN PRODUCTS	AGRICULTURE	PRODUCTION-CROPS
BRW	BREWER (C.) + CO	AGRICULTURE	PRODUCTION-CROPS
NHL	NEWHALL LAND + FARMING	AGRICULTURE	PRODUCTION-CROPS
NOR	NORIN CORP	AGRICULTURE	PRODUCTION-CROPS
SAN	SAN CARLOS MILLING	AGRICULTURE	PRODUCTION-CROPS
	* 912673 100 USUG D U S SUGAR CORP		*** MISSING ITEM(15)
AZL	AZL RESOURCES INC	AGRICULTURE	PRODUC-LIVESTOCK
TRC	TEJON RANCH CO	AGRICULTURE	PRODUC-LIVESTOCK
AMX	AMAX INC	METAL MINING	
AR	ASARCO INC	METAL MINING	
AZ	ATLAS CORP	METAL MINING	
BW	BRUSH WELLMAN INC	METAL MINING	
CCH	CAMPBELL CHIBOGAMAU MINES-A	METAL MINING	
CLF	CLEVELAND-CLIFFS IRON CO	METAL MINING	
CYM	CYPRUS MINES CORP	METAL MINING	
DRH	DRIVER HARRIS CO	METAL MINING	
FDR	FEDERAL RESOURCES	METAL MINING	
FTE	FOOTE MINERAL CO	METAL MINING	
HNM	HANNA MINING CO	METAL MINING	
HL	HECLA MINING CO	METAL MINING	
N	INCO LTD	METAL MINING	
NZ	NEW MEXICO + ARIZONA LAND	METAL MINING	
PTC	PACIFIC TIN CONS CORP	METAL MINING	
ROS	ROSARIO RESOURCES CORP	METAL MINING	
SHM	STANDARD METALS	METAL MINING	
TG	TEXASGULF INC	METAL MINING	
UNC	UNITED NUCLEAR CORP	METAL MINING	
CMN	CALLAHAN MINING CORP	COPPER ORES	
MMU	MARINDUQUE MINING-CL B	COPPER ORES	
NEM	NEWMONT MINING CORP	COPPER ORES	
PD	PHELPS DODGE CORP	COPPER ORES	
PLC	PLACER DEVELOPMENT LTD	COPPER ORES	
RAN	RANCHERS EXPLORATION + DEVEL	COPPER ORES	
ROM	RIO ALGOM LTD	COPPER ORES	
CLT	COMINCO LTD	LEAD + ZINC ORES	
GRE	GULF RESOURCES + CHEMICAL	LEAD + ZINC ORES	
HO A	HUDSON BAY MINING + SMELT-A	LEAD + ZINC ORES	
NGX	NORTHGATE EXPLORATION LTD	LEAD + ZINC ORES	
UPK	UNITED PARK CITY MINES	LEAD + ZINC ORES	
ASA	ASA LTD	GOLD ORES	
BE	BENQUET CONS INC-CL B	GOLD ORES	
CRK	CAMPBELL RED LAKE MINES	GOLD ORES	
DHI	DAY MINES INC	GOLD ORES	
DM	DOME MINES LTD	GOLD ORES	
GYK	GIANT YELLOWKNIFE MINES	GOLD ORES	
HOL	HOLLINGER MINES LTD-CL A	GOLD ORES	
HM	HOMESTAKE MINING	GOLD ORES	
LKK	LAKE SHORE MINES LTD	GOLD ORES	
PO	PATO CONS GOLD DREDGING INC	GOLD ORES	
PRS	PRESTON MINES LTD	GOLD ORES	
WRT	WRIGHT HARGREAVES MINES LTD	GOLD ORES	
BBO	BARBER OIL CORP	BITUMINOUS COAL + LIGNITE	MN
BAT	BATES MFG CO INC	BITUMINOUS COAL + LIGNITE	MN
RLB	BURNS (R.L.) CORP	BITUMINOUS COAL + LIGNITE	MN
EFU	EASTERN GAS + FUEL ASSOC	BITUMINOUS COAL + LIGNITE	MN
GEX	GENERAL EXPLORATION	BITUMINOUS COAL + LIGNITE	MN
GV	GOLDFIELD CORP	BITUMINOUS COAL + LIGNITE	MN
KAB	KANEB SERVICES INC	BITUMINOUS COAL + LIGNITE	MN
MP	MCINTYRE MINES LTD	BITUMINOUS COAL + LIGNITE	MN
NC	NORTH AMERICAN COAL	BITUMINOUS COAL + LIGNITE	MN
PCO	PITTSTON CO	BITUMINOUS COAL + LIGNITE	MN
SJO	ST JOE MINERALS CORP	BITUMINOUS COAL + LIGNITE	MN
WMOR	WESTMORELAND COAL CO	BITUMINOUS COAL + LIGNITE	MN
AOI	ADOBE OIL + GAS CORP	CRUDE PETROLEUM + NATURAL	GS
API	AMERICAN PETROFINA-CL A	CRUDE PETROLEUM + NATURAL	GS
APA	APACHE CORP	CRUDE PETROLEUM + NATURAL	GS
AQC	AQUITAINE CO CANADA LTD	CRUDE PETROLEUM + NATURAL	GS
BRN	BARNWELL INDUSTRIES	CRUDE PETROLEUM + NATURAL	GS
BFO	BARUCH-FOSTER CORP	CRUDE PETROLEUM + NATURAL	GS
BGO	BUTTES GAS + OIL CO	CRUDE PETROLEUM + NATURAL	GS
CHK	C + K PETROLEUM INC	CRUDE PETROLEUM + NATURAL	GS
CHO	CANADIAN HOMESTEAD OIL	CRUDE PETROLEUM + NATURAL	GS
CMJ	CANADIAN MERRILL LTD	CRUDE PETROLEUM + NATURAL	GS
CDS	CANADIAN SUPERIOR OIL	CRUDE PETROLEUM + NATURAL	GS
CGS	CONSOLIDATED OIL + GAS	CRUDE PETROLEUM + NATURAL	GS
CRE	CRESTMONT OIL + GAS CO	CRUDE PETROLEUM + NATURAL	GS

DAM	DAMSON OIL	CRUDE PETROLEUM + NATURAL	GS
DLH	DELHI INTL OIL CORP	CRUDE PETROLEUM + NATURAL	GS
DHP	DOHE PETROLEUM LTD	CRUDE PETROLEUM + NATURAL	GS
FEL	FELMONT OIL CO	CRUDE PETROLEUM + NATURAL	GS
GAO	GEN AMER OIL CO OF TEXAS	CRUDE PETROLEUM + NATURAL	GS
GET	GETTY OIL CO	CRUDE PETROLEUM + NATURAL	GS
GGR	GREAT BASINS PETROLEUM	CRUDE PETROLEUM + NATURAL	GS
HG A	HOME OIL CO-CL A	CRUDE PETROLEUM + NATURAL	GS
HOI	HOUSTON OIL + MINERALS CORP	CRUDE PETROLEUM + NATURAL	GS
HBO	HUDSON'S BAY OIL + GAS CO	CRUDE PETROLEUM + NATURAL	GS
INX	INEXCO OIL	CRUDE PETROLEUM + NATURAL	GS
JUN	JUNIPER PETROLEUM	CRUDE PETROLEUM + NATURAL	GS
LLX	LOUISIANA LAND + EXPLORATION	CRUDE PETROLEUM + NATURAL	GS
MCO	MCCULLOCH OIL	CRUDE PETROLEUM + NATURAL	GS
MSA	MESA PETROLEUM	CRUDE PETROLEUM + NATURAL	GS
MND	MITCHELL ENERGY + DEV	CRUDE PETROLEUM + NATURAL	GS
NOM	NATOMAS CO	CRUDE PETROLEUM + NATURAL	GS
NCD	NORTH CANADIAN OILS LTD	CRUDE PETROLEUM + NATURAL	GS
NMC	NUMAC OIL + GAS	CRUDE PETROLEUM + NATURAL	GS
OXY	OCCIDENTAL PETROLEUM CORP	CRUDE PETROLEUM + NATURAL	GS
PPC	PATRICK PETROLEUM CO	CRUDE PETROLEUM + NATURAL	GS
PTL	PETRO-LEWIS CORP	CRUDE PETROLEUM + NATURAL	GS
POY	PRAIRIE OIL ROYALTIES CO LTD	CRUDE PETROLEUM + NATURAL	GS
RGO	RANGER OIL (CANADA) LTD	CRUDE PETROLEUM + NATURAL	GS
RVO	RESERVE OIL + GAS	CRUDE PETROLEUM + NATURAL	GS
SRB	SCURRY-RAINBOW OIL LTD	CRUDE PETROLEUM + NATURAL	GS
SHN	SHENANDOAH OIL CORP	CRUDE PETROLEUM + NATURAL	GS
SDN	SUNDANCE OIL	CRUDE PETROLEUM + NATURAL	GS
SOC	SUPERIOR OIL CO	CRUDE PETROLEUM + NATURAL	GS
UVR	UNIVERSAL RESOURCES	CRUDE PETROLEUM + NATURAL	GS
WRO	WICHITA INDUSTRIES	CRUDE PETROLEUM + NATURAL	GS
WOG	WOODS PETROLEUM CORP	CRUDE PETROLEUM + NATURAL	GS
AGO	ANGLO CO LTD	DRILLING OIL + GAS	WELLS
CID	CHIEFTAIN DEVELOPMENT CO LTD	DRILLING OIL + GAS	WELLS
GLM	GLOBAL MARINE INC	DRILLING OIL + GAS	WELLS
HP	HELMERICH + PAYNE	DRILLING OIL + GAS	WELLS
PKD	PARKER DRILLING CO	DRILLING OIL + GAS	WELLS
RB	READING + BATES OFFSHORE DRL	DRILLING OIL + GAS	WELLS
ROC	ROWAN COS INC	DRILLING OIL + GAS	WELLS
SCP	SCOPE INDUSTRIES INC	DRILLING OIL + GAS	WELLS
SED	SEDCO INC	DRILLING OIL + GAS	WELLS
MOL	MAINOCO OIL CORP	DRILLING OIL + GAS	WELLS
WSN	WESTERN CO OF NORTH AMERICA	DRILLING OIL + GAS	WELLS
NP	NEWPARK RESOURCES	OIL-GAS FIELD EXPLORATION	
SAB	SABINE CORP	OIL-GAS FIELD EXPLORATION	
ARL	ARUNDEL CORP	MISC NONMETALLIC MINERALS	
FRX	FLORIDA ROCK INDS	MISC NONMETALLIC MINERALS	
FT	FREEPORT MINERALS CO	MISC NONMETALLIC MINERALS	
PBC	PEBBLE BEACH CORP	MISC NONMETALLIC MINERALS	
CTX	CENTEX CORP	GENERAL BUILDING CONTRACTORS	
ELK	ELCOR CORP	GENERAL BUILDING CONTRACTORS	
ENW	ELGIN NATIONAL INDUSTRIES	GENERAL BUILDING CONTRACTORS	
GSD	GULFSTREAM LAND + DEVELOPMNT	GENERAL BUILDING CONTRACTORS	
JTR	JETERO CORP	GENERAL BUILDING CONTRACTORS	
HKE	HCKEE CORP	GENERAL BUILDING CONTRACTORS	
HRN	MORRISON-KNUDSEN	GENERAL BUILDING CONTRACTORS	
SPF	STANDARD-PACIFIC CORP	GENERAL BUILDING CONTRACTORS	
SHO	STARRETT HOUSING CORP	GENERAL BUILDING CONTRACTORS	
TO	TECHNICAL OPERATIONS INC	GENERAL BUILDING CONTRACTORS	
TUR	TURNER CONSTRUCTION CO	GENERAL BUILDING CONTRACTORS	
ZOS	ZAPATA CORP	GENERAL BUILDING CONTRACTORS	
GBO	GENERAL BUILDERS CORP	OPERATIVE BUILDERS	
HKN	HCKEON CONSTRUCTION	OPERATIVE BUILDERS	
RYN	RYAN HOMES INC	OPERATIVE BUILDERS	
UH	U S HOME CORP	OPERATIVE BUILDERS	
MHI	WASHINGTON HOMES INC	OPERATIVE BUILDERS	
APC	ALPHA PORTLAND INDS	CONSTRUCTION-NOT BLDG CONSTR	
BAN	BANISTER CONT LTD	CONSTRUCTION-NOT BLDG CONSTR	
BLT	BLOUNT INC	CONSTRUCTION-NOT BLDG CONSTR	
* 105647 1600 BRU D BRAUN (C.F.) + CO		*** MISSING ITEM(15)	
DHM	DILLINGHAM CORP	CONSTRUCTION-NOT BLDG CONSTR	
DRV	DRAVO CORP	CONSTRUCTION-NOT BLDG CONSTR	
FLR	FLUOR CORP	CONSTRUCTION-NOT BLDG CONSTR	
GL	GREAT LAKES DREDGE + DOCK CO	CONSTRUCTION-NOT BLDG CONSTR	
HAL	HALLIBURTON CO	CONSTRUCTION-NOT BLDG CONSTR	
HDE	MCDERMOTT (J. RAY) + CO	CONSTRUCTION-NOT BLDG CONSTR	
MYR	MYERS (L.E.) + CO	CONSTRUCTION-NOT BLDG CONSTR	
PCR	PERINI CORP	CONSTRUCTION-NOT BLDG CONSTR	
PU	PULLMAN INC	CONSTRUCTION-NOT BLDG CONSTR	
RII	RAYMOND INTERNATIONAL INC	CONSTRUCTION-NOT BLDG CONSTR	
SAF	SANTA FE INTERNATIONAL	CONSTRUCTION-NOT BLDG CONSTR	
ANT	ANTHONY INDUSTRIES INC	CONSTRUCTION-SPL CONTRACTORS	

ERN	ERNST (E.C.) INC	CONSTRUCTION-SPL CONTRACTORS
FIS	FISCHBACH + MOORE INC	CONSTRUCTION-SPL CONTRACTORS
NBE	NEWBERY ENERGY	CONSTRUCTION-SPL CONTRACTORS
SWC	WALLACE (SAM P.) INC	CONSTRUCTION-SPL CONTRACTORS
CFS	CAPITOL FOOD INDS INC	FOOD + KINDRED PRODUCTS
CFD	CONSOLIDATED FOODS CORP	FOOD + KINDRED PRODUCTS
GF	GENERAL FOODS CORP	FOOD + KINDRED PRODUCTS
GIS	GENERAL MILLS INC	FOOD + KINDRED PRODUCTS
GEB	GERBER PRODUCTS CO	FOOD + KINDRED PRODUCTS
K	KELLOGG CO	FOOD + KINDRED PRODUCTS
NSI	NORTON SIMON INC	FOOD + KINDRED PRODUCTS
PSY	PILLSBURY CO	FOOD + KINDRED PRODUCTS
OAT	QUAKER OATS CO	FOOD + KINDRED PRODUCTS
SB	STANDARD BRANDS INC	FOOD + KINDRED PRODUCTS
UFD	UNITED FOODS INC	FOOD + KINDRED PRODUCTS
UFC	UNIVERSAL FOODS CORP	FOOD + KINDRED PRODUCTS
WD	WARD FOODS INC	FOOD + KINDRED PRODUCTS
BBX	BLUEBIRD INC	MEAT PRODUCTS
BFG	BURING FOOD GROUP INC	MEAT PRODUCTS
CGL	CAGLES INC	MEAT PRODUCTS
ESM	ESMARK INC	MEAT PRODUCTS
FFF	FEDERAL CO	MEAT PRODUCTS
GH	GENERAL HOST CORP	MEAT PRODUCTS
GLV	GLOVER INC	MEAT PRODUCTS
G	GREYHOUND CORP	MEAT PRODUCTS
HCP	HALCO PRODUCTS CORP	MEAT PRODUCTS
HRL	HORMEL (GEO. A.) + CO	MEAT PRODUCTS
IBP	IOWA BEEF PROCESSORS	MEAT PRODUCTS
KML	KANE-MILLER CORP	MEAT PRODUCTS
MXL	MBPX CORP	MEAT PRODUCTS
OMC	MAYER (OSCAR) + CO	MEAT PRODUCTS
MBC	MICKELBERRY CORP	MEAT PRODUCTS
RHP	RATH PACKING CO	MEAT PRODUCTS
SFO	SPENCER FOODS INC	MEAT PRODUCTS
TFI	TFI COS INC	MEAT PRODUCTS
TBN	TOBIN PACKING CO INC	MEAT PRODUCTS
UB	UNITED BRANDS	MEAT PRODUCTS
VMI	VALMAC INDUSTRIES INC	MEAT PRODUCTS
VER	VERIT INDUSTRIES	MEAT PRODUCTS
BRY	BEATRICE FOODS CO	DAIRY PRODUCTS
BN	BORDEN INC	DAIRY PRODUCTS
CMK	CARNATION CO	DAIRY PRODUCTS
DLD	DELLWOOD FOODS	DAIRY PRODUCTS
FMF	FAIRMONT FOODS CO	DAIRY PRODUCTS
KRA	KRAFT INC	DAIRY PRODUCTS
PET	PET INC	DAIRY PRODUCTS
CPB	CAMPBELL SOUP CO	CANNED-PRESERVED FRUITS-VEGS
CKE	CASTLE + COOKE INC	CANNED-PRESERVED FRUITS-VEGS
CBI	CURTICE-BURNS	CANNED-PRESERVED FRUITS-VEGS
DEL	DEL MONTE CORP	CANNED-PRESERVED FRUITS-VEGS
GG	GREEN GIANT CO	CANNED-PRESERVED FRUITS-VEGS
HNZ	HEINZ (H.J.) CO	CANNED-PRESERVED FRUITS-VEGS
OJ	ORANGE CO INC	CANNED-PRESERVED FRUITS-VEGS
SJM	SHUCKER (J.M.) CO	CANNED-PRESERVED FRUITS-VEGS
SBC	STOKELY-VAN CAMP INC	CANNED-PRESERVED FRUITS-VEGS
TOJ	TROPICANA PRODUCTS INC	CANNED-PRESERVED FRUITS-VEGS
CAG	CONAGRA INC	FLOUR + OTHER GRAIN MILL POS
IMC	INTL MULTIFOODS CORP	FLOUR + OTHER GRAIN MILL POS
SAM	SEABOARD ALLIED MILLING	FLOUR + OTHER GRAIN MILL POS
AZE	AMERICAN MAIZE-PRODUCTS-CL A	WET CORN MILLING
CPC	CPC INTL INC	WET CORN MILLING
STA	STALEY (A.E.) MFG CO	WET CORN MILLING
HTZ	HARTZ MOUNTAIN CORP	PREPARED FEEDS FOR ANIMALS
RAL	RALSTON PURINA CO	PREPARED FEEDS FOR ANIMALS
ABA	AMERICAN BAKERIES CO	BAKERY PRODUCTS
CTI	CAMPBELL TAGGART INC	BAKERY PRODUCTS
FLO	FLOWERS INDS	BAKERY PRODUCTS
NAB	NABISCO INC	BAKERY PRODUCTS
TBC	TASTY BAKING CO	BAKERY PRODUCTS
ASR	AMSTAR CORP	CANE SUGAR REFINING
ITC	INGREDIENT TECHNOLOGY CORP	CANE SUGAR REFINING
AGM	AMALGAMATED SUGAR CO	BEET SUGAR
HLV	HOLLY SUGAR CORP	BEET SUGAR
HI	HUNT INTL RESOURCES CORP	BEET SUGAR
MGU	MICHIGAN SUGAR	BEET SUGAR
UIS	U + I INC	BEET SUGAR
BBB	BARTONS CANDY CORP	CANDY + OTHER CONFECTIONERY
FFY	FANNY FARMER CANDY SHOPS INC	CANDY + OTHER CONFECTIONERY
HSY	HERSHEY FOODS CORP	CANDY + OTHER CONFECTIONERY
HAF	HACANDREWS + FORBES	CANDY + OTHER CONFECTIONERY
RUSS	RUSSELL STOVER CANDIES INC	CANDY + OTHER CONFECTIONERY
TR	TOOTSIE-ROLL INDUSTRIES INC	CANDY + OTHER CONFECTIONERY

TCG	TOPPS CHEWING GUM	CANDY + OTHER CONFECTIONERY	
WHY	WRIGLEY (WM.) JR CO	CANDY + OTHER CONFECTIONERY	
AYL	ANDERSON CLAYTON + CO	FATS + OILS	
ADM	ARCHER-DANIELS-MIDLAND CO	FATS + OILS	
ABW	ARMADA CORP	FATS + OILS	
CSY	CENTRAL SOYA CO	FATS + OILS	
CKI	COOK INDS INC	FATS + OILS	
CCR	CORENCO CORP	FATS + OILS	
ILX	INOLEX CORP	FATS + OILS	
ABUD	ANHEUSER-BUSCH INC	MALT BEVERAGES	
CKB	CARLING O'KEEFE LTD	MALT BEVERAGES	
ACCO	COORS (ADOLPH) CO	MALT BEVERAGES	
GHB	HEILEMAN (G.) BREWING INC	MALT BEVERAGES	
IBL	TROQUOIS BRANDS LTD	MALT BEVERAGES	
OLYB	OLYMPIA BREWING	MALT BEVERAGES	
PABT	PABST BREWING CO	MALT BEVERAGES	
PBR	PITTSBURGH BREWING	MALT BEVERAGES	
SFR	SCHAEFER (F.+M.) CORP	MALT BEVERAGES	
SLZ	SCHLITZ (JOSEPH) BREWING	MALT BEVERAGES	
ADC	AMERICAN DISTILLING CO	DISTILLED RECTIF	BLEND BEVRG
BFD	BROWN-FORMAN DISTILLERS-CL B	DISTILLED RECTIF	BLEND BEVRG
GDS	GLENMORE DISTILLERIES CO	DISTILLED RECTIF	BLEND BEVRG
HBL	HEUBLEIN INC	DISTILLED RECTIF	BLEND BEVRG
DR	NATIONAL DISTILLERS +CHEMICAL	DISTILLED RECTIF	BLEND BEVRG
PUL	PUBLICLICKER INDUSTRIES INC	DISTILLED RECTIF	BLEND BEVRG
VO	SEAGRAM CO LTD	DISTILLED RECTIF	BLEND BEVRG
HIR	WALKER(HIRAM) GOODRHM + WORT	DISTILLED RECTIF	BLEND BEVRG
KNY	COCA-COLA BOTTLING CO OF NY	BOTTLED-CANNED SOFT	DRINKS
KO	COCA-COLA CO	BOTTLED-CANNED SOFT	DRINKS
CTT	COTT CORP	BOTTLED-CANNED SOFT	DRINKS
DOC	DR PEPPER CO	BOTTLED-CANNED SOFT	DRINKS
MEI	MEI CORP	BOTTLED-CANNED SOFT	DRINKS
PCI	PEPCOM INDUSTRIES	BOTTLED-CANNED SOFT	DRINKS
PEP	PEPSICO INC	BOTTLED-CANNED SOFT	DRINKS
RCC	ROYAL CROWN COS INC	BOTTLED-CANNED SOFT	DRINKS
WOM	WOMETCO ENTERPRISES INC	BOTTLED-CANNED SOFT	DRINKS
ATN	ACTION CORP	FOOD PREPARATIONS N E C	
CBF	CHB FOODS INC	FOOD PREPARATIONS N E C	
CHF	CHOCK FULL O NUTS CORP	FOOD PREPARATIONS N E C	
STS	STANGE CO	FOOD PREPARATIONS N E C	
AMB	AMERICAN BRANDS INC	CIGARETTES	
BTI	B.A.T. INDUSTRIES LTD-ADR OR	CIGARETTES	
CWD	CONWOOD CORP	CIGARETTES	
IMT	IMPERIAL GROUP LTD-ADR	CIGARETTES	
LGT	LIGGETT GROUP	CIGARETTES	
MO	PHILIP MORRIS INC	CIGARETTES	
RJR	REYNOLDS (R.J.) INDS	CIGARETTES	
UBO	U S TOBACCO CO	CIGARETTES	
BYK	BAYUK CIGARS INC	CIGARS	
CUC	CULBRO CORP	CIGARS	
UCG	UNIVERSAL CIGAR CORP	CIGARS	
ABY	ALBANY INTL CORP	TEXTILE MILL PRODUCTS	
AFT	AMERICAN MFG CO	TEXTILE MILL PRODUCTS	
AVD	AVONDALE MILLS	TEXTILE MILL PRODUCTS	
BHY	BELODING HEMINWAY	TEXTILE MILL PRODUCTS	
BUR	BURLINGTON INDUSTRIES INC	TEXTILE MILL PRODUCTS	
CHD	CHELSEA INDUSTRIES INC	TEXTILE MILL PRODUCTS	
CK	COLLINS + AIKMAN CORP	TEXTILE MILL PRODUCTS	
CIS	CONCORD FABRICS INC	TEXTILE MILL PRODUCTS	
COE	CONE MILLS CORP	TEXTILE MILL PRODUCTS	
COU	COURTAULDS LTD	TEXTILE MILL PRODUCTS	
CRC	CROMPTON CO INC	TEXTILE MILL PRODUCTS	
CRM	CROWN CRAFTS INC	TEXTILE MILL PRODUCTS	
DML	DAN RIVER INC	TEXTILE MILL PRODUCTS	
	* 243631 2200 DII D DECORATOR INDUSTRIES INC		MISSING QUARTERLY
EDM	EDMOS CORP	TEXTILE MILL PRODUCTS	
FIT	FAB INDUSTRIES INC	TEXTILE MILL PRODUCTS	
FAB	FABIEN CORP	TEXTILE MILL PRODUCTS	
FTM	FAIR-TEX MILLS	TEXTILE MILL PRODUCTS	
FLD	FIELDCREST MILLS	TEXTILE MILL PRODUCTS	
FHC	FIRST HARTFORD CORP	TEXTILE MILL PRODUCTS	
GNR	GAYNOR-STAFFORD INDS	TEXTILE MILL PRODUCTS	
GVL	GRANITEVILLE CO	TEXTILE MILL PRODUCTS	
GFD	GUILFORD MILLS INC	TEXTILE MILL PRODUCTS	
HYK	HUYCK CORP	TEXTILE MILL PRODUCTS	
IST	INTL STRETCH PRODS	TEXTILE MILL PRODUCTS	
LEH	LEHIGH VALLEY INDS	TEXTILE MILL PRODUCTS	
LBV	LIBERTY FABRICS OF N Y INC	TEXTILE MILL PRODUCTS	
LST	LOWENSTEIN (M.) + SONS INC	TEXTILE MILL PRODUCTS	
MVW	MOUNT VERNON MILLS INC	TEXTILE MILL PRODUCTS	
NSN	NATIONAL SPINNING CO	TEXTILE MILL PRODUCTS	
OPK	OPELIKA MFG CORP	TEXTILE MILL PRODUCTS	

RVS	REEVES BROTHERS INC	TEXTILE	MILL	PRODUCTS
RTX	RIEDEL TEXTILE CORP	TEXTILE	MILL	PRODUCTS
RML	RUSSELL CORP	TEXTILE	MILL	PRODUCTS
SMI	SPRINGS MILLS INC	TEXTILE	MILL	PRODUCTS
SNC	STANDARD COOSA-THATCHER	TEXTILE	MILL	PRODUCTS
SKT	STEVCOKNIT INC	TEXTILE	MILL	PRODUCTS
STN	STEVENS (J.P.) + CO	TEXTILE	MILL	PRODUCTS
TXF	TEXTI INDUSTRIES	TEXTILE	MILL	PRODUCTS
VRT	VERTIPILE INC	TEXTILE	MILL	PRODUCTS
WPM	WEST POINT-PEPPERELL	TEXTILE	MILL	PRODUCTS
WKW	WORK WEAR CORP INC	TEXTILE	MILL	PRODUCTS
ACK	ARMSTRONG CORK CO	FLOOR COVERING	MILLS	
ETB	BARWICK (E.T.) INDUSTRIES	FLOOR COVERING	MILLS	
BVN	BERVEN CARPETS CORP	FLOOR COVERING	MILLS	
COG	CONGOLEUM CORP	FLOOR COVERING	MILLS	
GXY	GALAXY CARPET MILLS	FLOOR COVERING	MILLS	
MLD	MASLAND (C.H.) + SONS	FLOOR COVERING	MILLS	
ALL	ADAMS-MILLIS CORP	APPAREL + OTHER	FINISHED	PDS
TUX	AFTER SIX INC	APPAREL + OTHER	FINISHED	PDS
AEI	AILEEN INC	APPAREL + OTHER	FINISHED	PDS
AMS	ALBA-WALDENIAN INC	APPAREL + OTHER	FINISHED	PDS
AGL	ANGELICA CORP	APPAREL + OTHER	FINISHED	PDS
BRC	BARCO OF CALIFORNIA	APPAREL + OTHER	FINISHED	PDS
BBL	BLUE BELL INC	APPAREL + OTHER	FINISHED	PDS
BBK	BOBBIE BROOKS INC	APPAREL + OTHER	FINISHED	PDS
BDN	BODIN APPAREL	APPAREL + OTHER	FINISHED	PDS
CLU	CLUETT, PEABODY + CO	APPAREL + OTHER	FINISHED	PDS
DNI	DAMON CREATIONS-CL A	APPAREL + OTHER	FINISHED	PDS
DON	DONNKENNY INC	APPAREL + OTHER	FINISHED	PDS
FFN	FAIRFIELD-NOBLE CORP	APPAREL + OTHER	FINISHED	PDS
FRA	FARAH MFG CO	APPAREL + OTHER	FINISHED	PDS
GAN	GARAN INC	APPAREL + OTHER	FINISHED	PDS
GRK	GARLAND CORP	APPAREL + OTHER	FINISHED	PDS
HAI	HAMPTON INDUSTRIES	APPAREL + OTHER	FINISHED	PDS
HNS	HANES CORP	APPAREL + OTHER	FINISHED	PDS
HSM	HART SCHAFFNER + MARX CO	APPAREL + OTHER	FINISHED	PDS
HRO	HOUSE OF RONNIE	APPAREL + OTHER	FINISHED	PDS
IRV	IRVIN INDUSTRIES INC	APPAREL + OTHER	FINISHED	PDS
JAN	JANTZEN INC	APPAREL + OTHER	FINISHED	PDS
JOL	JONATHAN LOGAN INC	APPAREL + OTHER	FINISHED	PDS
KWO	KELLMOOD CO	APPAREL + OTHER	FINISHED	PDS
KOR	KORACORP INOS	APPAREL + OTHER	FINISHED	PDS
LES	LESLIE FAY INC	APPAREL + OTHER	FINISHED	PDS
LVI	LEVI STRAUSS + CO	APPAREL + OTHER	FINISHED	PDS
LLA	LILLI ANN CORP	APPAREL + OTHER	FINISHED	PDS
LIN	LYNNWEAR CORP-CL A	APPAREL + OTHER	FINISHED	PDS
MHT	MANHATTAN INDUSTRIES INC	APPAREL + OTHER	FINISHED	PDS
MLE	MARLENE INDUSTRIES CORP	APPAREL + OTHER	FINISHED	PDS
MPI	MARTIN PROCESSING INC	APPAREL + OTHER	FINISHED	PDS
MCGD	MCGREGOR-DONIGER INC-CL A	APPAREL + OTHER	FINISHED	PDS
MVS	MOVIE STAR INC	APPAREL + OTHER	FINISHED	PDS
MUN	MUNSINGWEAR INC	APPAREL + OTHER	FINISHED	PDS
NPA	NATIONAL PARAGON	APPAREL + OTHER	FINISHED	PDS
NOL	NOEL INDUSTRIES	APPAREL + OTHER	FINISHED	PDS
OSI	OUTDOOR SPORTS INDUSTRIES	APPAREL + OTHER	FINISHED	PDS
OXM	OXFORD INDUSTRIES INC	APPAREL + OTHER	FINISHED	PDS
PMB	PALM BEACH INC	APPAREL + OTHER	FINISHED	PDS
PVH	PHILLIPS-VAN HEUSEN	APPAREL + OTHER	FINISHED	PDS
POT	PIEDMONT INDUSTRIES	APPAREL + OTHER	FINISHED	PDS
PAE	PIONEER SYSTEMS INC	APPAREL + OTHER	FINISHED	PDS
PFC	PURITAN FASHIONS CORP	APPAREL + OTHER	FINISHED	PDS
RTS	RUSS TOGS INC	APPAREL + OTHER	FINISHED	PDS
SLT	SALANT CORP	APPAREL + OTHER	FINISHED	PDS
AMS	SCHRADER (ABE) CORP	APPAREL + OTHER	FINISHED	PDS
SPN	SPENCER COS INC	APPAREL + OTHER	FINISHED	PDS
SPL	SPLNTEX INC	APPAREL + OTHER	FINISHED	PDS
SRH	STAROUST INC	APPAREL + OTHER	FINISHED	PDS
SUA	SUE ANN INC	APPAREL + OTHER	FINISHED	PDS
SMT	SUMMIT ORGANIZATION INC	APPAREL + OTHER	FINISHED	PDS
SGC	SUPERIOR SURGICAL MFG	APPAREL + OTHER	FINISHED	PDS
USI	U S INDUSTRIES	APPAREL + OTHER	FINISHED	PDS
VFC	V.F. CORP	APPAREL + OTHER	FINISHED	PDS
VII	VENICE INDUSTRIES	APPAREL + OTHER	FINISHED	PDS
WRC	WARNACO INC	APPAREL + OTHER	FINISHED	PDS
WKT	WAYNE-GOSSARD CORP	APPAREL + OTHER	FINISHED	PDS
WLB	WILSON BROTHERS	APPAREL + OTHER	FINISHED	PDS
JWI	WINTER (JACK) INC	APPAREL + OTHER	FINISHED	PDS
HBM	WOLF (HOWARD B) INC	APPAREL + OTHER	FINISHED	PDS
BLA	BARCLAY INDUSTRIES	LUMBER + WOOD	PRODUCTS	
BCC	BOISE CASCADE CORP	LUMBER + WOOD	PRODUCTS	
CHA	CHAMPION INTL CORP	LUMBER + WOOD	PRODUCTS	
EVY	EVANS-PRODUCTS CO	LUMBER + WOOD	PRODUCTS	

GP	GEORGIA-PACIFIC CORP	LUMBER + WOOD PRODUCTS	
LPX	LOUISIANA PACIFIC	LUMBER + WOOD PRODUCTS	
MNC	MASONITE CORP	LUMBER + WOOD PRODUCTS	
MLG	MOULDINGS INC	LUMBER + WOOD PRODUCTS	
PL	PACIFIC LUMBER CO	LUMBER + WOOD PRODUCTS	
PGI	PLY-GEN INDUSTRIES	LUMBER + WOOD PRODUCTS	
POP	POPE + TALBOT INC	LUMBER + WOOD PRODUCTS	
WY	WEYERHAEUSER CO	LUMBER + WOOD PRODUCTS	
CHB	CHAMPION HOME BLDRS CO	WOOD BUILDINGS-MOBILE HOMES	
CCT	COMMODORE CORP	WOOD BUILDINGS-MOBILE HOMES	
CKC	CONCHEMCO INC	WOOD BUILDINGS-MOBILE HOMES	
DRI	DE ROSE INDUSTRIES	WOOD BUILDINGS-MOBILE HOMES	
	* 381328 2450 GWH D GOLDEN WEST HOMES	*** MISSING ITEM(15)	
KIT	KIT MANUFACTURING	WOOD BUILDINGS-MOBILE HOMES	
NHX	NATIONAL HOMES CORP	WOOD BUILDINGS-MOBILE HOMES	
NWD	NATIONWIDE HOMES	WOOD BUILDINGS-MOBILE HOMES	
OMH	OAKWOOD HOMES	WOOD BUILDINGS-MOBILE HOMES	
POL	POLORON PRODUCTS INC	WOOD BUILDINGS-MOBILE HOMES	
RE	REDMAN INDUSTRIES INC	WOOD BUILDINGS-MOBILE HOMES	
SHL	SHELTER RESOURCES	WOOD BUILDINGS-MOBILE HOMES	
	* 828360 2450 SLV D SILVERCREST INDUSTRIES	MISSING QUARTERLY	
SKY	SKYLINE CORP	WOOD BUILDINGS-MOBILE HOMES	
TWI	TIDWELL INDUSTRIES	WOOD BUILDINGS-MOBILE HOMES	
TNC	TOWN + COUNTRY MOBILE HOMES	WOOD BUILDINGS-MOBILE HOMES	
ZIM	ZIMMER HOMES CORP	WOOD BUILDINGS-MOBILE HOMES	
AMC	ABERDEEN MFG CORP	HOUSEHOLD FURNITURE	
BDY	BRODY (B.) SEATING CO	HOUSEHOLD FURNITURE	
CSO	COSCO INC	HOUSEHOLD FURNITURE	
KIR	KIRSCH CO	HOUSEHOLD FURNITURE	
KFM	KROEHLER MFG CO	HOUSEHOLD FURNITURE	
LUD	LUDLOW CORP	HOUSEHOLD FURNITURE	
MOH	MOHASCO CORP	HOUSEHOLD FURNITURE	
OMT	OHIO-SEALY MATTRESS	HOUSEHOLD FURNITURE	
PEN	PENTRON INDUSTRIES	HOUSEHOLD FURNITURE	
SHX	SHAW INDUSTRIES INC	HOUSEHOLD FURNITURE	
SIH	SIMMONS CO	HOUSEHOLD FURNITURE	
SNH	SPERRY + HUTCHINSON CO	HOUSEHOLD FURNITURE	
VIR	VIRCO MANUFACTURING	HOUSEHOLD FURNITURE	
WC	WEIMAN CO INC	HOUSEHOLD FURNITURE	
AMZ	AMERICAN SEATING CO	OFFICE FURNITURE	
GFB	GF BUSINESS EQUIPMENT	OFFICE FURNITURE	
NID	NEW IDRIA INC	OFFICE FURNITURE	
AIP	AMERICAN ISRAELI PAPER MILLS	PAPER + ALLIED PRODUCTS	
BWTR	BOWATER CORP LTD-ADR	PAPER + ALLIED PRODUCTS	
BWN	BROWN CO	PAPER + ALLIED PRODUCTS	
ZB	CROWN ZELLERBACH	PAPER + ALLIED PRODUCTS	
DTC	DOMTAR INC	PAPER + ALLIED PRODUCTS	
GLT	GLATFELTER (P.H.) CO	PAPER + ALLIED PRODUCTS	
GNN	GREAT NORTHERN NEKOOSA CORP	PAPER + ALLIED PRODUCTS	
HML	HAMMERMILL PAPER CO	PAPER + ALLIED PRODUCTS	
IP	INTL PAPER CO	PAPER + ALLIED PRODUCTS	
KMB	KIMBERLY-CLARK CORP	PAPER + ALLIED PRODUCTS	
MEA	MEAD CORP	PAPER + ALLIED PRODUCTS	
OKF	OLINKRAFT INC	PAPER + ALLIED PRODUCTS	
PCH	POTLATCH CORP	PAPER + ALLIED PRODUCTS	
SRT	ST REGIS PAPER CO	PAPER + ALLIED PRODUCTS	
SPP	SCOTT PAPER CO	PAPER + ALLIED PRODUCTS	
SPX	SIMPLEX INDUSTRIES	PAPER + ALLIED PRODUCTS	
SOG	SORG PAPER CO	PAPER + ALLIED PRODUCTS	
SWF	SOUTHWEST FOREST INDUSTRIES	PAPER + ALLIED PRODUCTS	
TTI	TECHNICAL TAPE INC	PAPER + ALLIED PRODUCTS	
UCC	UNION CAMP CORP	PAPER + ALLIED PRODUCTS	
W	WESTVACO CORP	PAPER + ALLIED PRODUCTS	
WPP	WHIPPANY PAPERBOARD	PAPER + ALLIED PRODUCTS	
APL	APL CORP	CONVERT PAPER-PAPERBD PD NEC	
BMS	BEHIS CO	CONVERT PAPER-PAPERBD PD NEC	
CSK	CHESAPEAKE CORP OF VA	CONVERT PAPER-PAPERBD PD NEC	
OSN	DENNISON MFG CO	CONVERT PAPER-PAPERBD PD NEC	
FHP	FORT HOWARD PAPER	CONVERT PAPER-PAPERBD PD NEC	
PCT	PAPERCRAFT CORP	CONVERT PAPER-PAPERBD PD NEC	
CLV	CLEVEPAK CORP	PAPERBOARD CONTAINERS-BOXES	
CON	CONNELLY CONTAINERS INC	PAPERBOARD CONTAINERS-BOXES	
DN	DIAMOND INTERNATIONAL CORP	PAPERBOARD CONTAINERS-BOXES	
FBO	FEDERAL PAPER BOARD CO	PAPERBOARD CONTAINERS-BOXES	
FBD	FIBREBOARD CORP	PAPERBOARD CONTAINERS-BOXES	
IN	INLAND CONTAINER CORP	PAPERBOARD CONTAINERS-BOXES	
MDC	MARYLAND CUP CORP	PAPERBOARD CONTAINERS-BOXES	
PAR	PARAMOUNT PACKAGING	PAPERBOARD CONTAINERS-BOXES	
RXH	REXHAM CORP	PAPERBOARD CONTAINERS-BOXES	
SHK	SIMKINS INDUSTRIES	PAPERBOARD CONTAINERS-BOXES	
STO	STONE CONTAINER CORP	PAPERBOARD CONTAINERS-BOXES	
SYP	SIMPLICITY PATTERN CO	PRINTING PUBLISHING + ALLIED	

WP	WESTERN PUBLISHING	PRINTING PUBLISHING + ALLIED
AFP	AFFILIATED PUBLICATIONS	NEWSPAPERS:PUBLISHING-PRINT
CCB	CAPITAL CITIES COMMUNICATION	NEWSPAPERS:PUBLISHING-PRINT
DJ	DOW JONES + CO INC	NEWSPAPERS:PUBLISHING-PRINT
GCI	GANNETT CO	NEWSPAPERS:PUBLISHING-PRINT
HHN	HARTE-HANKS COMMUNICATIONS	NEWSPAPERS:PUBLISHING-PRINT
KRN	KNIGHT-RIDDER NEWSPAPERS INC	NEWSPAPERS:PUBLISHING-PRINT
LEE	LEE ENTERPRISES	NEWSPAPERS:PUBLISHING-PRINT
MEG	MEDIA GENERAL-CL A	NEWSPAPERS:PUBLISHING-PRINT
NYK	NEW YORK TIMES CO	NEWSPAPERS:PUBLISHING-PRINT
PQB	QUEBECOR INC	NEWSPAPERS:PUBLISHING-PRINT
TMC	TIMES MIRROR CO	NEWSPAPERS:PUBLISHING-PRINT
WPO	WASHINGTON POST CO-CL B	NEWSPAPERS:PUBLISHING-PRINT
CDE	CADENCE IND CORP	PERIODICALS:PUBLISHING-PRINT
MOP	MEREDITH CORP	PERIODICALS:PUBLISHING-PRINT
PLA	PLAYBOY ENTERPRISES	PERIODICALS:PUBLISHING-PRINT
TL	TIME INC	PERIODICALS:PUBLISHING-PRINT
ALYN	ALLYN BACON INC	BOOKS:PUBLISHING + PRINTING
GLR	GROLIER INC	BOOKS:PUBLISHING + PRINTING
HBJ	HARCOURT BRACE JOVANOVIH	BOOKS:PUBLISHING + PRINTING
HROW	HARPER ROW PUBLISHERS	BOOKS:PUBLISHING + PRINTING
HTN	HOUGHTON MIFFLIN CO	BOOKS:PUBLISHING + PRINTING
MLL	MACMILLAN INC	BOOKS:PUBLISHING + PRINTING
MHP	MCGRAW-HILL INC	BOOKS:PUBLISHING + PRINTING
PTN	PRENTICE-HALL INC	BOOKS:PUBLISHING + PRINTING
SFN	SCOTT FORESMAN CO	BOOKS:PUBLISHING + PRINTING
ACA	ARCATA NATIONAL CORP	COMMERCIAL PRINTING
BJ	BLAIR (JOHN) + CO	COMMERCIAL PRINTING
BNE	BOWNE + CO INC	COMMERCIAL PRINTING
DNY	DONNELLEY (R.R.) + SONS CO	COMMERCIAL PRINTING
HPG	HALL (W.F.) PRINTING CO	COMMERCIAL PRINTING
JH	HARLAND (JOHN H.) CO	COMMERCIAL PRINTING
IBK	INTERNATIONAL BANKNOTE	COMMERCIAL PRINTING
LP	LEHIGH PRESS INC	COMMERCIAL PRINTING
SLI	STAFFORD-LOWDON	COMMERCIAL PRINTING
MMH	WILLIAMHOUSE REGENCY INC	COMMERCIAL PRINTING
ABP	AMERICAN BUSINESS PRODUCTS	MANIFOLD BUSINESS FORMS
DPX	DUPLEX PRODUCTS	MANIFOLD BUSINESS FORMS
EBF	ENNIS BUSINESS FORMS	MANIFOLD BUSINESS FORMS
MORC	MOORE CORP LTD	MANIFOLD BUSINESS FORMS
REYN	REYNOLDS + REYNOLDS	MANIFOLD BUSINESS FORMS
SREG	STANDARD REGISTER CO	MANIFOLD BUSINESS FORMS
URC	UARCO INC	MANIFOLD BUSINESS FORMS
WF	WALLACE BUSINESS FORMS	MANIFOLD BUSINESS FORMS
AGRE	AMERICAN GREETINGS CORP	GREETING CARD PUBLISHING
MGG	METROPOLITAN GREETINGS INC	GREETING CARD PUBLISHING
RUS	RUST CRAFT GREETING CARDS	GREETING CARD PUBLISHING
CPU	COMPUGRAPHIC CORP	SERVICE INDUS FOR PRINT TRDE
EEG	ELECTROGRAPHIC CORP	SERVICE INDUS FOR PRINT TRDE
PYC	POLYCHROME CORP	SERVICE INDUS FOR PRINT TRDE
ACD	ALLIED CHEMICAL CORP	CHEMICALS + ALLIED PRODS
ACY	AMERICAN CYANAMID CO	CHEMICALS + ALLIED PRODS
CZ	CELANESE CORP	CHEMICALS + ALLIED PRODS
DIA	DIAMOND SHAMROCK CORP	CHEMICALS + ALLIED PRODS
DOW	DOW CHEMICAL	CHEMICALS + ALLIED PRODS
DD	DU PONT (E.I.) DE NEMOURS	CHEMICALS + ALLIED PRODS
EY	ETHYL CORP	CHEMICALS + ALLIED PRODS
GRA	GRACE (W.R.) + CO	CHEMICALS + ALLIED PRODS
GLK	GREAT LAKES CHEMICAL CORP	CHEMICALS + ALLIED PRODS
HPC	HERCULES INC	CHEMICALS + ALLIED PRODS
KOP	KOPPERS CO	CHEMICALS + ALLIED PRODS
MTC	MONSANTO CO	CHEMICALS + ALLIED PRODS
MNP	MORTON-NORWICH PRODUCTS	CHEMICALS + ALLIED PRODS
OLN	OLIN CORP	CHEMICALS + ALLIED PRODS
PSM	PENNWALT CORP	CHEMICALS + ALLIED PRODS
ROM	ROHM + HAAS CO	CHEMICALS + ALLIED PRODS
UK	UNION CARBIDE CORP	CHEMICALS + ALLIED PRODS
APD	AIR PRODUCTS + CHEMICALS INC	INDL INORGANIC CHEMICALS
BETZ	BETZ LABORATORIES INC	INDL INORGANIC CHEMICALS
CXY	CANADIAN OCCIDENTAL PETRO	INDL INORGANIC CHEMICALS
NL	NL INDUSTRIES	INDL INORGANIC CHEMICALS
NNC	NEW ENGLAND NUCLEAR CORP	INDL INORGANIC CHEMICALS
PPG	PPG INDUSTRIES INC	INDL INORGANIC CHEMICALS
STF	STAUFFER CHEMICAL CO	INDL INORGANIC CHEMICALS
URD	U S RADIUM CORP	INDL INORGANIC CHEMICALS
AXO	AKZONA	PLASTIC MATR+SYNTHETIC RESIN
PNT	PANTASOTE CO	PLASTIC MATR+SYNTHETIC RESIN
RCI	REICHOLD CHEMICALS INC	PLASTIC MATR+SYNTHETIC RESIN
ROB	ROBINTCH INC	PLASTIC MATR+SYNTHETIC RESIN
ABT	ABBOTT LABORATORIES	DRUGS
AGN	ALLERGAN PHARMACEUTICALS INC	DRUGS
AMP	AMERICAN HOME PRODUCTS CORP	DRUGS

COO	COOPER LABORATORIES	DRUGS
FRX	FOREST LABORATORIES INC	DRUGS
ICN	ICN PHARMACEUTICALS INC	DRUGS
LLY	LILLY (ELI) + CO	DRUGS
MKC	MARION LABORATORIES	DRUGS
MRK	MERCK + CO	DRUGS
PFE	PFIZER INC	DRUGS
PUR	PUREPAC LABORATORIES	DRUGS
RXM	RICHARDSON-MERRELL INC	DRUGS
RAH	ROBINS (A.H.) CO	DRUGS
ROR	ROKER GROUP	DRUGS
SGP	SCHERING-PLOUGH	DRUGS
SRL	SEARLE (G.D.) + CO	DRUGS
SHC	SHAKLEE CORP	DRUGS
SKL	SMITHKLINE CORP	DRUGS
SQB	SQUIBB CORP	DRUGS
STY	STERLING DRUG INC	DRUGS
SYN	SYNTEX CORP	DRUGS
TPAX	TAMPAX INC	DRUGS
UPJ	UPJOHN CO	DRUGS
WLA	WARNER-LAMBERT CO	DRUGS
CLX	CLOROX CO	SOAP + OTHER DETERGENTS
CL	COLGATE-PALMOLIVE CO	SOAP + OTHER DETERGENTS
ECON	ECONOMICS LABORATORY INC	SOAP + OTHER DETERGENTS
HCH	HEALTH-CHEM CORP	SOAP + OTHER DETERGENTS
MGX	MEDALLION GROUP INC	SOAP + OTHER DETERGENTS
	* 635298 2841 NCH D NATIONAL CHEMSEARCH	*** MISSING ITEM(15)
OKT	OAKITE PRODUCTS	SOAP + OTHER DETERGENTS
PG	PROCTER + GAMBLE CO	SOAP + OTHER DETERGENTS
PRX	PUREX CORP	SOAP + OTHER DETERGENTS
UN	UNILEVER N V	SOAP + OTHER DETERGENTS
WCP	WEST CHEMICAL PRODUCTS INC	SOAP + OTHER DETERGENTS
ATQ	ATI INC	PERFUMES COSMETICS TOIL PREP
ACV	ALBERTO-CULVER CO	PERFUMES COSMETICS TOIL PREP
AVP	AVON PRODUCTS	PERFUMES COSMETICS TOIL PREP
BMV	BRISTOL-MYERS CO	PERFUMES COSMETICS TOIL PREP
CAR	CARTER-MALLACE INC	PERFUMES COSMETICS TOIL PREP
CBM	CHESEBROUGH-POND'S INC	PERFUMES COSMETICS TOIL PREP
DLI	DEL LABORATORIES INC	PERFUMES COSMETICS TOIL PREP
FBG	FABERGE INC	PERFUMES COSMETICS TOIL PREP
GS	GILLETTE CO	PERFUMES COSMETICS TOIL PREP
HC	HELENE CURTIS INDUSTRIES	PERFUMES COSMETICS TOIL PREP
IFF	INTL FLAVORS + FRAGRANCES	PERFUMES COSMETICS TOIL PREP
JPC	JOHNSON PRODUCTS	PERFUMES COSMETICS TOIL PREP
LHR	LA MAUR INC	PERFUMES COSMETICS TOIL PREP
MKY	MARY KAY COSMETICS	PERFUMES COSMETICS TOIL PREP
MEM	MEM CO	PERFUMES COSMETICS TOIL PREP
NMR	NESTLE-LEMUR CO	PERFUMES COSMETICS TOIL PREP
REV	REVLON INC	PERFUMES COSMETICS TOIL PREP
COK	COOK PAINT + VARNISH	PAINTS-VARNISHES-LACQUERS
DSO	DE SOTO INC	PAINTS-VARNISHES-LACQUERS
BOY	DUTCH BOY INC	PAINTS-VARNISHES-LACQUERS
GRO	GROW CHEMICAL CORP	PAINTS-VARNISHES-LACQUERS
GRV	GUARDSMAN CHEMICALS INC	PAINTS-VARNISHES-LACQUERS
INR	INSILCO CORP	PAINTS-VARNISHES-LACQUERS
PM	PRATT + LAMBERT INC	PAINTS-VARNISHES-LACQUERS
SCM	SCM CORP	PAINTS-VARNISHES-LACQUERS
SHW	SHERWIN-WILLIAMS CO	PAINTS-VARNISHES-LACQUERS
VAL	VALSPAR CORP	PAINTS-VARNISHES-LACQUERS
CNK	CROMPTON + KNOWLES CORP	INDUSTRIAL ORGANIC CHEMICALS
NLC	NALCO CHEMICAL CO	INDUSTRIAL ORGANIC CHEMICALS
SCL	STEPAN CHEMICAL CO	INDUSTRIAL ORGANIC CHEMICALS
BKI	BEKER INDS	AGRICULTURE CHEMICALS
FRM	FIRST MISSISSIPPI CORP	AGRICULTURE CHEMICALS
IGL	INTL MINERALS + CHEMICAL	AGRICULTURE CHEMICALS
TCI	TERRA CHEMICALS INTL	AGRICULTURE CHEMICALS
WMB	WILLIAMS COS	AGRICULTURE CHEMICALS
ALC	ALCOLAC INC	MISC CHEMICAL PRODUCTS
AVY	AVERY INTERNATIONAL	MISC CHEMICAL PRODUCTS
CBT	CABOT CORP	MISC CHEMICAL PRODUCTS
CPK	COMPAC CORP	MISC CHEMICAL PRODUCTS
DEX	DEXTER CORP	MISC CHEMICAL PRODUCTS
ESX	ESSEX CHEMICAL CORP	MISC CHEMICAL PRODUCTS
FMT	FAIRMOUNT CHEMICAL CO INC	MISC CHEMICAL PRODUCTS
FOE	FERRO CORP	MISC CHEMICAL PRODUCTS
KIN	KIN-ARK CORP	MISC CHEMICAL PRODUCTS
LAW	LAWTER CHEMICALS INC	MISC CHEMICAL PRODUCTS
LOC	LOCTITE CORP	MISC CHEMICAL PRODUCTS
LZ	LUBRIZOL CORP	MISC CHEMICAL PRODUCTS
NSC	NATIONAL STARCH + CHEMICAL	MISC CHEMICAL PRODUCTS
PAK	PARK CHEMICAL CO	MISC CHEMICAL PRODUCTS
PRC	PRODUCTS RESEARCH + CHEMICAL	MISC CHEMICAL PRODUCTS

SNL	SUN CHEMICAL CORP	MISC CHEMICAL PRODUCTS	
WN	WYNNS INTERNATIONAL INC	MISC CHEMICAL PRODUCTS	
AHC	AMERADA HESS CORP	PETROLEUM REFINING	
ASM	ASAMERA OIL CORP	PETROLEUM REFINING	
ASH	ASHLAND OIL INC	PETROLEUM REFINING	
ARC	ATLANTIC RICHFIELD CO	PETROLEUM REFINING	
BPC	BELCO PETROLEUM CORP	PETROLEUM REFINING	
BVI	BOW VALLEY INDS	PETROLEUM REFINING	
BP	BRITISH PETROLEUM CO LTD	PETROLEUM REFINING	
CHR	CHARTER CO	PETROLEUM REFINING	
CS	CITIES SERVICE CO	PETROLEUM REFINING	
CKO	CLARK OIL + REFINING CORP	PETROLEUM REFINING	
CLL	CONTINENTAL OIL CO	PETROLEUM REFINING	
CNP	CROWN CENTRAL PETROLEUM CORP	PETROLEUM REFINING	
COR	CRYSTAL OIL CO	PETROLEUM REFINING	
ERC	EARTH RESOURCES CO	PETROLEUM REFINING	
XON	EXXON CORP	PETROLEUM REFINING	
GOC	GULF OIL OF CANADA	PETROLEUM REFINING	
GO	GULF OIL CORP	PETROLEUM REFINING	
HOC	HOLLY CORP	PETROLEUM REFINING	
HML	HOWELL CORP	PETROLEUM REFINING	
HYO	HUSKY OIL LTD	PETROLEUM REFINING	
IMO	IMPERIAL OIL LTD-CL A	PETROLEUM REFINING	
KMG	KERR-MCGEE CORP	PETROLEUM REFINING	
MRO	MARATHON OIL CO	PETROLEUM REFINING	
MOB	MOBIL CORP	PETROLEUM REFINING	
MUR	MURPHY OIL CORP	PETROLEUM REFINING	
PP	PACIFIC PETROLEUMS LTD	PETROLEUM REFINING	
PZL	PENNZOIL CO	PETROLEUM REFINING	
P	PHILLIPS PETROLEUM CO	PETROLEUM REFINING	
KSF	QUAKER STATE OIL REFINING	PETROLEUM REFINING	
RD	ROYAL DUTCH PETROLEUM CO	PETROLEUM REFINING	
SUO	SHELL OIL CO	PETROLEUM REFINING	
SO	STANDARD OIL CO (CALIF)	PETROLEUM REFINING	
SN	STANDARD OIL CO (INDIANA)	PETROLEUM REFINING	
SOH	STANDARD OIL CO (OHIO)	PETROLEUM REFINING	
SUN	SUN CO	PETROLEUM REFINING	
TSO	TESORO PETROLEUM CORP	PETROLEUM REFINING	
TX	TEXACO INC	PETROLEUM REFINING	
TPN	TOTAL PETROLEUM OF N AMERICA	PETROLEUM REFINING	
UCL	UNION OIL CO OF CALIFORNIA	PETROLEUM REFINING	
URE	UNITED REFINING CO	PETROLEUM REFINING	
WIT	WITCO CHEMICAL CORP	PETROLEUM REFINING	
AHX	ASHLAND OIL CANADA LTD	PAVING + ROOFING MATERIALS	
CRT	CERTAIN-TEED CORP	PAVING + ROOFING MATERIALS	
FO	FLINTKOTE CO	PAVING + ROOFING MATERIALS	
GAF	GAF CORP	PAVING + ROOFING MATERIALS	
JM	JOHNS-MANVILLE CORP	PAVING + ROOFING MATERIALS	
NG	NATIONAL GYPSUM CO	PAVING + ROOFING MATERIALS	
RHM	ROBERTSON (H.H.) CO	PAVING + ROOFING MATERIALS	
JWC	WALTER (JIM) CORP	PAVING + ROOFING MATERIALS	
AO	AEGIS CORP	RUBBER + MISC PLASTICS PRODS	
ATR	ALLIANCE TIRE + RUBBER CO	RUBBER + MISC PLASTICS PRODS	
AAE	AMERACE CORP	RUBBER + MISC PLASTICS PRODS	
ARM	ARMSTRONG RUBBER	RUBBER + MISC PLASTICS PRODS	
BDG	BANDAG INC	RUBBER + MISC PLASTICS PRODS	
CSL	CARLISLE CORP	RUBBER + MISC PLASTICS PRODS	
CTB	COOPER TIRE + RUBBER	RUBBER + MISC PLASTICS PRODS	
DAY	DAYCO CORP	RUBBER + MISC PLASTICS PRODS	
DLP	DUNLOP HOLDING LTD	RUBBER + MISC PLASTICS PRODS	
FIR	FIRESTONE TIRE + RUBBER CO	RUBBER + MISC PLASTICS PRODS	
GY	GENERAL TIRE + RUBBER CO	RUBBER + MISC PLASTICS PRODS	
GR	GOODRICH (B.F.) CO	RUBBER + MISC PLASTICS PRODS	
GT	GOODYEAR TIRE + RUBBER CO	RUBBER + MISC PLASTICS PRODS	
HSF	HANSFIELD TIRE + RUBBER CO	RUBBER + MISC PLASTICS PRODS	
MWK	MOHAWK RUBBER CO	RUBBER + MISC PLASTICS PRODS	
RBD	RUBBERMAID INC	RUBBER + MISC PLASTICS PRODS	
R	* 806517 3000 SCH D SCHENUIT INDUSTRIES	RUBBER + MISC PLASTICS PRODS	*** MISSING ITEM(15)
USU	UNIROYAL INC	RUBBER + MISC PLASTICS PRODS	
ABL	U.S. RUBBER RECLAIMING CO	RUBBER + MISC PLASTICS PRODS	
GRI	AMERICAN BILTRITE INC	FABRICATED RUBBER PRODS NEC	
OSL	GREAT AMERICAN INDUSTRIES	FABRICATED RUBBER PRODS NEC	
OSL	O'SULLIVAN CORP	FABRICATED RUBBER PRODS NEC	
RCS	RICHARDSON CO	FABRICATED RUBBER PRODS NEC	
AE	A + E PLASTIK PAK INC	MISC PLASTIC PRODUCTS	
ARP	ARMIN CORP	MISC PLASTIC PRODUCTS	
CC	CELLU-CRAFT INC	MISC PLASTIC PRODUCTS	
CEC	CETEC CORP	MISC PLASTIC PRODUCTS	
CPY	* 163852 3079 CMP D CHEMPLAST INC	MISC PLASTIC PRODUCTS	MISSING QUARTERLY
CFO	CLOPAY CORP	MISC PLASTIC PRODUCTS	
CFO	CREST-FOAM CORP	MISC PLASTIC PRODUCTS	
GLA	GLASROCK PRODUCTS	MISC PLASTIC PRODUCTS	

GLO	GLOBE INDUSTRIES	MISC PLASTIC PRODUCTS
KVU	KLEER-VU INDUSTRIES INC	MISC PLASTIC PRODUCTS
MG	MONOGRAM INDUSTRIES INC	MISC PLASTIC PRODUCTS
PLR	PLYMOUTH RUBBER CO-CL A	MISC PLASTIC PRODUCTS
ROG	ROGERS CORP	MISC PLASTIC PRODUCTS
VSI	VSI CORP	MISC PLASTIC PRODUCTS
VOT	VOPLEX CORP	MISC PLASTIC PRODUCTS
RGB	BARRY (R G) "	FOOTWEAR EXCEPT RUBBER
BG	BROWN GROUP INC	FOOTWEAR EXCEPT RUBBER
CSA	CARESSA INC	FOOTWEAR EXCEPT RUBBER
GCO	GENESCO INC	FOOTWEAR EXCEPT RUBBER
ISS	INTERCO INC	FOOTWEAR EXCEPT RUBBER
KLR	KLEINERTS INC	FOOTWEAR EXCEPT RUBBER
MDO	MCDONOUGH CO	FOOTWEAR EXCEPT RUBBER
MES	MELVILLE CORP	FOOTWEAR EXCEPT RUBBER
	* 709342 3140 PSO D PENOBSCOT SHOE	*** MISSING ITEM(15)
SMS	SHAER SHOE CORP	FOOTWEAR EXCEPT RUBBER
SRR	STRIDE RITE CORP	FOOTWEAR EXCEPT RUBBER
SHV	SUAVE SHOE CORP	FOOTWEAR EXCEPT RUBBER
USR	U S SHOE CORP	FOOTWEAR EXCEPT RUBBER
	* 949476 3140 WLC D WELLCO ENTERPRISES	*** MISSING ITEM(15)
WEY	WEYENBERG SHOE MFG CO	FOOTWEAR EXCEPT RUBBER
WHW	WOLVERINE WORLD WIDE	FOOTWEAR EXCEPT RUBBER
JLN	JACLYN INC	LEATHER GOODS N E C
OLA	OLLA INDUSTRIES	LEATHER GOODS N E C
SEL	SETON CO	LEATHER GOODS N E C
TAB	TANDY BRANDS	LEATHER GOODS N E C
VUL	VULCAN CORP	LEATHER GOODS N E C
GLW	CORNING GLASS WORKS	FLAT GLASS
GRO	GUARDIAN INDUSTRIES	FLAT GLASS
JGA	JEANNETTE CORP	FLAT GLASS
KGM	KERR GLASS MFG	FLAT GLASS
LOF	LIBBEY-OWENS-FORD CO	FLAT GLASS
SVE	SEAGRAVE CORP	FLAT GLASS
AC	AMERICAN CAN CO	GLASS CONTAINERS
ARH	ANCHOR HOCKING CORP	GLASS CONTAINERS
BLL	BALL CORP	GLASS CONTAINERS
BRK	BROCKWAY GLASS CO	GLASS CONTAINERS
CCC	CONTINENTAL GROUP	GLASS CONTAINERS
CKK	CROWN CORK + SEAL CO INC	GLASS CONTAINERS
DSY	DORSEY CORP	GLASS CONTAINERS
MIG	MIDLAND GLASS CO	GLASS CONTAINERS
NAC	NATIONAL CAN CORP	GLASS CONTAINERS
OT	OWENS-ILLINOIS INC	GLASS CONTAINERS
PLS	PEERLESS TUBE CO	GLASS CONTAINERS
PLD	PLANT INDUSTRIES INC	GLASS CONTAINERS
STT	STANDARD CONTAINER CO	GLASS CONTAINERS
VOC	VAN DORN CO	GLASS CONTAINERS
AAC	AMCORD INC	CEMENT HYDRAULIC
CPO	CALIFORNIA PORTLAND CEMENT	CEMENT HYDRAULIC
GPT	GENERAL PORTLAND INC	CEMENT HYDRAULIC
GPO	GIANT PORTLAND + MASONRY CEM	CEMENT HYDRAULIC
IDL	IDEAL BASIC INDUSTRIES INC	CEMENT HYDRAULIC
KCG	KAISER CEMENT + GYPSUM CORP	CEMENT HYDRAULIC
LCE	LONE STAR INDUSTRIES	CEMENT HYDRAULIC
LCO	LOUISVILLE CEMENT	CEMENT HYDRAULIC
MPO	MEDUSA CORP	CEMENT HYDRAULIC
OKC	OKC CORP	CEMENT HYDRAULIC
PRN	PUERTO RICAN CEMENT CO INC	CEMENT HYDRAULIC
SDW	SOUTHDOWN INC	CEMENT HYDRAULIC
SCT	SUPERCRETE LTD	CEMENT HYDRAULIC
GGB	GLEN-GERY CORP	STRUCTURAL CLAY PRODUCTS
SK A	SIKES CORP-CL A	STRUCTURAL CLAY PRODUCTS
SPR	SPARTEK INC	STRUCTURAL CLAY PRODUCTS
LNK	LENEX INC	POTTERY PRODUCTS N E C
AMN	AMERON INC	CONCRETE GYPSUM + PLASTER
CRZ	CONROCK CO	CONCRETE GYPSUM + PLASTER
GST	GENSTAR LTD	CONCRETE GYPSUM + PLASTER
GFH	GIFFORD-HILL + CO	CONCRETE GYPSUM + PLASTER
INP	INTERPACE CORP	CONCRETE GYPSUM + PLASTER
RGK	REPUBLIC GYPSUM CO	CONCRETE GYPSUM + PLASTER
SQN	SUSQUEHANNA CORP	CONCRETE GYPSUM + PLASTER
TXI	TEXAS INDUSTRIES INC	CONCRETE GYPSUM + PLASTER
USG	U S GYPSUM CO	CONCRETE GYPSUM + PLASTER
BAI	BASIC INC	ABRASIVE ASBESTOS + MISC MIN
GRX	GENERAL REFRACTORIES CO	ABRASIVE ASBESTOS + MISC MIN
MBR	MWA CO	ABRASIVE ASBESTOS + MISC MIN
NRT	NORTON CO	ABRASIVE ASBESTOS + MISC MIN
OCF	OWENS-CORNING FIBERGLAS CORP	ABRASIVE ASBESTOS + MISC MIN
VMC	VULCAN MATERIALS CO	ABRASIVE ASBESTOS + MISC MIN
AG	ALLEGHENY LUDLUM INDS	BLAST FURNACES + STEEL WORKS
AP	AMPCO-PITTSBURGH CORP	BLAST FURNACES + STEEL WORKS

AS	ARMCO STEEL CORP	BLAST FURNACES + STEEL WORKS
ATH	ATHLONE INDS	BLAST FURNACES + STEEL WORKS
BS	BETHLEHEM STEEL CORP	BLAST FURNACES + STEEL WORKS
BLI	BLISS + LAUGHLIN INDS	BLAST FURNACES + STEEL WORKS
BNY	BUNDY CORP	BLAST FURNACES + STEEL WORKS
CRS	CARPENTER TECHNOLOGY	BLAST FURNACES + STEEL WORKS
COS	COPPERWELD CORP	BLAST FURNACES + STEEL WORKS
CYL	CYCLOPS CORP	BLAST FURNACES + STEEL WORKS
FLS	FLORIDA STEEL CORP	BLAST FURNACES + STEEL WORKS
FRO	FRIEDMAN INDUSTRIES	BLAST FURNACES + STEEL WORKS
HOF	HOFMANN INDUSTRIES INC	BLAST FURNACES + STEEL WORKS
IAD	INLAND STEEL CO	BLAST FURNACES + STEEL WORKS
IK	INTERLAKE INC	BLAST FURNACES + STEEL WORKS
KSC	KAISER STEEL CORP	BLAST FURNACES + STEEL WORKS
LB	LA BARGE INC	BLAST FURNACES + STEEL WORKS
LUC	LUKENS STEEL CO	BLAST FURNACES + STEEL WORKS
LY	LYKES CORP	BLAST FURNACES + STEEL WORKS
MLX	MCLOUTH STEEL CORP	BLAST FURNACES + STEEL WORKS
NVF	NVF CORP	BLAST FURNACES + STEEL WORKS
NS	NATIONAL STEEL CORP	BLAST FURNACES + STEEL WORKS
NTK	NORTEK INC	BLAST FURNACES + STEEL WORKS
NSW	NORTHWESTERN STEEL + WIRE CO	BLAST FURNACES + STEEL WORKS
PDI	PENN-DIXIE INDUSTRIES	BLAST FURNACES + STEEL WORKS
PORT	PORTER (H.K.) CO	BLAST FURNACES + STEEL WORKS
NX	QUANEX CORP	BLAST FURNACES + STEEL WORKS
RS	REPUBLIC STEEL CORP	BLAST FURNACES + STEEL WORKS
SSH	SHARON STEEL	BLAST FURNACES + STEEL WORKS
STD	STANDARD ALLIANCE INDUSTRIES	BLAST FURNACES + STEEL WORKS
TAM	TUBOS DE ACERO DE MEXICO S A	BLAST FURNACES + STEEL WORKS
X	U.S. STEEL CORP	BLAST FURNACES + STEEL WORKS
VI	VALLEY INDUSTRIES	BLAST FURNACES + STEEL WORKS
WSS	WASHINGTON STEEL CORP	BLAST FURNACES + STEEL WORKS
WTA	WELDED TUBE OF AMERICA	BLAST FURNACES + STEEL WORKS
WHX	WHEELING-PITTSBURGH STEEL	BLAST FURNACES + STEEL WORKS
MAB	MANGOOD CORP	IRON + STEEL FOUNDRIES
NAR	NORTH AMERICAN ROYALTIES	IRON + STEEL FOUNDRIES
VX	VULCAN INC	IRON + STEEL FOUNDRIES
AL	ALCAN ALUMINIUM LTD	PRIM SMELT-REFIN NONFER MTL
AA	ALUMINUM CO OF AMERICA	PRIM SMELT-REFIN NONFER MTL
ACM	ATLAS CONS MINING + DEV	PRIM SMELT-REFIN NONFER MTL
IC	INSPIRATION CONS COPPER CO	PRIM SMELT-REFIN NONFER MTL
KLU	KAISER ALUMINUM + CHEM CORP	PRIM SMELT-REFIN NONFER MTL
KN	KENNECOTT COPPER CORP	PRIM SMELT-REFIN NONFER MTL
OKP	O'OKIEP COPPER CO	PRIM SMELT-REFIN NONFER MTL
RLM	REYNOLDS METALS CO	PRIM SMELT-REFIN NONFER MTL
HSC	HARSCO CORP	SECOND SMELT-REFIN NONFER MT
PS	PROLER INTERNATIONAL CORP	SECOND SMELT-REFIN NONFER MT
BEL	BELDEN CORP	ROLLING + DRAW NONFER METAL
COR	CONSOLIDATED REFINING	ROLLING + DRAW NONFER METAL
CCX	CONTINENTAL COPPER + STL INO	ROLLING + DRAW NONFER METAL
GK	GENERAL CABLE CORP	ROLLING + DRAW NONFER METAL
HNH	HANDY + HARMAN	ROLLING + DRAW NONFER METAL
PX	PHOENIX STEEL CORP	ROLLING + DRAW NONFER METAL
RSC	RSC INDUSTRIES INC	ROLLING + DRAW NONFER METAL
REA	READING INDUSTRIES	ROLLING + DRAW NONFER METAL
RVB	REVERE COPPER + BRASS INC	ROLLING + DRAW NONFER METAL
TRI	TRIANGLE INDUSTRIES	ROLLING + DRAW NONFER METAL
WCB	WHITAKER CABLE CORP	ROLLING + DRAW NONFER METAL
CRO	CHROMALLOY AMERICAN CORP	BRASS CORP MISSING QUARTERLY
KMT	KENAMETAL INC	MISC PRIMARY METAL PRODUCTS
ACU	ACME UNITED CORP	MISC PRIMARY METAL PRODUCTS
ACX	ACTION INDUSTRIES INC	HARDWARE-N E C
BRZ	BREEZE CORP	HARDWARE-N E C
EAC	EAC INDUSTRIES	HARDWARE-N E C
ES	EASCO CORP	HARDWARE-N E C
MTE	MITE CORP	HARDWARE-N E C
NRI	NORRIS INDUSTRIES INC	HARDWARE-N E C
SVT	SERVOTRONICS INC	HARDWARE-N E C
SNA	SNAP-ON TOOLS CORP	HARDWARE-N E C
SWK	STANLEY WORKS	HARDWARE-N E C
SCX	STARRETT (L.S.) CO	HARDWARE-N E C
TRG	TRIANGLE CORP	HARDWARE-N E C
VAC	VERMONT AMERICAN-CL A	HARDWARE-N E C
AST	AMERICAN STANDARD INC	HEATING EQUIP + PLUMBING FIX
BZO	BERNZ-O-MATIC CORP	HEATING EQUIP + PLUMBING FIX
TCC	CITATION COS	HEATING EQUIP + PLUMBING FIX
CUO	CONTINENTAL MATERIALS CORP	HEATING EQUIP + PLUMBING FIX
MAS	MASCO CORP	HEATING EQUIP + PLUMBING FIX
URI	UNIVERSAL-RUNDLE CORP	HEATING EQUIP + PLUMBING FIX
WMC	WALLACE-MURRAY CORP	HEATING EQUIP + PLUMBING FIX
AOP	ALLIED PRODUCTS	MISC METAL WORK

ATL	ATCO INDS	MISC	METAL	WORK				
BLX	BUILDDEX INC	MISC	METAL	WORK				
CCP	CECO CORP	MISC	METAL	WORK				
CBH	CHICAGO BRIDGE + IRON CO	MISC	METAL	WORK				
EML	EASTERN CO	MISC	METAL	WORK				
FRZ	FRANTZ MFG CO	MISC	METAL	WORK				
HVU	HOOVER UNIVERSAL INC	MISC	METAL	WORK				
ISY	INSTRUMENT SYSTEMS CORP	MISC	METAL	WORK				
IAL	INTERNATIONAL ALUMINUM	MISC	METAL	WORK				
MGL	MICHIGAN GENERAL CORP	MISC	METAL	WORK				
NUE	NUCOR CORP	MISC	METAL	WORK				
OHM	OVERHEAD DOOR CORP	MISC	METAL	WORK				
PKE	PARK ELECTROCHEMICAL CORP	MISC	METAL	WORK				
PHL	PHILIPS INDUSTRIES INC	MISC	METAL	WORK				
PDM	PITTSBURGH-DES MOINES STEEL	MISC	METAL	WORK				
RIB	RIBLET PRODUCTS CORP	MISC	METAL	WORK				
RBL	ROBLIN INDUSTRIES	MISC	METAL	WORK				
RSO	RUSCO INDUSTRIES INC	MISC	METAL	WORK				
ST	SPS TECHNOLOGIES INC	MISC	METAL	WORK				
SAI	SEASON-ALL INDUSTRIES INC	MISC	METAL	WORK				
SXI	STANDEX INTERNATIONAL CORP	MISC	METAL	WORK				
SSC	SUNSHINE MINING CO	MISC	METAL	WORK				
UIP	U I P CORP	MISC	METAL	WORK				
WOLA	WOLVERINE ALUMINUM CORP	MISC	METAL	WORK				
ZRO	ZERO CORP	MISC	METAL	WORK				
AVC	AVC CORP	BOLTS-NUTS-SCREWS-RIV-WASHRS						
CVR	CHICAGO RIVET + MACHINE CO	BOLTS-NUTS-SCREWS-RIV-WASHRS						
HSI	HI-SHEAR INDUSTRIES	BOLTS-NUTS-SCREWS-RIV-WASHRS						
HUX	HUCK MANUFACTURING CO	BOLTS-NUTS-SCREWS-RIV-WASHRS						
ITW	ILLINOIS TOOL WORKS	BOLTS-NUTS-SCREWS-RIV-WASHRS						
LMS	LAMSON + SESSIONS CO	BOLTS-NUTS-SCREWS-RIV-WASHRS						
PNN	PENN ENGINEERING + MFG CORP	BOLTS-NUTS-SCREWS-RIV-WASHRS						
PRE	PREMIER INDUSTRIAL CORP	BOLTS-NUTS-SCREWS-RIV-WASHRS						
GER	GENERAL RECREATION	ORDNANCE + ACCESSORIES						
RED	R.E.D.M. CORP	ORDNANCE + ACCESSORIES						
RAE	RAYMOND INDUSTRIES INC	ORDNANCE + ACCESSORIES						
REM	REMINGTON ARMS CO	ORDNANCE + ACCESSORIES						
CR	CRANE CO	VALVES+PIPE FITTINGS EX BRAS						
HK	MARK CONTROLS	VALVES+PIPE FITTINGS EX BRAS						
TYL	TYLER CORP	VALVES+PIPE FITTINGS EX BRAS						
MCN	WORCESTER CONTROLS	VALVES+PIPE FITTINGS EX BRAS						
Y	ALLEGHANY CORP	FABRICATED METAL PRDS N F C						
ATO	AUTOMATED BLDG COMPONENTS	FABRICATED METAL PRDS N F C						
BEX	BRAUN ENGINEERING	FABRICATED METAL PRDS N F C						
KRO	CROWN INDUSTRIES	FABRICATED METAL PRDS N F C						
DBO	DIEBOLD INC	FABRICATED METAL PRDS N F C						
EXR	ELIXIR INDUSTRIES	FABRICATED METAL PRDS N F C						
ENR	ENERGY RESOURCES CORP	FABRICATED METAL PRDS N F C						
GHW	GENERAL HOUSEWARES	FABRICATED METAL PRDS N F C						
IGT	INTL GENERAL INDUSTRIES	FABRICATED METAL PRDS N F C						
IS	INTL SYSTEMS + CONTROLS	FABRICATED METAL PRDS N F C						
KEL	KELLER INDUSTRIES INC	FABRICATED METAL PRDS N F C						
KES	KEYSTONE CONS INDUSTRIES INC	FABRICATED METAL PRDS N F C						
KUH	KUHLMAN CORP	FABRICATED METAL PRDS N F C						
LRI	LEA-RONAL	FABRICATED METAL PRDS N F C						
LPR	LEIGH PRODUCTS INC	FABRICATED METAL PRDS N F C						
MY	MARLEY CO	FABRICATED METAL PRDS N F C						
MTX	METEX CORP	FABRICATED METAL PRDS N F C						
MIR	MIRRO ALUMINUM CO	FABRICATED METAL PRDS N F C						
NSD	NATIONAL STANDARD CO	FABRICATED METAL PRDS N F C						
PF	P + F INDUSTRIES INC	FABRICATED METAL PRDS N F C						
PHC	PACIFIC HOLDING	FABRICATED METAL PRDS N F C						
RIS	RISDON MFG CO	FABRICATED METAL PRDS N F C						
SGS	SIGNODE CORP	FABRICATED METAL PRDS N F C						
SYO	SYNALLOY CORP	FABRICATED METAL PRDS N F C						
TRN	TRINITY INDUSTRIES	FABRICATED METAL PRDS N F C						
WSO	WATSCO INC	FABRICATED METAL PRDS N F C						
YES	YATES INDUSTRIES INC	FABRICATED METAL PRDS N F C						
CSP	COMBUSTION ENGINEERING INC	ENGINES + TURBINES						
FMC	FOSTER WHEELER CORP	ENGINES + TURBINES						
OH	OUTBOARD MARINE CORP	ENGINES + TURBINES						
ROP	ROPER CORP	ENGINES + TURBINES						
AH	ALLIS-CHALMERS CORP	FARM + GARDEN MACHINERY + EQ						
DE	DEERE + CO	FARM + GARDEN MACHINERY + EQ						
HES	HESSTON CORP	FARM + GARDEN MACHINERY + EQ						
KUB	KUBOTA LTD	FARM + GARDEN MACHINERY + EQ						
MSE	MASSEY FERGUSON LTD	FARM + GARDEN MACHINERY + EQ						
TFY	TIFFANY INDUSTRIES	FARM + GARDEN MACHINERY + EQ						
AHO	AMERICAN HOIST + DERRICK CO	CONSTRUCTION MACHINERY + EQP						
BY	BUCYRUS-ERIE CO	CONSTRUCTION MACHINERY + EQP						
CMX	CMC CORP	CONSTRUCTION MACHINERY + EQP						
CAT	CATERPILLAR TRACTOR CO	CONSTRUCTION MACHINERY + EQP						

CKL	CLARK EQUIPMENT CO	CONSTRUCTION MACHINERY + EQP
CTR	CRUTCHER RESOURCES CORP	CONSTRUCTION MACHINERY + EQP
FMC	FMC CORP	CONSTRUCTION MACHINERY + EQP
KOE	KOEHRING CO	CONSTRUCTION MACHINERY + EQP
POR	PORTEC INC	CONSTRUCTION MACHINERY + EQP
REX	REXNORD INC	CONSTRUCTION MACHINERY + EQP
UNR	UNARCO INDUSTRIES INC	CONSTRUCTION MACHINERY + EQP
BKO	BAKER INTERNATIONAL CORP	OIL FIELD MACHINERY + EQUIP
BIG	BIG THREE INDUSTRIES	OIL FIELD MACHINERY + EQUIP
CAM	CAMCO INC	OIL FIELD MACHINERY + EQUIP
DI	DRESSER INDUSTRIES INC	OIL FIELD MACHINERY + EQUIP
GOI	GEARHART OWEN INDUSTRIES	OIL FIELD MACHINERY + EQUIP
HT	HUGHES TOOL CO	OIL FIELD MACHINERY + EQUIP
MTM	MARATHON MFG CO	OIL FIELD MACHINERY + EQUIP
SLB	SCHLUMBERGER LTD	OIL FIELD MACHINERY + EQUIP
SII	SMITH INTERNATIONAL INC	OIL FIELD MACHINERY + EQUIP
TEI	TEXAS INTERNATIONAL CO	OIL FIELD MACHINERY + EQUIP
TRO	TRICO INDUSTRIES	OIL FIELD MACHINERY + EQUIP
BPI	BROOKS + PERKINS INC	HOIST-INDUS CRANES-MONORAIL
MPH	HARNISCHFEGER CORP	HOIST-INDUS CRANES-MONORAIL
AMT	ACME-CLEVELAND CORP	METALWORKING MACHINERY + EQP
ACL	ACME PRECISION PRODUCTS INC	METALWORKING MACHINERY + EQP
BNS	BROWN + SHARPE MFG CO	METALWORKING MACHINERY + EQP
CMZ	CINCINNATI MILACRON INC	METALWORKING MACHINERY + EQP
CLA	CLAUSING CORP	METALWORKING MACHINERY + EQP
GID	GOODINGS + LEWIS INC	METALWORKING MACHINERY + EQP
KEAR	KEARNEY + TRECKER CORP	METALWORKING MACHINERY + EQP
MMO	MONARCH MACHINE TOOL CO	METALWORKING MACHINERY + EQP
RBC	REGAL BELOIT	METALWORKING MACHINERY + EQP
SKC	SKIL CORP	METALWORKING MACHINERY + EQP
SNS	SUNOSTRAND CORP	METALWORKING MACHINERY + EQP
WS	WARNER + SWASEY	METALWORKING MACHINERY + EQP
WID	WEAN UNITED INC	METALWORKING MACHINERY + EQP
BET	BETHLEHEM CORP	SPECIAL INDUSTRY MACHINERY
BOK	BLACK + DECKER MFG CO	SPECIAL INDUSTRY MACHINERY
CEM	COMPO INDS	SPECIAL INDUSTRY MACHINERY
CD	CORDON INTL	SPECIAL INDUSTRY MACHINERY
DOV	DOVER CORP	SPECIAL INDUSTRY MACHINERY
EMH	EMHART CORP	SPECIAL INDUSTRY MACHINERY
XLO	EX-CELL-O CORP	SPECIAL INDUSTRY MACHINERY
ION	IONICS INC	SPECIAL INDUSTRY MACHINERY
JOY	JOY MFG CO	SPECIAL INDUSTRY MACHINERY
LSO	LEESONA CORP	SPECIAL INDUSTRY MACHINERY
LSP	LODGE + SHIPLEY CO	SPECIAL INDUSTRY MACHINERY
MME	MCNEIL CORP	SPECIAL INDUSTRY MACHINERY
MLR	MIDLAND-ROSS CORP	SPECIAL INDUSTRY MACHINERY
NEW	NEWCOR INC	SPECIAL INDUSTRY MACHINERY
OMK	OMARK INDUSTRIES INC	SPECIAL INDUSTRY MACHINERY
PNU	PNEUMATIC SCALE CORP	SPECIAL INDUSTRY MACHINERY
RKY	ROCKAWAY CORP	SPECIAL INDUSTRY MACHINERY
SLS	SELAS CORP OF AMERICA	SPECIAL INDUSTRY MACHINERY
SLX	STERLING EXTRUDER CORP	SPECIAL INDUSTRY MACHINERY
SUM	STRUTHERS WELLS CORP	SPECIAL INDUSTRY MACHINERY
WEC	WADELL EQUIPMENT CO	SPECIAL INDUSTRY MACHINERY
WNW	WOOD INDUSTRIES INC	SPECIAL INDUSTRY MACHINERY
ATO	A-T-O INC	GENERAL INDUSTRIAL MACH + EQP
AER	AERO-FLOW DYNAMICS INC	GENERAL INDUSTRIAL MACH + EQP
AFX	ANSUL CO	GENERAL INDUSTRIAL MACH + EQP
ARO	ARO CORP	GENERAL INDUSTRIAL MACH + EQP
BTU	B T U ENGINEERING	GENERAL INDUSTRIAL MACH + EQP
B	BARNES GROUP INC	GENERAL INDUSTRIAL MACH + EQP
BIN	BINKS MFG CO	GENERAL INDUSTRIAL MACH + EQP
BGG	BRIGGS + STRATTON	GENERAL INDUSTRIAL MACH + EQP
CGG	CHICAGO PNEUMATIC TOOL CO	GENERAL INDUSTRIAL MACH + EQP
CBE	COOPER INDS INC	GENERAL INDUSTRIAL MACH + EQP
CM	CURTISS-WRIGHT CORP	GENERAL INDUSTRIAL MACH + EQP
DOR	DORR-OLIVER INC	GENERAL INDUSTRIAL MACH + EQP
DYA	DYNAMICS CORP OF AMERICA	GENERAL INDUSTRIAL MACH + EQP
GDC	GARDNER-DENVER CO	GENERAL INDUSTRIAL MACH + EQP
GRC	GORMAN-RUPP CO	GENERAL INDUSTRIAL MACH + EQP
GRH	GREER HYDRAULICS INC	GENERAL INDUSTRIAL MACH + EQP
HOB	HOBART CORP	GENERAL INDUSTRIAL MACH + EQP
IMG	IMC MAGNETICS CORP	GENERAL INDUSTRIAL MACH + EQP
IR	INGERSOLL-RAND CO	GENERAL INDUSTRIAL MACH + EQP
KE	KEENE CORP	GENERAL INDUSTRIAL MACH + EQP
LFE	LFE CORP	GENERAL INDUSTRIAL MACH + EQP
MTL	MATERIALS RESEARCH	GENERAL INDUSTRIAL MACH + EQP
MCC	MESTA MACHINE CO	GENERAL INDUSTRIAL MACH + EQP
MRC	MILTON ROY CO	GENERAL INDUSTRIAL MACH + EQP
NMS	NATIONAL MINE SERVICE CO	GENERAL INDUSTRIAL MACH + EQP
NWH	NEW HAMPSHIRE BALL BEARINGS	GENERAL INDUSTRIAL MACH + EQP
PLL	PALL CORP	GENERAL INDUSTRIAL MACH + EQP

PH	PARKER-HANNIFIN CORP	GENERAL INDUSTRIAL MACH	+ EQ
PEC	PENNSYLVANIA ENGINEERING	GENERAL INDUSTRIAL MACH	+ EQ
RBG	RANSBURG CORP	GENERAL INDUSTRIAL MACH	+ EQ
RIL	RILEY CO	GENERAL INDUSTRIAL MACH	+ EQ
SBS	SALEM CORP	GENERAL INDUSTRIAL MACH	+ EQ
STX	STEWART-WARNER CORP	GENERAL INDUSTRIAL MACH	+ EQ
TFX	TELEFLEX INC	GENERAL INDUSTRIAL MACH	+ EQ
TNY	TENNEY ENGINEERING INC	GENERAL INDUSTRIAL MACH	+ EQ
TOR	TORIN CORP	GENERAL INDUSTRIAL MACH	+ EQ
TDI	TWIN DISC INC	GENERAL INDUSTRIAL MACH	+ EQ
AAF	AMERICAN AIR FILTER CO	POLLUTION CONTROL MACHINERY	
APR	AMERICAN PRECISION INDS	POLLUTION CONTROL MACHINERY	
BFC	BUFFALO FORGE CO	POLLUTION CONTROL MACHINERY	
BGS	BURGESS INDS	POLLUTION CONTROL MACHINERY	
CE	COMBUSTION EQUIP ASSOC	POLLUTION CONTROL MACHINERY	
EVT	ENVIROTECH CORP	POLLUTION CONTROL MACHINERY	
PBD	PEABODY INTERNATIONAL CORP	POLLUTION CONTROL MACHINERY	
RC	RESEARCH-COTTRELL	POLLUTION CONTROL MACHINERY	
USF	U S FILTER CORP	POLLUTION CONTROL MACHINERY	
WFI	WHEELABRATOR-FRYE	POLLUTION CONTROL MACHINERY	
ZRN	ZURN INDUSTRIES INC	POLLUTION CONTROL MACHINERY	
AIN	ADDRESSOGRAPH-MULTIGRAPH	OFFICE COMPUTING + ACCTG	MCH
BGH	BURROUGHS CORP	OFFICE COMPUTING + ACCTG	MCH
CPI	CALIFORNIA COMPUTER PRODUCTS	OFFICE COMPUTING + ACCTG	MCH
CBU	COMMODORE INTL INC	OFFICE COMPUTING + ACCTG	MCH
CDA	CONTROL DATA CORP	OFFICE COMPUTING + ACCTG	MCH
ABD	DICK (A.B.) CO	OFFICE COMPUTING + ACCTG	MCH
DC	DICTAPHONE CORP	OFFICE COMPUTING + ACCTG	MCH
EA	ELECTRONIC ASSOCIATES INC	OFFICE COMPUTING + ACCTG	MCH
IBM	INTL BUSINESS MACHINES CORP	OFFICE COMPUTING + ACCTG	MCH
NCR	NCR CORP	OFFICE COMPUTING + ACCTG	MCH
NSH	NASHUA CORP	OFFICE COMPUTING + ACCTG	MCH
PBI	PITNEY-BOWES INC	OFFICE COMPUTING + ACCTG	MCH
SBM	SPEED-O-PRINT BUS MACHINES	OFFICE COMPUTING + ACCTG	MCH
WAN	WANG LABORATORIES	OFFICE COMPUTING + ACCTG	MCH
XRX	XEROX CORP	OFFICE COMPUTING + ACCTG	MCH
AMH	AMDAHL CORP	ELECTRONIC COMPUTING EQUIP	
ADS	APPLIED DIGITAL DATA SYSTEMS	ELECTRONIC COMPUTING EQUIP	
APH	APPLIED MAGNETICS CORP	ELECTRONIC COMPUTING EQUIP	
BAR	BARRY WRIGHT CORP	ELECTRONIC COMPUTING EQUIP	
CEN	CENTRONICS DATA COMPUTER	ELECTRONIC COMPUTING EQUIP	
DGN	DATA GENERAL CORP	ELECTRONIC COMPUTING EQUIP	
DTS	DATA TERMINAL SYSTEMS INC	ELECTRONIC COMPUTING EQUIP	
DPT	DATAPPOINT CORP	ELECTRONIC COMPUTING EQUIP	
DPC	DATAPRODUCTS CORP	ELECTRONIC COMPUTING EQUIP	
DEC	DIGITAL EQUIPMENT	ELECTRONIC COMPUTING EQUIP	
DCM	DOCUMENTATION INC	ELECTRONIC COMPUTING EQUIP	
EMM	ELECTRONIC MEMORIES + MAGNET	ELECTRONIC COMPUTING EQUIP	
HON	HONEYWELL INC	ELECTRONIC COMPUTING EQUIP	
LBP	LANIER BUSINESS PRODUCTS INC	ELECTRONIC COMPUTING EQUIP	
MX	MEASUREX CORP	ELECTRONIC COMPUTING EQUIP	
MRX	MEMOREX CORP	ELECTRONIC COMPUTING EQUIP	
MOS	MOHAWK DATA SCIENCES	ELECTRONIC COMPUTING EQUIP	
PCC	PERTEC COMPUTER CORP	ELECTRONIC COMPUTING EQUIP	
SY	SPERRY RAND CORP	ELECTRONIC COMPUTING EQUIP	MISSING QUARTERLY
STK	STORAGE TECHNOLOGY CORP	ELECTRONIC COMPUTING EQUIP	
SYT	SYSTEMS ENGINEERING LABS	ELECTRONIC COMPUTING EQUIP	MISSING QUARTERLY
TC	TELEX CORP	ELECTRONIC COMPUTING EQUIP	
CRR	CARRIER CORP	REFRIG + SERVICE IND MACHINE	
CRF	COPELAND CORP	REFRIG + SERVICE IND MACHINE	
L	CORNELIUS CO	REFRIG + SERVICE IND MACHINE	
FJQ	FEDDERS CORP	REFRIG + SERVICE IND MACHINE	
GCA	GCA CORP	REFRIG + SERVICE IND MACHINE	
TNT	TANNETICS INC	REFRIG + SERVICE IND MACHINE	
TECU	TECUMSEH PRODUCTS CO	REFRIG + SERVICE IND MACHINE	
TOK	TOKHEIM CORP	REFRIG + SERVICE IND MACHINE	
TRA	TRANE CO	REFRIG + SERVICE IND MACHINE	
UMT	UMC INDUSTRIES	REFRIG + SERVICE IND MACHINE	
VEN	VENDO CO	REFRIG + SERVICE IND MACHINE	
WML	WYLAIN INC	REFRIG + SERVICE IND MACHINE	
EMR	EMERSON ELECTRIC CO	ELEC + ELECTR MACH EQ + SUPP	
GE	GENERAL ELECTRIC CO	ELEC + ELECTR MACH EQ + SUPP	
NPH	NORTH AMERICAN PHILIPS CORP	ELEC + ELECTR MACH EQ + SUPP	
WX	WESTINGHOUSE ELECTRIC CORP	ELEC + ELECTR MACH EQ + SUPP	
BR	BUNKER RAMO CORP	ELEC TRANSMISSION + DISTR EQ	
CHI	CROUSE-HINDS CO	ELEC TRANSMISSION + DISTR EQ	
ET	ELTRA CORP	ELEC TRANSMISSION + DISTR EQ	
GLO	GOULD INC	ELEC TRANSMISSION + DISTR EQ	
MGR	MCGRAW-EDISON CO	ELEC TRANSMISSION + DISTR EQ	
MOG	MOOG INC	ELEC TRANSMISSION + DISTR EQ	

OHS	OHIO BRASS CO	ELEC TRANSMISSION +	DISTR EQ
RTE	R T E CORP	ELEC TRANSMISSION +	DISTR EQ
REE	RELIANCE ELECTRIC CO	ELEC TRANSMISSION +	DISTR EQ
UV	UV INDUSTRIES INC	ELEC TRANSMISSION +	DISTR EQ
BIR	BARNES ENGINEERING CO	INDUSTRIAL CONTROLS	
CLR	CLAROSTAT MANUF CO INC	INDUSTRIAL CONTROLS	
CH	CUTLER-HAMMER INC	INDUSTRIAL CONTROLS	
ECA	ELECTRONICS CORP OF AMERICA	INDUSTRIAL CONTROLS	
LDN	LEEDS + NORTHRUP CO	INDUSTRIAL CONTROLS	
SQD	SQUARE D CO	INDUSTRIAL CONTROLS	
ACI	AMERICAN CONTROLLED INDS	HOUSEHOLD APPLIANCES	
HMI	HEALTH-MOR INC	HOUSEHOLD APPLIANCES	
HOOV	HOOVER CO	HOUSEHOLD APPLIANCES	
MGC	MAGIC CHEF INC	HOUSEHOLD APPLIANCES	
MYG	MAYTAG CO	HOUSEHOLD APPLIANCES	
NPK	NATIONAL PRESTO INDS INC	HOUSEHOLD APPLIANCES	
RCE	REECE CORP	HOUSEHOLD APPLIANCES	
REP	REPUBLIC CORP	HOUSEHOLD APPLIANCES	
RON	RONSON CORP	HOUSEHOLD APPLIANCES	
SFZ	SCOTT + FETZER CO	HOUSEHOLD APPLIANCES	
SCO	SCOVILL MANUFACTURING CO	HOUSEHOLD APPLIANCES	
SMF	SINGER CO	HOUSEHOLD APPLIANCES	
SMB	SUNBEAM CORP	HOUSEHOLD APPLIANCES	
TAP	TAPPAN CO	HOUSEHOLD APPLIANCES	
WHR	WHIRLPOOL CORP	HOUSEHOLD APPLIANCES	
WSM	WHITE CONSOLIDATED INDS INC	HOUSEHOLD APPLIANCES	
DUR	DURO-TEST CORP	ELECTRIC LIGHTING-WIRING	EQ
ESQ	ESQUIRE INC	ELECTRIC LIGHTING-WIRING	EQ
LOL	LIGHTOLIER INC	ELECTRIC LIGHTING-WIRING	EQ
TEN	SENSOR CORP	ELECTRIC LIGHTING-WIRING	EQ
THI	THOMAS INDUSTRIES INC	ELECTRIC LIGHTING-WIRING	EQ
AND	ANDREA RADIO CORP	RADIO-TV RECEIVING SETS	
ADO	AUDIOTRONICS CORP	RADIO-TV RECEIVING SETS	
ART	AUTOMATIC RADIO MFG CO	RADIO-TV RECEIVING SETS	
CRA	CRAIG CORP	RADIO-TV RECEIVING SETS	
EME	EMERSON RADIO	RADIO-TV RECEIVING SETS	
EE	ESQUIRE RADIO + ELECTRON INC	RADIO-TV RECEIVING SETS	
LAF	LAFAYETTE RADIO ELCTRNC CORP	RADIO-TV RECEIVING SETS	
MC	MATSUSHITA ELECTRIC	RADIO-TV RECEIVING SETS	
RCA	RCA CORP	RADIO-TV RECEIVING SETS	
SNE	SONY CORP-ADR	RADIO-TV RECEIVING SETS	
TNA	TENNA CORP	RADIO-TV RECEIVING SETS	
ZE	ZENITH RADIO CORP	RADIO-TV RECEIVING SETS	
EMI	EMI LTD	PHONOGRAPH RECORDS	
WCI	WARNER COMMUNICATIONS INC	PHONOGRAPH RECORDS	
LYC	LYNCH COMMUNICATION SYSTEM	TELE + TELEGRAPH APPARATUS	
NT	NORTHERN TELECOM LTD	TELE + TELEGRAPH APPARATUS	
PLX	PLANTRONICS INC	TELE + TELEGRAPH APPARATUS	
AIR	AAR CORP	RADIO-TV TRANSMITTING EQUIP-AP	
AAR	ADAMS RUSSELL	RADIO-TV TRANSMITTING EQUIP-AP	
AHA	ALPHA INDS	RADIO-TV TRANSMITTING EQUIP-AP	
ADE	APPLIED DEVICES	RADIO-TV TRANSMITTING EQUIP-AP	
AYD	AYDIN CORP	RADIO-TV TRANSMITTING EQUIP-AP	
CMT	CMT INDS	RADIO-TV TRANSMITTING EQUIP-AP	
CHM	CANADIAN MARCONI CO	RADIO-TV TRANSMITTING EQUIP-AP	
COH	COHU INC	RADIO-TV TRANSMITTING EQUIP-AP	
CAX	CONRAC CORP	RADIO-TV TRANSMITTING EQUIP-AP	
ESY	E-SYSTEMS INC	RADIO-TV TRANSMITTING EQUIP-AP	
EXU	EXECUTONE INC	RADIO-TV TRANSMITTING EQUIP-AP	
GES	GENISCO TECHNOLOGY	RADIO-TV TRANSMITTING EQUIP-AP	
GRG	GRANGER ASSOCIATES	RADIO-TV TRANSMITTING EQUIP-AP	
HRS	HARRIS CORP	RADIO-TV TRANSMITTING EQUIP-AP	
JET	JETRONIC INDUSTRIES INC	RADIO-TV TRANSMITTING EQUIP-AP	
JEF	JOHNSON (E.F.) CO	RADIO-TV TRANSMITTING EQUIP-AP	
KRC	KING RADIO CORP	RADIO-TV TRANSMITTING EQUIP-AP	
LPI	LA POINTE INDUSTRIES	RADIO-TV TRANSMITTING EQUIP-AP	
LOY	LUNDY ELECTRONICS + SYSTEMS	RADIO-TV TRANSMITTING EQUIP-AP	
MOT	MOTOROLA INC	RADIO-TV TRANSMITTING EQUIP-AP	
RTN	RAYTHEON CO	RADIO-TV TRANSMITTING EQUIP-AP	
SFA	SCIENTIFIC-ATLANTA INC	RADIO-TV TRANSMITTING EQUIP-AP	
SNR	SUNAIR ELECTRONICS INC	RADIO-TV TRANSMITTING EQUIP-AP	
TSC	TELESCIENCES INC	RADIO-TV TRANSMITTING EQUIP-AP	
TRR	TRACOR INC	RADIO-TV TRANSMITTING EQUIP-AP	
WJ	WATKINS-JOHNSON	RADIO-TV TRANSMITTING EQUIP-AP	
ALE	ALTEC CORP	ELECTRONIC COMPONENTS + ACCE	
AB	AMBAC INDUSTRIES INC	ELECTRONIC COMPONENTS + ACCE	
AMP	AMP INC	ELECTRONIC COMPONENTS + ACCE	
EDO	EDO CORP	ELECTRONIC COMPONENTS + ACCE	
FCI	FAIRCHILD CAMERA + INSTRUMENT	ELECTRONIC COMPONENTS + ACCE	
GRL	GENERAL INSTRUMENT CORP	ELECTRONIC COMPONENTS + ACCE	
GUL	GULTON INDUSTRIES INC	ELECTRONIC COMPONENTS + ACCE	
HZ	HAZELTINE CORP	ELECTRONIC COMPONENTS + ACCE	

HVE	HIGH VOLTAGE ENGINEERING	ELECTRONIC COMPONENTS	+	ACCE
INTC	INTEL CORP	ELECTRONIC COMPONENTS	+	ACCE
LOR	LORAL CORP	ELECTRONIC COMPONENTS	+	ACCE
NSM	NATIONAL SEMICONDUCTOR CORP	ELECTRONIC COMPONENTS	+	ACCE
SAA	SANDERS ASSOCIATES INC	ELECTRONIC COMPONENTS	+	ACCE
SCA	SERVO CORP OF AMERICA	ELECTRONIC COMPONENTS	+	ACCE
SPA	SPARTON CORP	ELECTRONIC COMPONENTS	+	ACCE
TXN	TEXAS INSTRUMENTS INC	ELECTRONIC COMPONENTS	+	ACCE
VAR	VARIAN ASSOCIATES INC	ELECTRONIC COMPONENTS	+	ACCE
VRO	VARO INC	ELECTRONIC COMPONENTS	+	ACCE
VSH	VISHAY INTERTECHNOLOGY INC	ELECTRONIC COMPONENTS	+	ACCE
AVX	AVX CORP	ELECTRONIC COMPONENTS	N	CC
APX	AMPEX CORP	ELECTRONIC COMPONENTS	N	CC
AUG	AUGAT INC	ELECTRONIC COMPONENTS	N	CC
AVT	AVNET INC	ELECTRONIC COMPONENTS	N	CC
BDC	BURNDY CORP	ELECTRONIC COMPONENTS	N	CC
CTS	CTS CORP	ELECTRONIC COMPONENTS	N	CC
CT	CERTRON CORP	ELECTRONIC COMPONENTS	N	CC
DIO	DIODES INC	ELECTRONIC COMPONENTS	N	CC
EGG	EG+G INC	ELECTRONIC COMPONENTS	N	CC
EAD	ELECTRO AUDIO DYNAMICS	ELECTRONIC COMPONENTS	N	CC
EEC	ELECTRONIC ENGINEERING CO-CA	ELECTRONIC COMPONENTS	N	CC
EKA	ELECTRONIC RESEARCH ASSOC	ELECTRONIC COMPONENTS	N	CC
ESP	ESPEY MFG + ELECTRONICS CORP	ELECTRONIC COMPONENTS	N	CC
GTI	GTI CORP	ELECTRONIC COMPONENTS	N	CC
HGI	HI-G INC	ELECTRONIC COMPONENTS	N	CC
IRP	INTL RECTIFIER CORP	ELECTRONIC COMPONENTS	N	CC
LSI	LEAR SIEGLER CORP	ELECTRONIC COMPONENTS	N	CC
LGL	LYNCH CORP	ELECTRONIC COMPONENTS	N	CC
HAI	M A COM INC	ELECTRONIC COMPONENTS	N	CC
MRY	MALLORY (P.R.) + CO	ELECTRONIC COMPONENTS	N	CC
NRO	NARDA MICROWAVE CORP	ELECTRONIC COMPONENTS	N	CC
NDI	NUCLEAR DATA	ELECTRONIC COMPONENTS	N	CC
OAK	OAK INDUSTRIES INC	ELECTRONIC COMPONENTS	N	CC
PLY	PLESSEY CO LTD	ELECTRONIC COMPONENTS	N	CC
SG	SEAELECTRO CORP	ELECTRONIC COMPONENTS	N	CC
SMH	SEMTECH CORP	ELECTRONIC COMPONENTS	N	CC
SGI	SIGMA INSTRUMENTS	ELECTRONIC COMPONENTS	N	CC
SOD	SOLITRON DEVICES INC	ELECTRONIC COMPONENTS	N	CC
TCK	TEC INC	ELECTRONIC COMPONENTS	N	CC
TNL	TECHNITROL INC	ELECTRONIC COMPONENTS	N	CC
TNB	THOMAS + BETTS CORP	ELECTRONIC COMPONENTS	N	CC
TYC	TYCO LAB	ELECTRONIC COMPONENTS	N	CC
UMX	UNIMAX GROUP INC	ELECTRONIC COMPONENTS	N	CC
UTR	UNITRODE CORP	ELECTRONIC COMPONENTS	N	CC
VRN	VERNITRON CORP	ELECTRONIC COMPONENTS	N	CC
WAB	WABASH INC	ELECTRONIC COMPONENTS	N	CC
ASV	AUTOMATIC SWITCH	ELECTRICAL MACHY+EQUIP	N	CC
BEZ	BALDOR ELECTRIC	ELECTRICAL MACHY+EQUIP	N	CC
ECH	ECHLIN MFG CO	ELECTRICAL MACHY+EQUIP	N	CC
GLB	GLOBE-UNION INC	ELECTRICAL MACHY+EQUIP	N	CC
HIP	HIPOTRONICS INC	ELECTRICAL MACHY+EQUIP	N	CC
HUB	HUBBELL (HARVEY) INC-CL 8	ELECTRICAL MACHY+EQUIP	N	CC
MOT	MEDTRONIC INC	ELECTRICAL MACHY+EQUIP	N	CC
SL	SGL INDUSTRIES INC	ELECTRICAL MACHY+EQUIP	N	CC
WNC	WALCO NATIONAL CORP	ELECTRICAL MACHY+EQUIP	N	CC
AMO	AMERICAN MOTORS CORP	MOTOR VEHICLES + CAR BODIES		
CHC	CHECKER MOTORS CORP	MOTOR VEHICLES + CAR BODIES		
C	CHRYSLER CORP	MOTOR VEHICLES + CAR BODIES		
FC	FORD MOTOR CO OF CANADA LTD	MOTOR VEHICLES + CAR BODIES		
F	FORD MOTOR CO	MOTOR VEHICLES + CAR BODIES		
GM	GENERAL MOTORS CORP	MOTOR VEHICLES + CAR BODIES		
ALW	ALTAMIL CORP	TRUCK + BUS BODIES		
CCI	CCI CORP	TRUCK + BUS BODIES		
CDT	CONDEC CORP	TRUCK + BUS BODIES		
CUM	CUMMINS ENGINE	TRUCK + BUS BODIES		
HR	INTL HARVESTER CO	TRUCK + BUS BODIES		
NOV	NOVO CORP	TRUCK + BUS BODIES		
SGT	SARGENT INDUSTRIES	TRUCK + BUS BODIES		
WH	WHITE MOTOR CORP	TRUCK + BUS BODIES		
ASP	ASPRO INC	MOTOR VEHICLE PARTS-ACCESSOR		
ALN	ALLEN GROUP	MOTOR VEHICLE PARTS-ACCESSOR		
ASQ	AMERICAN SAFETY EQUIP CORP	MOTOR VEHICLE PARTS-ACCESSOR		
	42727 3714 AI D ARROW	AUTOMOTIVE INDUSTRIES		MISSING QUARTERLY
ARV	ARVIN INDUSTRIES INC	MOTOR VEHICLE PARTS-ACCESSOR		
BER	BEARINGS INC	MOTOR VEHICLE PARTS-ACCESSOR		
BX	BENDIX CORP	MOTOR VEHICLE PARTS-ACCESSOR		
BOR	BORG-WARNER CORP	MOTOR VEHICLE PARTS-ACCESSOR		
BUE	BUELL INDUSTRIES INC	MOTOR VEHICLE PARTS-ACCESSOR		
CHM	CHAMPION SPARK PLUG	MOTOR VEHICLE PARTS-ACCESSOR		
CRI	CORE INDUSTRIES INC	MOTOR VEHICLE PARTS-ACCESSOR		
DCN	DANA CORP	MOTOR VEHICLE PARTS-ACCESSOR		

EPI	EAGLE-PICHER INDS	MOTOR VEHICLE	PARTS-ACESSOR
ETN	EATON CORP	MOTOR VEHICLE	PARTS-ACESSOR
FDI	FDI INC	MOTOR VEHICLE	PARTS-ACESSOR
FCT	FACET ENTERPRISES	MOTOR VEHICLE	PARTS-ACESSOR
FMO	FEDERAL-MOGUL CORP	MOTOR VEHICLE	PARTS-ACESSOR
FTR	FRUEHAUF CORP	MOTOR VEHICLE	PARTS-ACESSOR
GAT	GATEWAY INDUSTRIES INC	MOTOR VEHICLE	PARTS-ACESSOR
GLE	GLEASON WORKS	MOTOR VEHICLE	PARTS-ACESSOR
HMF	HASTINGS MFG CO	MOTOR VEHICLE	PARTS-ACESSOR
HAY	HAYES-ALBION CORP	MOTOR VEHICLE	PARTS-ACESSOR
HH	HOUDAILLE INDUSTRIES INC	MOTOR VEHICLE	PARTS-ACESSOR
HOW	HOWELL INDUSTRIES INC	MOTOR VEHICLE	PARTS-ACESSOR
KZ	KYSOR INDUSTRIAL CORP	MOTOR VEHICLE	PARTS-ACESSOR
MAR	MAREMONT CORP	MOTOR VEHICLE	PARTS-ACESSOR
NAP	NAPCO INDUSTRIES INC	MOTOR VEHICLE	PARTS-ACESSOR
IQ	QUESTOR CORP	MOTOR VEHICLE	PARTS-ACESSOR
RAY	RAYBESTOS-MANHATTAN INC	MOTOR VEHICLE	PARTS-ACESSOR
RYH	RYERSON + HAYNES INC	MOTOR VEHICLE	PARTS-ACESSOR
SFE	SAFEGUARD INDS INC	MOTOR VEHICLE	PARTS-ACESSOR
SPW	SEALED POWER	MOTOR VEHICLE	PARTS-ACESSOR
SHG	SHELLER-GLOBE	MOTOR VEHICLE	PARTS-ACESSOR
SMC	SMITH (A.O.) CORP	MOTOR VEHICLE	PARTS-ACESSOR
SHP	STANDARD MOTOR PRODUCTS INC	MOTOR VEHICLE	PARTS-ACESSOR
SPD	STANDARD PRODUCTS CO	MOTOR VEHICLE	PARTS-ACESSOR
SE	SUN ELECTRIC CORP	MOTOR VEHICLE	PARTS-ACESSOR
SUP	SUPERIOR INDUSTRIES INTL	MOTOR VEHICLE	PARTS-ACESSOR
TRW	TRW INC	MOTOR VEHICLE	PARTS-ACESSOR
TKR	TIMKEN CO	MOTOR VEHICLE	PARTS-ACESSOR
CEA	CESSNA AIRCRAFT CO	AIRCRAFT + PARTS	
FEN	FAIRCHILD INDUSTRIES INC	AIRCRAFT + PARTS	
LK	LOCKHEED CORP	AIRCRAFT + PARTS	
NOC	NORTHROP CORP	AIRCRAFT + PARTS	
BCX	BEECH AIRCRAFT CORP	AIRCRAFT	
BA	BOEING CO	AIRCRAFT	
GLJ	GATES LEARJET CORP	AIRCRAFT	
MD	MCDONNELL DOUGLAS CORP	AIRCRAFT	
ARN	AERONCA INC	AIRCRAFT	
BTA	BERTEA CORP	AIRCRAFT PARTS + AUX EQUIP	
MCT	MACRODYNE INDS	AIRCRAFT PARTS + AUX EQUIP	
MTY	MAUL TECHNOLOGY CORP	AIRCRAFT PARTS + AUX EQUIP	
OEA	OEA INC	AIRCRAFT PARTS + AUX EQUIP	
RHR	ROHR INDUSTRIES	AIRCRAFT PARTS + AUX EQUIP	
SSS	SSP INDUSTRIES	AIRCRAFT PARTS + AUX EQUIP	
SER	SIERRACIN CORP	AIRCRAFT PARTS + AUX EQUIP	
SAC	STANLEY AVIATION CORP	AIRCRAFT PARTS + AUX EQUIP	
TRE	TRE CORP	AIRCRAFT PARTS + AUX EQUIP	
UAP	UNITED AIRCRAFT PRODUCTS INC	AIRCRAFT PARTS + AUX EQUIP	
UTX	UNITED TECHNOLOGIES CORP	AIRCRAFT PARTS + AUX EQUIP	
ABG	AMERICAN SHIP-BUILDING CO	SHIP-BOAT BUILDING+REPAIRING	
BNK	BANGOR PUNTA CORP	SHIP-BOAT BUILDING+REPAIRING	
CMH	CAMPBELL INDS	SHIP-BOAT BUILDING+REPAIRING	
CCN	CHRIS-CRAFT INDS	SHIP-BOAT BUILDING+REPAIRING	
CRY	CONROY INC	SHIP-BOAT BUILDING+REPAIRING	
GD	GENERAL DYNAMICS CORP	SHIP-BOAT BUILDING+REPAIRING	
TOD	TODD SHIPYARDS CORP	SHIP-BOAT BUILDING+REPAIRING	
ACF	ACF INDS	RAILROAD EQUIPMENT	
AO	AMSTED INDUSTRIES	RAILROAD EQUIPMENT	
GMT	GATX CORP	RAILROAD EQUIPMENT	
GSI	GENERAL STEEL INDS	RAILROAD EQUIPMENT	
PFG	PITTSBURGH FORGINGS CO	RAILROAD EQUIPMENT	
HUF	HUFFY CORP	MOTORCYCLES BICYCLES + PARTS	
MYO	MURRAY OHIO MFG CO	MOTORCYCLES BICYCLES + PARTS	
GQ	GRUMMAN CORP	GUIDED MISSILES + SPACE VEH	
ML	MARTIN MARIETTA CORP	GUIDED MISSILES + SPACE VEH	
ROK	ROCKWELL INTL CORP	GUIDED MISSILES + SPACE VEH	
THI	THIokol CORP	GUIDED MISSILES + SPACE VEH	
COA	COACHMEN INDUSTRIES INC	TRAVEL TRAILERS + CAMPERS	
EII	EXECUTIVE INDUSTRIES	TRAVEL TRAILERS + CAMPERS	
FLE	FLEETWOOD ENTERPRISES	TRAVEL TRAILERS + CAMPERS	
VSY	VESELY CO	TRAVEL TRAILERS + CAMPERS	
WGO	WINNEBAGO INDUSTRIES	TRAVEL TRAILERS + CAMPERS	
ASE	AMERICAN SCIENCE ENGINEERING	ENGR LAB + RESEARCH EQUIP	
AME	AMETEK INC	ENGR LAB + RESEARCH EQUIP	
BEC	BECKMAN INSTRUMENTS INC	ENGR LAB + RESEARCH EQUIP	
CUB	CUBIC CORP	ENGR LAB + RESEARCH EQUIP	
FS	FISHER SCIENTIFIC CO	ENGR LAB + RESEARCH EQUIP	
GRB	GERBER SCIENTIFIC INSTRUMENT	ENGR LAB + RESEARCH EQUIP	
HEI	HEINICKE INSTRUMENTS	ENGR LAB + RESEARCH EQUIP	
PKN	PERKIN-ELMER CORP	ENGR LAB + RESEARCH EQUIP	
SWS	SARGENT-WELCH SCIENTIFIC	ENGR LAB + RESEARCH EQUIP	
SIR	SCHILLER INDUSTRIES	ENGR LAB + RESEARCH EQUIP	

TSY	TECH-SYM CORP	ENGR LAB + RESEARCH EQUIP
TCN	TECHNICON CORP	ENGR LAB + RESEARCH EQUIP
UIC	UNITED INDUSTRIAL CORP	ENGR LAB + RESEARCH EQUIP
VEE	VEECO INSTRUMENTS	ENGR LAB + RESEARCH EQUIP
BMI	BADGER METER INC	MEASURING + CONTROLLING INST
ISN	INSTRON CORP	MEASURING + CONTROLLING INST
JCI	JOHNSON CONTROLS INC	MEASURING + CONTROLLING INST
RNI	RANCO INC	MEASURING + CONTROLLING INST
ROF	ROBERTSHAW CONTROLS	MEASURING + CONTROLLING INST
SYS	SYSTRON-DONNER CORP	MEASURING + CONTROLLING INST
DAN	DANIEL INDUSTRIES	INDUSTRIAL MEASUREMENT INSTR
ESL	ESTERLINE CORP	INDUSTRIAL MEASUREMENT INSTR
FP	FISCHER + PORTER CO	INDUSTRIAL MEASUREMENT INSTR
FOX	FOXBORO CO	INDUSTRIAL MEASUREMENT INSTR
GXX	GENERAL SIGNAL CORP	INDUSTRIAL MEASUREMENT INSTR
HWP	HEWLETT-PACKARD CO	INDUSTRIAL MEASUREMENT INSTR
SP	SIMMONDS PRECISION PRODS INC	INDUSTRIAL MEASUREMENT INSTR
FKM	FLUKE (JOHN) MFG CO	ELEC MEAS + TEST INSTR
MUL	MULTI-AMP CORP	ELEC MEAS + TEST INSTR
TEK	TEKTRONIX INC	ELEC MEAS + TEST INSTR
TER	TERADYNE INC	ELEC MEAS + TEST INSTR
BOL	BAUSCH + LOMB INC	OPTICAL INSTRUMENTS + LENSES
FRG	FRIGITRONICS INC	OPTICAL INSTRUMENTS + LENSES
ITK	ITEK CORP	OPTICAL INSTRUMENTS + LENSES
KOL	KOLLMORGEN CORP	OPTICAL INSTRUMENTS + LENSES
NPD	NATIONAL PATENT DEVELOPMENT	OPTICAL INSTRUMENTS + LENSES
AFH	AFFILIATED HOSPITAL PRODS	SURG + MED INSTRUMENTS + APP
AHS	AMERICAN HOSPITAL SUPPLY	SURG + MED INSTRUMENTS + APP
ASZ	AMERICAN STERILIZER CO	SURG + MED INSTRUMENTS + APP
BCR	BARD (C.R.) INC	SURG + MED INSTRUMENTS + APP
BAX	BAXTER TRAVENOL LABORATORIES	SURG + MED INSTRUMENTS + APP
BDX	BECTON, DICKINSON + CO	SURG + MED INSTRUMENTS + APP
HCL	HYCEL INC	SURG + MED INSTRUMENTS + APP
JNJ	JOHNSON + JOHNSON	SURG + MED INSTRUMENTS + APP
NAO	NARCO SCIENTIFIC INC	SURG + MED INSTRUMENTS + APP
SYB	SYBRON CORP	SURG + MED INSTRUMENTS + APP
TEC	TECHNICARE CORP	SURG + MED INSTRUMENTS + APP
CAV	CAVITRON CORP	DENTAL EQUIP + SUPPLIES
DTZ	DEN-TAL-EZ INC	DENTAL EQUIP + SUPPLIES
OSP	DENTSPLY INTERNATIONAL INC	DENTAL EQUIP + SUPPLIES
	* 524038 3843 LPH D LEE PHARMACEUTICALS	*** MISSING ITEM(15)
ANK	ANKEN INDUSTRIES	PHOTOGRAPHIC EQUIP + SUPPL
BHM	BELL + HOWELL CO	PHOTOGRAPHIC EQUIP + SUPPL
EK	EASTMAN KODAK CO	PHOTOGRAPHIC EQUIP + SUPPL
HCC	HUNT (PHILIP A.) CHEMICAL	PHOTOGRAPHIC EQUIP + SUPPL
MMM	MINNESOTA MINING + MFG CO	PHOTOGRAPHIC EQUIP + SUPPL
PRO	POLAROID CORP	PHOTOGRAPHIC EQUIP + SUPPL
VGC	VISUAL GRAPHICS	PHOTOGRAPHIC EQUIP + SUPPL
BVA	BULOVA WATCH CO	WATCHES CLOCKS + PARTS
HMM	HMM INDUSTRIES INC	WATCHES CLOCKS + PARTS
TAL	TALLEY INDUSTRIES INC	WATCHES CLOCKS + PARTS
DJI	DESIGNCRAFT JEWEL INDS	JEWELRY-PRECIOUS METALS
FM	FRANKLIN MINT CORP	JEWELRY-PRECIOUS METALS
RIC	RIGHTON INTERNATIONAL CORP	JEWELRY-PRECIOUS METALS
SDT	STERNO DENT CORP	JEWELRY-PRECIOUS METALS
SNK	SWANK INC	JEWELRY-PRECIOUS METALS
WEB	WELLS BENRUS CORP	JEWELRY-PRECIOUS METALS
NSL	NATIONAL SILVER INDS	SILVERWARE-PLATEWARE
OCQ	ONEIDA LTD	SILVERWARE-PLATEWARE
NRL	NORLIN CORP	MUSICAL INSTRUMENTS
PRA	PRATT-READ CORP	MUSICAL INSTRUMENTS
WUR	WURLITZER CO	MUSICAL INSTRUMENTS
AMF	AMF INC	TOYS + AMUSEMENT SPORT GOODS
AEI	ARCTIC ENTERPRISES INC	TOYS + AMUSEMENT SPORT GOODS
BC	BRUNSWICK CORP	TOYS + AMUSEMENT SPORT GOODS
CLO	COLECO INDS	TOYS + AMUSEMENT SPORT GOODS
CLN	COLEMAN CO INC	TOYS + AMUSEMENT SPORT GOODS
GAB	GABRIEL INDS	TOYS + AMUSEMENT SPORT GOODS
GIA	GARCIA CORP	TOYS + AMUSEMENT SPORT GOODS
HAS	HASBRO INDUSTRIES INC	TOYS + AMUSEMENT SPORT GOODS
ID	IDEAL TOY CORP	TOYS + AMUSEMENT SPORT GOODS
MAT	MATTEL INC	TOYS + AMUSEMENT SPORT GOODS
MDI	MEDALIST INDS	TOYS + AMUSEMENT SPORT GOODS
MB	MILTON BRADLEY CO	TOYS + AMUSEMENT SPORT GOODS
OAR	OHIO ART CO	TOYS + AMUSEMENT SPORT GOODS
SKP	SHAKESPEARE CO	TOYS + AMUSEMENT SPORT GOODS
TAC	TANDYCRAFTS INC	TOYS + AMUSEMENT SPORT GOODS
TKA	TONKA CORP	TOYS + AMUSEMENT SPORT GOODS
BIC	BIC PEN CORP	PENS-PENCIL + OTH OFFICE MAT
BYS	BINNEY + SMITH INC	PENS-PENCIL + OTH OFFICE MAT
ATX	CROSS (A.T.) + CO-CL A	PENS-PENCIL + OTH OFFICE MAT
MAGM	MAGIC MARKER CORP	PENS-PENCIL + OTH OFFICE MAT

ATM	AMERICAN TECHNICAL IND	MISC	MANUFACTURING	INDUSTRIE
BLY	BALLY MFG CORP	MISC	MANUFACTURING	INDUSTRIE
CENG	CAPITAL ENERGY CORP	MISC	MANUFACTURING	INDUSTRIE
CTF	CERTIFIED CORP	MISC	MANUFACTURING	INDUSTRIE
CDC	COMPU DYNE CORP	MISC	MANUFACTURING	INDUSTRIE
EVS	EVANS-ARISTOCRAT INDS	MISC	MANUFACTURING	INDUSTRIE
HB	HILLENBRAND INDUSTRIES	MISC	MANUFACTURING	INDUSTRIE
JOS	JOSTENS INC	MISC	MANUFACTURING	INDUSTRIE
BNI	BURLINGTON NORTHERN INC	MISC	MANUFACTURING	INDUSTRIE
CP	CANADIAN PACIFIC LTD	RAILROADS-LINE	HAUL	OPERATNG
CO	CHESSIE SYSTEM INC	RAILROADS-LINE	HAUL	OPERATNG
CNWE	CHICAGO+ N WESTN TRANSN-CL A	RAILROADS-LINE	HAUL	OPERATNG
ICX	IC INDUSTRIES INC	RAILROADS-LINE	HAUL	OPERATNG
KSU	KANSAS CITY SOUTHERN INDS	RAILROADS-LINE	HAUL	OPERATNG
MIS	MISSOURI PACIFIC CORP	RAILROADS-LINE	HAUL	OPERATNG
NFK	NORFOLK + WESTERN RAILWAY	RAILROADS-LINE	HAUL	OPERATNG
RGI	RIO GRANDE INDUSTRIES	RAILROADS-LINE	HAUL	OPERATNG
FN	ST LOUIS-SAN FRAN RAILWAY	RAILROADS-LINE	HAUL	OPERATNG
SFF	SANTA FE INDUSTRIES	RAILROADS-LINE	HAUL	OPERATNG
SCI	SEABOARD COAST LINE INDS	RAILROADS-LINE	HAUL	OPERATNG
SOO	SOO LINE RAILROAD	RAILROADS-LINE	HAUL	OPERATNG
SX	SOUTHERN PACIFIC CO	RAILROADS-LINE	HAUL	OPERATNG
SR	SOUTHERN RAILWAY	RAILROADS-LINE	HAUL	OPERATNG
UNP	UNION PACIFIC CORP	RAILROADS-LINE	HAUL	OPERATNG
WPI	WESTERN PACIFIC INDUSTRIES	RAILROADS-LINE	HAUL	OPERATNG
ATC	AUTO-TRAIN CORP	SWITCHING-TERMINAL CO		
ABZ	ARKANSAS BEST CORP	TRUCKING-LOCAL+LONG	DISTANCE	
BNR	BANNER INDS INC	TRUCKING-LOCAL+LONG	DISTANCE	
BII	BRANCH INDS	TRUCKING-LOCAL+LONG	DISTANCE	
BTL	BUTLER INTL	TRUCKING-LOCAL+LONG	DISTANCE	
CHM	C H TRANSPORT INC	TRUCKING-LOCAL+LONG	DISTANCE	
CAO	CAROLINA FREIGHT CARRIERS	TRUCKING-LOCAL+LONG	DISTANCE	
CNF	CONSOLIDATED FREIGHTWAYS INC	TRUCKING-LOCAL+LONG	DISTANCE	
CJT	COOPER-JARRETT INC	TRUCKING-LOCAL+LONG	DISTANCE	
EAZ	EAZOR EXPRESS INC	TRUCKING-LOCAL+LONG	DISTANCE	
FQA	FUQUA INDS INC	TRUCKING-LOCAL+LONG	DISTANCE	
GCY	GOLDEN CYCLE CORP	TRUCKING-LOCAL+LONG	DISTANCE	
HMT	HALL'S MOTOR TRANSIT	TRUCKING-LOCAL+LONG	DISTANCE	
LTC	LEASEWAY TRANS CORP	TRUCKING-LOCAL+LONG	DISTANCE	
MLN	MCLEAN TRUCKING CO	TRUCKING-LOCAL+LONG	DISTANCE	
MRCH	MERCHANTS INC	TRUCKING-LOCAL+LONG	DISTANCE	
NTL	NATIONAL CITY LINES	TRUCKING-LOCAL+LONG	DISTANCE	
OVT	OVERNITE TRANSPORTATION	TRUCKING-LOCAL+LONG	DISTANCE	
REF	REFRIGERATED TRANSPORT INC	TRUCKING-LOCAL+LONG	DISTANCE	
ROAD	ROADWAY EXPRESS INC	TRUCKING-LOCAL+LONG	DISTANCE	
RO	ROCOR INTERNATIONAL	TRUCKING-LOCAL+LONG	DISTANCE	
SST	SMITH'S TRANSFER	TRUCKING-LOCAL+LONG	DISTANCE	
SIX	SPECTOR INDUSTRIES	TRUCKING-LOCAL+LONG	DISTANCE	
TMDC	T.I.M.E. DC INC	TRUCKING-LOCAL+LONG	DISTANCE	
TEL	TELECOM CORP	TRUCKING-LOCAL+LONG	DISTANCE	
TCL	TRANSCON LINES	TRUCKING-LOCAL+LONG	DISTANCE	
TSM	TRI-STATE MOTOR TRANSIT	TRUCKING-LOCAL+LONG	DISTANCE	
WDS	WOODS CORP	TRUCKING-LOCAL+LONG	DISTANCE	
YELL	YELLOW FREIGHT SYSTEM	TRUCKING-LOCAL+LONG	DISTANCE	
KEX	KIRBY EXPLORATION CO	WATER TRANSPORTATION		
MMR	MOORE MCCORMACK RESOURCES	WATER TRANSPORTATION		
OSG	OVERSEAS SHIPHOLDING GROUP	WATER TRANSPORTATION		
SCN	SEA-CONTAINERS	WATER TRANSPORTATION		
SEA	SEATRAN LINES	WATER TRANSPORTATION		
TOW	TIDEWATER INC	WATER TRANSPORTATION		
ALK	ALASKA AIRLINES INC	AIR TRANSPORTATION-CERTIFIED		
ALA	ALLEGHENY AIRLINES INC	AIR TRANSPORTATION-CERTIFIED		
AMR	AMERICAN AIRLINES INC	AIR TRANSPORTATION-CERTIFIED		
BNF	BRANIFF INTL CORP	AIR TRANSPORTATION-CERTIFIED		
CAIR	CAPITOL INTL AIRWAYS	AIR TRANSPORTATION-CERTIFIED		
CAL	CONTINENTAL AIR LINES INC	AIR TRANSPORTATION-CERTIFIED		
DAL	DELTA AIR LINES INC	AIR TRANSPORTATION-CERTIFIED		
EAL	EASTERN AIR LINES	AIR TRANSPORTATION-CERTIFIED		
FA	FRONTIER AIRLINES INC	AIR TRANSPORTATION-CERTIFIED		
HA	HAWAIIAN AIRLINES INC	AIR TRANSPORTATION-CERTIFIED		
KLM	KLM ROYAL DUTCH AIRLINES	AIR TRANSPORTATION-CERTIFIED		
NAL	NATIONAL AIRLINES INC	AIR TRANSPORTATION-CERTIFIED		
NCA	NORTH CENTRAL AIRLINES INC	AIR TRANSPORTATION-CERTIFIED		
NWA	NORTHWEST AIRLINES INC	AIR TRANSPORTATION-CERTIFIED		
OVER	OVERSEAS NATIONAL AIRWAYS	AIR TRANSPORTATION-CERTIFIED		
OZA	OZARK AIR LINES INC	AIR TRANSPORTATION-CERTIFIED		
PSA	PSA INC	AIR TRANSPORTATION-CERTIFIED		
PN	PAN AMERICAN WORLD AIRWAYS	AIR TRANSPORTATION-CERTIFIED		
PIED	PIEDMONT AVIATION INC	AIR TRANSPORTATION-CERTIFIED		
SWA	SEABOARD WORLD AIRLINES	AIR TRANSPORTATION-CERTIFIED		
STHN	SOUTHERN AIRWAYS INC	AIR TRANSPORTATION-CERTIFIED		
LUV	SOUTHWEST AIRLINES	AIR TRANSPORTATION-CERTIFIED		

TGR	TIGER INTERNATIONAL	AIR TRANSPORTATION-CERTIFIED
TWA	TRANS WORLD AIRLINES	AIR TRANSPORTATION-CERTIFIED
UAL	UAL INC	AIR TRANSPORTATION-CERTIFIED
WAL	WESTERN AIR LINES INC	AIR TRANSPORTATION-CERTIFIED
WCON	WIEN AIR ALASKA	AIR TRANSPORTATION-CERTIFIED
WOA	WORLD AIRWAYS INC	AIR TRANSPORTATION-CERTIFIED
ABF	AIRBORNE FREIGHT CORP	TRANSPORTATION SERVICES
CRH	CANAL-RANDOLPH CORP	TRANSPORTATION SERVICES
EAF	EMERY AIR FREIGHT CORP	TRANSPORTATION SERVICES
SHU	SHULMAN TRANSPORT ENTERPRISE	TRANSPORTATION SERVICES
TNH	TRANSWAY INTERNATIONAL CORP	TRANSPORTATION SERVICES
MAF	W T C INC	TRANSPORTATION SERVICES
T	AMERICAN TELE + TELEGRAPH	TELEPHONE COMMUNICATION
BCA	BELL TELEPHONE OF CANADA	TELEPHONE COMMUNICATION
CTU	CENTRAL TELEPHONE + UTIL	TELEPHONE COMMUNICATION
CSN	CINCINNATI BELL INC	TELEPHONE COMMUNICATION
CQ	COMMUNICATIONS SATELLITE	TELEPHONE COMMUNICATION
CTC	CONTINENTAL TEL CORP	TELEPHONE COMMUNICATION
GTE	GENERAL TELEPHONE+ELECTRONCS	TELEPHONE COMMUNICATION
MID	MID-CONTINENT TELEPHONE	TELEPHONE COMMUNICATION
HOU	MOUNTAIN STATES TEL + TEL	TELEPHONE COMMUNICATION
NTT	NEW ENG TEL + TEL	TELEPHONE COMMUNICATION
PNB	PACIFIC NOWEST BELL TELEPHON	TELEPHONE COMMUNICATION
PAC	PACIFIC TEL + TEL CO	TELEPHONE COMMUNICATION
PHI	PHILLIPINE LONG DISTANCE TEL	TELEPHONE COMMUNICATION
RTC	ROCHESTER TEL CO	TELEPHONE COMMUNICATION
SNG	SOUTHERN NEW ENG TELEPHONE	TELEPHONE COMMUNICATION
UT	UNITED TELECOMMUNICATIONS	TELEPHONE COMMUNICATION
WUI	WUI INC	TELEPHONE COMMUNICATION
WU	WESTERN UNION CORP	TELEPHONE COMMUNICATION
ABC	AMERICAN BROADCASTING	RADIO-TV BROADCASTERS
CBS	CBS INC	RADIO-TV BROADCASTERS
CWL	COWLES COMMUNICATIONS	RADIO-TV BROADCASTERS
COX	COX BROADCASTING CORP	RADIO-TV BROADCASTERS
GGG	GROSS TELECASTING	RADIO-TV BROADCASTERS
MET	METROMEDIA INC	RADIO-TV BROADCASTERS
RBT	REEVES TELECOM CORP	RADIO-TV BROADCASTERS
SOB	SONDERLING BROADCASTING CORP	RADIO-TV BROADCASTERS
SBK	STORER BROADCASTING CO	RADIO-TV BROADCASTERS
TFB	TAFT BROADCASTING CO	RADIO-TV BROADCASTERS
TP	TELEPROMPTER CORP	CATV
VIA	VIACOM INTERNATIONAL	CATV
AYP	ALLEGHENY POWER SYSTEM	ELECTRIC UTILITIES-FLOW THRU
AZP	ARIZONA PUBLIC SERVICE CO	ELECTRIC UTILITIES-FLOW THRU
CPN	CP NATIONAL CORP	ELECTRIC UTILITIES-FLOW THRU
CNH	CENTRAL HUDSON GAS + ELEC	ELECTRIC UTILITIES-FLOW THRU
CPUB	CENTRAL VERMONT PUB SERV	ELECTRIC UTILITIES-FLOW THRU
CIN	CINCINNATI GAS + ELECTRIC	ELECTRIC UTILITIES-FLOW THRU
COC	COLUMBUS + SOUTHERN OHIO	ELECTRIC UTILITIES-FLOW THRU
COED	CONCORD ELECTRIC CO	ELECTRIC UTILITIES-FLOW THRU
EO	CONSOLIDATED EDISON OF N.Y.	ELECTRIC UTILITIES-FLOW THRU
DPL	DAYTON POWER + LIGHT	ELECTRIC UTILITIES-FLOW THRU
DEM	DELMARVA POWER + LIGHT	ELECTRIC UTILITIES-FLOW THRU
GPWR	GREEN MOUNTAIN POWER CORP	ELECTRIC UTILITIES-FLOW THRU
LIL	LONG ISLAND LIGHTING	ELECTRIC UTILITIES-FLOW THRU
NVP	NEVADA POWER CO	ELECTRIC UTILITIES-FLOW THRU
NGE	NEW YORK STATE ELEC + GAS	ELECTRIC UTILITIES-FLOW THRU
NMK	NIAGARA MOHAWK POWER	ELECTRIC UTILITIES-FLOW THRU
NU	NORTHEAST UTILITIES	ELECTRIC UTILITIES-FLOW THRU
DEC	OHIO EDISON CO	ELECTRIC UTILITIES-FLOW THRU
ORU	ORANGE + ROCKLAND UTILITIES	ELECTRIC UTILITIES-FLOW THRU
PCG	PACIFIC GAS + ELECTRIC	ELECTRIC UTILITIES-FLOW THRU
PPW	PACIFIC POWER + LIGHT	ELECTRIC UTILITIES-FLOW THRU
PPL	PENNSYLVANIA POWER + LIGHT	ELECTRIC UTILITIES-FLOW THRU
PGN	PORTLAND GENERAL ELECTRIC CO	ELECTRIC UTILITIES-FLOW THRU
PNH	PUB.SRV.OF N H	ELECTRIC UTILITIES-FLOW THRU
PSD	PUGET SOUND POWER + LIGHT	ELECTRIC UTILITIES-FLOW THRU
RGS	ROCHESTER GAS + ELECTRIC	ELECTRIC UTILITIES-FLOW THRU
SDO	SAN DIEGO GAS + ELECTRIC	ELECTRIC UTILITIES-FLOW THRU
SCE	SOUTHERN CALIF EDISON CO	ELECTRIC UTILITIES-FLOW THRU
TGE	TUCSON GAS + ELECTRIC	ELECTRIC UTILITIES-FLOW THRU
UIL	UNITED ILLUMINATING CO	ELECTRIC UTILITIES-FLOW THRU
WHP	WASHINGTON WATER POWER	ELECTRIC UTILITIES-FLOW THRU
AEP	AMERICAN ELECTRIC POWER	ELEC UTILITIES-NORMALIZED
ATE	ATLANTIC CITY ELECTRIC	ELEC UTILITIES-NORMALIZED
BGE	BALTIMORE GAS + ELECTRIC	ELEC UTILITIES-NORMALIZED
BANG	BANGOR HYDRO-ELEC CO	ELEC UTILITIES-NORMALIZED
BHPL	BLACK HILLS POWER + LIGHT CO	ELEC UTILITIES-NORMALIZED
BSE	BOSTON EDISON CO	ELEC UTILITIES-NORMALIZED
BRS	BRASCAN LTD-CL A	ELEC UTILITIES-NORMALIZED
CPL	CAROLINA POWER + LIGHT	ELEC UTILITIES-NORMALIZED
CSR	CENTRAL + SOUTH WEST CORP	ELEC UTILITIES-NORMALIZED

CER	CENTRAL ILLINOIS LIGHT	ELEC	UTILITIES-NORMALIZED
CIP	CENTRAL ILL PUBLIC SERVICE	ELEC	UTILITIES-NORMALIZED
CEL	CENTRAL LOUISIANA ELECTRIC	ELEC	UTILITIES-NORMALIZED
CTP	CENTRAL MAINE POWER CO	ELEC	UTILITIES-NORMALIZED
CVX	CLEVELAND ELECTRIC ILLUM	ELEC	UTILITIES-NORMALIZED
CWE	COMMONWEALTH EDISON	ELEC	UTILITIES-NORMALIZED
CMM	COMMUNITY PUBLIC SERVICE	ELEC	UTILITIES-NORMALIZED
CMS	CONSUMERS POWER CO	ELEC	UTILITIES-NORMALIZED
DTE	DETROIT EDISON CO	ELEC	UTILITIES-NORMALIZED
DUK	DUKE POWER CO	ELEC	UTILITIES-NORMALIZED
DQU	DUQUESNE LIGHT CO	ELEC	UTILITIES-NORMALIZED
EVA	EASTERN UTILITIES ASSOC	ELEC	UTILITIES-NORMALIZED
ESE	EDISON SAULT ELECTRIC	ELEC	UTILITIES-NORMALIZED
ELPA	EL PASO ELECTRIC CO	ELEC	UTILITIES-NORMALIZED
EDE	EMPIRE DISTRICT ELECTRIC CO	ELEC	UTILITIES-NORMALIZED
FGE	FITCHBURG GAS + ELEC LIGHT	ELEC	UTILITIES-NORMALIZED
FPL	FLORIDA POWER + LIGHT	ELEC	UTILITIES-NORMALIZED
FDP	FLORIDA POWER CORP	ELEC	UTILITIES-NORMALIZED
GPU	GENERAL PUBLIC UTILITIES	ELEC	UTILITIES-NORMALIZED
GTU	GULF STATES UTILITIES CO	ELEC	UTILITIES-NORMALIZED
HE	HAWAIIAN ELECTRIC CO	ELEC	UTILITIES-NORMALIZED
HOU	HOUSTON INDUSTRIES	ELEC	UTILITIES-NORMALIZED
IDA	IDAHO POWER CO	ELEC	UTILITIES-NORMALIZED
IPC	ILLINOIS POWER CO	ELEC	UTILITIES-NORMALIZED
IPL	INDIANAPOLIS POWER + LIGHT	ELEC	UTILITIES-NORMALIZED
IPW	INTERSTATE POWER CO	ELEC	UTILITIES-NORMALIZED
IEL	IOWA ELECTRIC LIGHT + PWR	ELEC	UTILITIES-NORMALIZED
IMG	IOWA-ILLINOIS GAS + ELEC	ELEC	UTILITIES-NORMALIZED
IOP	IOWA POWER + LIGHT	ELEC	UTILITIES-NORMALIZED
IPS	IOWA PUBLIC SERVICE CO	ELEC	UTILITIES-NORMALIZED
IUTL	IOWA SOUTHERN UTILITIES CO	ELEC	UTILITIES-NORMALIZED
KLT	KANSAS CITY POWER + LIGHT	ELEC	UTILITIES-NORMALIZED
KGE	KANSAS GAS + ELECTRIC	ELEC	UTILITIES-NORMALIZED
KAN	KANSAS POWER + LIGHT	ELEC	UTILITIES-NORMALIZED
KU	KENTUCKY UTILITIES CO	ELEC	UTILITIES-NORMALIZED
LAKE	LAKE SUPERIOR DIST POWER CO	ELEC	UTILITIES-NORMALIZED
LOU	LOUISVILLE GAS + ELECTRIC	ELEC	UTILITIES-NORMALIZED
MOSN	MAISON GAS + ELECTRIC CO	ELEC	UTILITIES-NORMALIZED
MAP	MAINE PUBLIC SERVICE	ELEC	UTILITIES-NORMALIZED
MSU	MIDDLE SOUTH UTILITIES	ELEC	UTILITIES-NORMALIZED
MPL	MINNESOTA POWER + LIGHT	ELEC	UTILITIES-NORMALIZED
MPV	MISSOURI PUBLIC SERVICE CO	ELEC	UTILITIES-NORMALIZED
MOK	MONTANA-DAKOTA UTILITIES	ELEC	UTILITIES-NORMALIZED
MTP	MONTANA POWER CO	ELEC	UTILITIES-NORMALIZED
NES	NEW ENGLAND ELECTRIC SYSTEM	ELEC	UTILITIES-NORMALIZED
NEG	NEW ENGLAND GAS + ELECTRIC	ELEC	UTILITIES-NORMALIZED
NI	NORTHERN INDIANA PUBLIC SERV	ELEC	UTILITIES-NORMALIZED
NSP	NORTHERN STATES POWER	ELEC	UTILITIES-NORMALIZED
NWPS	NORTHWESTERN PUBLIC SERV CO	ELEC	UTILITIES-NORMALIZED
OGE	OKLAHOMA GAS + ELECTRIC	ELEC	UTILITIES-NORMALIZED
OTTR	OTTER TAIL POWER CO	ELEC	UTILITIES-NORMALIZED
PE	PHILADELPHIA ELECTRIC CO	ELEC	UTILITIES-NORMALIZED
POM	POTOMAC ELECTRIC POWER	ELEC	UTILITIES-NORMALIZED
PSR	PUB.SRV.OF COLO	ELEC	UTILITIES-NORMALIZED
PIN	PUB.SRV.OF IND	ELEC	UTILITIES-NORMALIZED
PNM	PUB.SRV.OF N MEX	ELEC	UTILITIES-NORMALIZED
PEG	PUBLIC SERVICE ELEC + GAS	ELEC	UTILITIES-NORMALIZED
SAJ	ST-JOSEPH-LIGHT + POWER	ELEC	UTILITIES-NORMALIZED
SAV	SAVANNAH ELEC + POWER	ELEC	UTILITIES-NORMALIZED
SRP	SIERRA PACIFIC POWER CO	ELEC	UTILITIES-NORMALIZED
SCG	SOUTH CAROLINA ELEC + GAS	ELEC	UTILITIES-NORMALIZED
SO	SOUTHERN CO	ELEC	UTILITIES-NORMALIZED
SIG	SOUTHERN INDIANA GAS + ELEC	ELEC	UTILITIES-NORMALIZED
SWEL	SOUTHWESTERN ELEC SERVICE	ELEC	UTILITIES-NORMALIZED
SPS	SOUTHWESTERN PUBLIC SERV CO	ELEC	UTILITIES-NORMALIZED
TE	TAMPA-ELECTRIC CO	ELEC	UTILITIES-NORMALIZED
TXU	TEXAS UTILITIES CO	ELEC	UTILITIES-NORMALIZED
TED	TOLEDO EDISON COMPANY	ELEC	UTILITIES-NORMALIZED
UEP	UNION ELECTRIC CO	ELEC	UTILITIES-NORMALIZED
UPEN	UPPER-PENINSULA POWER	ELEC	UTILITIES-NORMALIZED
UTP	UTAH POWER + LIGHT	ELEC	UTILITIES-NORMALIZED
VEL	VIRGINIA ELECTRIC + POWER	ELEC	UTILITIES-NORMALIZED
WPC	WISCONSIN ELECTRIC POWER	ELEC	UTILITIES-NORMALIZED
WPL	WISCONSIN POWER + LIGHT	ELEC	UTILITIES-NORMALIZED
WPS	WISCONSIN PUBLIC SERVICE	ELEC	UTILITIES-NORMALIZED
AKI	ALASKA INTERSTATE CO	NATURAL	GAS TRANSMISSION
BGC	BAY STATE GAS	NATURAL	GAS TRANSMISSION
CGR	COASTAL STATES GAS CORP	NATURAL	GAS TRANSMISSION
ELG	EL PASO CO	NATURAL	GAS TRANSMISSION
ETX	ENTEX INC	NATURAL	GAS TRANSMISSION
FLG	FLORIDA GAS	NATURAL	GAS TRANSMISSION
MFS	MOUNTAIN FUEL SUPPLY CO	NATURAL	GAS TRANSMISSION

NNG	NORTHERN NATURAL GAS	NATURAL GAS TRANSMISSION
NWP	NORTHWEST ENERGY	NATURAL GAS TRANSMISSION
PEL	PANHANDLE EASTERN PIPE LINE	NATURAL GAS TRANSMISSION
NRG	SOUTHERN NATURAL RESOURCES	NATURAL GAS TRANSMISSION
TET	TEXAS EASTERN CORP	NATURAL GAS TRANSMISSION
TXG	TEXAS GAS TRANSMISSION	NATURAL GAS TRANSMISSION
TXO	TEXAS OIL + GAS CORP	NATURAL GAS TRANSMISSION
E	TRANSCO COS	NATURAL GAS TRANSMISSION
UER	UNITED ENERGY RESOURCES	NATURAL GAS TRANSMISSION
AGA	ALABAMA GAS CORP	NATURAL GAS DISTRIBUTION
ANR	AMERICAN NATURAL RESOURCES	NATURAL GAS DISTRIBUTION
ALG	ARKANSAS LOUISIANA GAS	NATURAL GAS DISTRIBUTION
AGLT	ATLANTA GAS LIGHT CO	NATURAL GAS DISTRIBUTION
BU	BROOKLYN UNION GAS CO	NATURAL GAS DISTRIBUTION
CGC	CASCADE NATURAL GAS CORP	NATURAL GAS DISTRIBUTION
CG	COLUMBIA GAS SYSTEM	NATURAL GAS DISTRIBUTION
CNG	CONSOLIDATED NATURAL GAS CO	NATURAL GAS DISTRIBUTION
CGT	CONSUMERS GAS CO	NATURAL GAS DISTRIBUTION
ENS	ENSERCH CORP	NATURAL GAS DISTRIBUTION
EQT	EQUITABLE GAS CO	NATURAL GAS DISTRIBUTION
HNG	HOUSTON NATURAL GAS CORP	NATURAL GAS DISTRIBUTION
IGC	INDIANA GAS CO	NATURAL GAS DISTRIBUTION
KNB	KANSAS-NEBRASKA NATL GAS CO	NATURAL GAS DISTRIBUTION
LG	LACLEDE GAS CO	NATURAL GAS DISTRIBUTION
MCG	MICHIGAN GAS UTILITIES CO	NATURAL GAS DISTRIBUTION
MNG	MINNESOTA GAS CO	NATURAL GAS DISTRIBUTION
MVAL	MISSISSIPPI VALLEY GAS CO	NATURAL GAS DISTRIBUTION
NFG	NATIONAL FUEL GAS CO	NATURAL GAS DISTRIBUTION
NJNG	NEW JERSEY NATURAL GAS CO	NATURAL GAS DISTRIBUTION
GAS	NICOR INC	NATURAL GAS DISTRIBUTION
NWNG	NORTHWEST NATURAL GAS CO	NATURAL GAS DISTRIBUTION
ONG	OKLAHOMA NATURAL GAS CO	NATURAL GAS DISTRIBUTION
PLT	PACIFIC LIGHTING CORP	NATURAL GAS DISTRIBUTION
PGL	PEOPLES GAS CO	NATURAL GAS DISTRIBUTION
PNY	PIEDMONT NATURAL GAS CO	NATURAL GAS DISTRIBUTION
PNA	PIONEER CORP	NATURAL GAS DISTRIBUTION
PVY	PROVIDENCE GAS CO	NATURAL GAS DISTRIBUTION
PSNC	PUB. SRV. OF N. C.	NATURAL GAS DISTRIBUTION
SJT	SOUTH JERSEY INDUSTRIES	NATURAL GAS DISTRIBUTION
SUG	SOUTHERN UNION CO	NATURAL GAS DISTRIBUTION
SWGS	SOUTHWEST GAS CORP	NATURAL GAS DISTRIBUTION
UGI	UGI CORP	NATURAL GAS DISTRIBUTION
UNG	UNION GAS LTD-CL A	NATURAL GAS DISTRIBUTION
WGL	WASHINGTON GAS LIGHT CO	NATURAL GAS DISTRIBUTION
WGS	WASHINGTON NATURAL GAS CO	NATURAL GAS DISTRIBUTION
MCC	WISCONSIN GAS CO	NATURAL GAS DISTRIBUTION
BFI	BROWNING-FERRIS INDS	SERVICES-POLLUTION CONTROL
NPH	NEPTUNE INTERNATIONAL CORP	SERVICES-POLLUTION CONTROL
SCV	SCA SERVICES INC	SERVICES-POLLUTION CONTROL
MMX	WASTE MANAGEMENT INC	SERVICES-POLLUTION CONTROL
APS	A P S INC	WHSL-AUTOS + PARTS
GPC	GENUINE PARTS CO	WHSL-AUTOS + PARTS
RPS	RPS PRODUCTS INC	WHSL-AUTOS + PARTS
SEQ	SEAPORT CORP	WHSL-AUTOS + PARTS
STG	STERLING PRECISION CORP	WHSL-AUTOS + PARTS
AGG	AGUIRRE CO	WHSL-LUMBER + CONSTR MATL
III	IMPERIAL INDUSTRIES INC	WHSL-LUMBER + CONSTR MATL
EHR	EHRENREICH PHOTO OPTICAL IND	WHSL-SPORTING + RECREA GOODS
ERO	ERO INDUSTRIES INC	WHSL-SPORTING + RECREA GOODS
GMN	GREENMAN BROTHERS INC	WHSL-SPORTING + RECREA GOODS
IPH	INTERPHOTO CORP	WHSL-SPORTING + RECREA GOODS
MGO	MEGO INTERNATIONAL	WHSL-SPORTING + RECREA GOODS
CAS	CASTLE (A.M.) + CO	WHSL-METALS + MINERALS
ENG	ENGELHARD MINERALS + CHEM CP	WHSL-METALS + MINERALS
JOR	JORGENSEN (EARLE M.) CO	WHSL-METALS + MINERALS
SIF	SIFCO INDUSTRIES	WHSL-METALS + MINERALS
ANX	ANIXTER BROS INC	WHSL-ELEC APPARATUS + EQUIP
CLK	CLARK CONSOLIDATED INDS	WHSL-ELEC APPARATUS + EQUIP
CRM	CRAMER ELECTRONICS INC	WHSL-ELEC APPARATUS + EQUIP
FSS	FEDERAL SIGNAL CORP	WHSL-ELEC APPARATUS + EQUIP
GMW	GRAINGER (W.W.) INC	WHSL-ELEC APPARATUS + EQUIP
SPP	SUPERSCOPE INC	WHSL-ELEC APPARATUS + EQUIP
CPE	CAPEHART CORP	WHSL-ELEC APPLIANCE TV+RADIO
LYD	LLOYD'S ELECTRONICS	WHSL-ELEC APPLIANCE TV+RADIO
RTI	RONCO TELEPRODUCTS INC	WHSL-ELEC APPLIANCE TV+RADIO
SON	SOUNDESIGN CORP	WHSL-ELEC APPLIANCE TV+RADIO
TCR	TELECOR INC	WHSL-ELEC APPLIANCE TV+RADIO
ARW	ARROW ELECTRONICS INC	WHSL-ELECTRONIC PARTS+EQUIP
ASI	ASTREX INC	WHSL-ELECTRONIC PARTS+EQUIP
BI	BELL INDUSTRIES	WHSL-ELECTRONIC PARTS+EQUIP
HRA	HARVEY GROUP	WHSL-ELECTRONIC PARTS+EQUIP
MI	MARSHALL INDUSTRIES	WHSL-ELECTRONIC PARTS+EQUIP

PEM	PENCOR INC	WHSL-ELECTRONIC PARTS+EQUIP
SEC	STERLING ELECTRONICS	WHSL-ELECTRONIC PARTS+EQUIP
WOC	WILSHIRE OIL OF TEXAS	WHSL-ELECTRONIC PARTS+EQUIP
WYL	WYLE LABORATORIES	WHSL-ELECTRONIC PARTS+EQUIP
GBI	GABLE INDUSTRIES	WHSL-HARDWR PLUM HEAT EQUIP
IHS	IPCO HOSPITAL SUPPLY CORP	WHSL-MACHINERY + EQUIPMENT
LSB	LSB INDUSTRIES INC	WHSL-MACHINERY + EQUIPMENT
SVB	SAVIN BUSINESS MACHINES	WHSL-MACHINERY + EQUIPMENT
CMC	COMMERCIAL METALS CO	WHSL-SCRAP + WASTE MATERIALS
DMC	DIVERSIFIED INDUSTRIES INC	WHSL-SCRAP + WASTE MATERIALS
OG	OGDEN CORP	WHSL-SCRAP + WASTE MATERIALS
SML	STEELMET INC	WHSL-SCRAP + WASTE MATERIALS
CMK	CHADWICK-MILLER INC	WHSL-DURABLE GOODS NEC
HOL	HANDLEMAN CO	WHSL-DURABLE GOODS NEC
INS	INTL SEAWAY TRADING CORP	WHSL-DURABLE GOODS NEC
KTL	K-TEL INTERNATIONAL	WHSL-DURABLE GOODS NEC
UNA	U.N.A. CORP	WHSL-DURABLE GOODS NEC
UVV	UNIVAR CORP	WHSL-DURABLE GOODS NEC
AAX	ALLIED ARTISTS INDUSTRIES	WHSL-DRUGS + PROPRIETARY
BBC	BERGEN BRUNSWIG CORP	WHSL-DRUGS + PROPRIETARY
FOR	FOREMOST-MCKESSON INC	WHSL-DRUGS + PROPRIETARY
KCH	KETCHUM + CO	WHSL-DRUGS + PROPRIETARY
SVS	SAV-A-STOP INC	WHSL-DRUGS + PROPRIETARY
SPO	SPECTRO INDUSTRIES INC	WHSL-DRUGS + PROPRIETARY
ALT	ATLANTA CORP	WHSL-GROCERIES + RELATED
DIG	DI GIORGIO CORP	WHSL-GROCERIES + RELATED
FSF	FLAGSTAFF CORP	WHSL-GROCERIES + RELATED
FLM	FLEMING COMPANIES INC	WHSL-GROCERIES + RELATED
FYN	FOODWAYS NATL INC	WHSL-GROCERIES + RELATED
IFS	INTL FOODSERVICE CORP	WHSL-GROCERIES + RELATED
PRO	INTL PROTEINS	WHSL-GROCERIES + RELATED
MHI	MALONE + HYDE INC	WHSL-GROCERIES + RELATED
MFI	MARSHALL FOODS INC	WHSL-GROCERIES + RELATED
SLE	SCOT-LAD FOODS	WHSL-GROCERIES + RELATED
SNI	SUN CITY INDUSTRIES	WHSL-GROCERIES + RELATED
SFS	SUPER FOOD SERVICES INC	WHSL-GROCERIES + RELATED
SVU	SUPER VALU STORES INC	WHSL-GROCERIES + RELATED
SYV	SYSCO CORP	WHSL-GROCERIES + RELATED
UL	UNILEVER LTD-AMER SHRS	WHSL-GROCERIES + RELATED
AAV	AAV COS	WHSL-NONDURABLE GOODS N
ASN	ALCO STANDARD CORP	WHSL-NONDURABLE GOODS N
BD	BRO-DART INDUSTRIES	WHSL-NONDURABLE GOODS N
DEV	DEVON GROUP	WHSL-NONDURABLE GOODS N
GMD	GENERAL MEDICAL CORP	WHSL-NONDURABLE GOODS N
MPO	MPO VIDEOTRONICS INC	WHSL-NONDURABLE GOODS N
NDC	NATIONAL DISTRIBUTING CO	WHSL-NONDURABLE GOODS N
NLX	NOLEX CORP	WHSL-NONDURABLE GOODS N
PI	PAT FASHIONS INDUSTRIES	WHSL-NONDURABLE GOODS N
SDI	SMD INDUSTRIES INC	WHSL-NONDURABLE GOODS N
SXP	SAXON INDUSTRIES	WHSL-NONDURABLE GOODS N
UVV	UNIVERSAL LEAF TOBACCO	WHSL-NONDURABLE GOODS N
FCE	FOREST CITY ENTERPRISES INC	RETAIL-LUMBER+OTHER BLDG MAT
SHB	SCOTTY'S INC	RETAIL-LUMBER+OTHER BLDG MAT
SBP	STANDARD BRANDS PAINT CO	RETAIL-LUMBER+OTHER BLDG MAT
TPC	TRIANGLE PACIFIC CORP	RETAIL-LUMBER+OTHER BLDG MAT
WIX	WICKES CORP	RETAIL-LUMBER+OTHER BLDG MAT
MH	MOBILE HOME INDUSTRIES	RETAIL-MOBILE HOME DEALERS
VIN	VINTAGE ENTERPRISES INC	RETAIL-MOBILE HOME DEALERS
ALX	ALEXANDER'S INC	RETAIL-DEPARTMENT STORES
ALS	ALLIED STORES	RETAIL-DEPARTMENT STORES
ALY	ALMY STORES INC	RETAIL-DEPARTMENT STORES
ADD	AMES DEPT STORES INC	RETAIL-DEPARTMENT STORES
AMA	AMFAC INC	RETAIL-DEPARTMENT STORES
ARE	ARLEN REALTY + DEVELOPMENT	RETAIL-DEPARTMENT STORES
DG	ASSO DRY GOODS CORP	RETAIL-DEPARTMENT STORES
BES	BEST-PRODUCTS	RETAIL-DEPARTMENT STORES
CA	CALDOOR INC	RETAIL-DEPARTMENT STORES
CRN	CARSON PIRIE SCOTT + CO	RETAIL-DEPARTMENT STORES
CHH	CARTER HAWLEY HALE STORES	RETAIL-DEPARTMENT STORES
CCF	COOK UNITED INC	RETAIL-DEPARTMENT STORES
COM	CROWLEY MILNER + CO	RETAIL-DEPARTMENT STORES
OH	DAYTON-HUDSON CORP	RETAIL-DEPARTMENT STORES
DDS	DILLARD DEPT STORES-CL A	RETAIL-DEPARTMENT STORES
FMI	FED-MART CORP	RETAIL-DEPARTMENT STORES
FDS	FEDERATED DEPT STORES INC	RETAIL-DEPARTMENT STORES
GSK	GAMBLE-SKOGMO	RETAIL-DEPARTMENT STORES
GBM	GARFINCKEL BROOKS BROTHERS	RETAIL-DEPARTMENT STORES
GYL	GAYLORDS NATIONAL CORP	RETAIL-DEPARTMENT STORES
GEE	GLOSSER BROTHERS INC	RETAIL-DEPARTMENT STORES
GDB	GOLDBLATT BROS INC	RETAIL-DEPARTMENT STORES
GOO	GOOD (L.S.) CO	RETAIL-DEPARTMENT STORES
GC	GRAND CENTRAL INC	RETAIL-DEPARTMENT STORES

HRT	HARTFIELD-ZODYS INC	RETAIL-DEPARTMENT STORES
HSS	HESS'S INC	RETAIL-DEPARTMENT STORES
JMY	JAMESWAY CORP	RETAIL-DEPARTMENT STORES
KDT	KING'S DEPT STORES	RETAIL-DEPARTMENT STORES
KBK	KUHN'S-BIG K STORES	RETAIL-DEPARTMENT STORES
NZ	MACY (R.H.) + CO	RETAIL-DEPARTMENT STORES
MF	MARSHALL FIELD + CO	RETAIL-DEPARTMENT STORES
MA	MAY DEPARTMENT STORES CO	RETAIL-DEPARTMENT STORES
HST	MERCANTILE STORES CO INC	RETAIL-DEPARTMENT STORES
MOH	MODERN MERCHANDISING	RETAIL-DEPARTMENT STORES
NCL	NICHOLS (S.E.)	RETAIL-DEPARTMENT STORES
OTU	OUTLET CO	RETAIL-DEPARTMENT STORES
PAM	PAMIDA INC	RETAIL-DEPARTMENT STORES
JCP	PENNEY (J.C.) CO	RETAIL-DEPARTMENT STORES
SOA	SCOA INDUSTRIES INC	RETAIL-DEPARTMENT STORES
S	SEARS ROEBUCK + CO	RETAIL-DEPARTMENT STORES
TWN	TWIN FAIR INC	RETAIL-DEPARTMENT STORES
VNO	VORNADO INC	RETAIL-DEPARTMENT STORES
WMT	WAL-MART STORES	RETAIL-DEPARTMENT STORES
WIE	WIEBOLDT STORES INC	RETAIL-DEPARTMENT STORES
ZY	ZAYRE CORP	RETAIL-DEPARTMENT STORES
FOO	FAMILY DOLLAR STORES	RETAIL-VARIETY STORES
FSH	FISHMAN (M.H.) INC	RETAIL-VARIETY STORES
HEX	HECK'S INC	RETAIL-VARIETY STORES
KH	K MART CORP	RETAIL-VARIETY STORES
LVS	LEVITT INDUSTRIES	RETAIL-VARIETY STORES
MKS	MACKS STORES	RETAIL-VARIETY STORES
MPH	MURPHY (G.C.) CO	RETAIL-VARIETY STORES
RPD	RAPID-AMERICAN CORP	RETAIL-VARIETY STORES
WT	WOOLWORTH (F.W.) CO LTD	RETAIL-VARIETY STORES
Z	WOOLWORTH (F.W.) CO	RETAIL-VARIETY STORES
ABS	ALBERTSON'S INC	RETAIL-GROCERY STORES
ASU	ALLIED SUPERMARKETS	RETAIL-GROCERY STORES
ALF	ALTERMAN FOODS	RETAIL-GROCERY STORES
ASC	AMERICAN STORES CO	RETAIL-GROCERY STORES
BAYM	BAYLESS (A.J.) MARKETS INC	RETAIL-GROCERY STORES
BIV	BIG V SUPERMARKETS	RETAIL-GROCERY STORES
BRF	BORMAN'S INC	RETAIL-GROCERY STORES
CKP	CIRCLE K CORP	RETAIL-GROCERY STORES
CSI	COLONIAL STORES INC	RETAIL-GROCERY STORES
OLL	DILLON COS	RETAIL-GROCERY STORES
FHR	FISHER FOODS INC	RETAIL-GROCERY STORES
FFS	FOOD FAIR INC	RETAIL-GROCERY STORES
FSH	FOODARAMA SUPERMARKETS	RETAIL-GROCERY STORES
GFS	GIANT FOOD INC	RETAIL-GROCERY STORES
GAP	GREAT ATLANTIC + PAC TEA CO	RETAIL-GROCERY STORES
HRD	HANNAFORD BROTHERS CO	RETAIL-GROCERY STORES
JWL	JEWEL COS INC	RETAIL-GROCERY STORES
KR	KROGER CO	RETAIL-GROCERY STORES
LNO	LANECO INC	RETAIL-GROCERY STORES
LKS	LUCKY STORES INC	RETAIL-GROCERY STORES
MSM	MOTT'S SUPER MARKETS INC	RETAIL-GROCERY STORES
MFD	MUNFORD INC	RETAIL-GROCERY STORES
NTY	NATIONAL TEA CO	RETAIL-GROCERY STORES
NFS	NIAGARA FRONTIER SERVICES	RETAIL-GROCERY STORES
PNF	PENN TRAFFIC CO	RETAIL-GROCERY STORES
PNC	PNEUMO CORP	RETAIL-GROCERY STORES
PIT	PUEBLO INTERNATIONAL INC	RETAIL-GROCERY STORES
RDK	RUDDICK CORP	RETAIL-GROCERY STORES
SA	SAFAWAY STORES INC	RETAIL-GROCERY STORES
SH	SHOPWELL INC	RETAIL-GROCERY STORES
SLC	SOUTHLAND CORP	RETAIL-GROCERY STORES
STR	STAR SUPERMARKETS	RETAIL-GROCERY STORES
SHP	STOP + SHOP COS	RETAIL-GROCERY STORES
SJS	SUNSHINE-JR STORES	RETAIL-GROCERY STORES
SGL	SUPERMARKETS GENERAL CORP	RETAIL-GROCERY STORES
TMI	THOROFARE MARKETS	RETAIL-GROCERY STORES
TFT	THRIFTMART INC	RETAIL-GROCERY STORES
WMK	WEIS MARKETS INC	RETAIL-GROCERY STORES
WIN	WINN-DIXIE STORES INC	RETAIL-GROCERY STORES
GAI	GRAND AUTO INC	RETAIL-AUTO DEALERS+GAS STAT
PBY	PEP BOYS-MANNY MOE + JACK	RETAIL-AUTO DEALERS+GAS STAT
ASK	ASKIN SERVICE CORP	RETAIL-APPAREL + ACCES STORE
BRI	BELSCOT RETAILERS INC	RETAIL-APPAREL + ACCES STORE
GPS	GAP STORES INC	RETAIL-APPAREL + ACCES STORE
KWN	KENWIN SHOPS INC	RETAIL-APPAREL + ACCES STORE
LNY	LANE BRYANT INC	RETAIL-APPAREL + ACCES STORE
LOH	LOEHMANN'S INC	RETAIL-APPAREL + ACCES STORE
MSR	MASTERS INC	RETAIL-APPAREL + ACCES STORE
MJW	MAYS (J.W.) INC	RETAIL-APPAREL + ACCES STORE
NEX	NEXUS INDUSTRIES INC	RETAIL-APPAREL + ACCES STORE
ROC	ROCKOWER BROTHERS INC	RETAIL-APPAREL + ACCES STORE

VLM	VOLUME MERCHANDISE	RETAIL-APPAREL + ACCES STORE
MLW	MILLER-WOHL CO	RETAIL-WOMENS READY TO WEAR
PST	PETRIE STORES CORP	RETAIL-WOMENS READY TO WEAR
WNK	WINKELMAN STORES INC	RETAIL-WOMENS READY TO WEAR
EOS	EDISON BROTHERS STORES	RETAIL-SHOE STORES
FLW	FELSHAY CORP	RETAIL-SHOE STORES
MRS	MORSE SHOE INC	RETAIL-SHOE STORES
MOS	MORTON'S SHOE STORES	RETAIL-SHOE STORES
	* 719520 5661 PNP D PIC*N PAY STORES	*** MISSING ITEM(15)
SSM	SIMCO STORES	RETAIL-SHOE STORES
LEV	LEVITZ FURNITURE CORP	RETAIL-FURNITURE STORES
RBI	R B INDUSTRIES INC	RETAIL-FURNITURE STORES
SBI	STERCHI BROTHERS STORES INC	RETAIL-FURNITURE STORES
FF	FRIENDLY FROST INC	RETAIL-HSHLD APPLIANCE STORE
SIL	SILO INC	RETAIL-HSHLD APPLIANCE STORE
WRD	WARDS CO INC	RETAIL-HSHLD APPLIANCE STORE
BK	BICKFORD CORP	RETAIL-EATING PLACES
CAW	CAESARS WORLD	RETAIL-EATING PLACES
CRL	CARROLLS DEVELOPMENT CORP	RETAIL-EATING PLACES
CHU	CHURCH'S FRIED CHICKEN	RETAIL-EATING PLACES
CF	COLLINS FOOD INTL	RETAIL-EATING PLACES
DEN	DENNY'S INC	RETAIL-EATING PLACES
FCC	FLORIDA CAPITAL CORP	RETAIL-EATING PLACES
FICE	FRIENDLY ICE CREAM CORP	RETAIL-EATING PLACES
FRS	FRISCH'S RESTAURANTS INC	RETAIL-EATING PLACES
GNO	GINO'S INC	RETAIL-EATING PLACES
H	HARDEE'S FOOD SYSTEMS INC	RETAIL-EATING PLACES
HOR	HORN + HARDART CO (NY)	RETAIL-EATING PLACES
HII	HOST INTERNATIONAL INC	RETAIL-EATING PLACES
HJ	HOWARD JOHNSON CO	RETAIL-EATING PLACES
KTI	KAPOK TREE INNS	RETAIL-EATING PLACES
MHS	MARRIOTT CORP	RETAIL-EATING PLACES
MCD	MCDONALD'S CORP	RETAIL-EATING PLACES
PON	PONDEROSA SYSTEM INC	RETAIL-EATING PLACES
RA	RESTAURANT ASSOC INDS INC	RETAIL-EATING PLACES
SGA	SAGA CORP	RETAIL-EATING PLACES
SRI	SAMBO'S RESTAURANTS	RETAIL-EATING PLACES
SE	SPARTAN FOOD SYSTEMS	RETAIL-EATING PLACES
SPC	SPECIALTY RESTAURANTS	RETAIL-EATING PLACES
VLE	VALLE'S STEAK HOUSE	RETAIL-EATING PLACES
ADG	ADAMS DRUG INC	RETAIL-DRUG+PROPRIET STORES
COO	CUNNINGHAM DRUG STORES INC	RETAIL-DRUG+PROPRIET STORES
DF	DRUG FAIR INC	RETAIL-DRUG+PROPRIET STORES
ECK	ECKERD (JACK) CORP	RETAIL-DRUG+PROPRIET STORES
FAY	FAY'S DRUG CO	RETAIL-DRUG+PROPRIET STORES
GDX	GENOVESE DRUG STORES	RETAIL-DRUG+PROPRIET STORES
GRY	GRAY DRUG STORES	RETAIL-DRUG+PROPRIET STORES
LOG	LONGS DRUG STORES INC	RETAIL-DRUG+PROPRIET STORES
PAY	PAY LESS DRUG STORES NW	RETAIL-DRUG+PROPRIET STORES
POG	PEOPLES DRUG STORES INC	RETAIL-DRUG+PROPRIET STORES
ROS	REVCO (D.S.) INC	RETAIL-DRUG+PROPRIET STORES
RAD	RITE AID CORP	RETAIL-DRUG+PROPRIET STORES
SVN	SAV-ON-DRUGS INC	RETAIL-DRUG+PROPRIET STORES
SKG	SKAGGS COS INC	RETAIL-DRUG+PROPRIET STORES
TFD	THRIFTY CORPORATION	RETAIL-DRUG+PROPRIET STORES
WAG	WALGREEN CO	RETAIL-DRUG+PROPRIET STORES
CHJ	COHEN-HATFIELD INDS INC	RETAIL-JEWELRY STORES
GOR	GORDON JEWELRY CORP	RETAIL-JEWELRY STORES
JC	JEWELCOR INC	RETAIL-JEWELRY STORES
KAY	KAY CORP	RETAIL-JEWELRY STORES
MEO	MEDCO JEWELRY CORP	RETAIL-JEWELRY STORES
ZAL	ZALE CORP	RETAIL-JEWELRY STORES
OFI	OISCOUNT FABRICS	RETAIL-SEWING+NEEDLEWORK STR
FCA	FABRI-CENTERS OF AMERICA	RETAIL-SEWING+NEEDLEWORK STR
FAF	FASHION FABRICS	RETAIL-SEWING+NEEDLEWORK STR
HF	HOUSE OF FABRICS INC	RETAIL-SEWING+NEEDLEWORK STR
TDD	THREE D DEPARTMENTS INC	RETAIL-SEWING+NEEDLEWORK STR
BTH	BARTH SPENCER CORP	RETAIL-MAIL ORDER HOUSES
GRR	G R I CORP	RETAIL-MAIL ORDER HOUSES
NOZ	NEW PROCESS CO	RETAIL-MAIL ORDER HOUSES
UBU	UNITY BUYING SERVICE	RETAIL-MAIL ORDER HOUSES
MAK	MACKE CO	RETAIL-AUTO MDSNG MACH OPER
SVH	SERVOMATION CORP	RETAIL-AUTO MDSNG MACH OPER
CDH	CANADIAN HYDROCARBONS LTD	RETAIL-FUEL + ICE DEALERS
DWG	DWG CORP	RETAIL-FUEL + ICE DEALERS
MDA	MAPCO INC	RETAIL-FUEL + ICE DEALERS
PTO	PETROLANE INC	RETAIL-FUEL + ICE DEALERS
SPG	SUBURBAN PROPANE GAS CORP	RETAIL-FUEL + ICE DEALERS
ARA	ARA SERVICES	RETAIL-STORES N E C
CWI	CHILD WORLD	RETAIL-STORES N E C
CLE	COLE NATIONAL CORP	RETAIL-STORES N E C
D	DART INDUSTRIES	RETAIL-STORES N E C

EGC	EMPIRE GAS CORP	ENTERPRISES INC	RETAIL-STORES	N	E	C
BDL	FLANIGAN'S	ENTERPRISES INC	RETAIL-STORES	N	N	C
FKS	FRANKS NURSERY SALES		RETAIL-STORES	N	N	C
HOV	HOUSE OF VISION INC		RETAIL-STORES	N	N	C
KNG	KING OPTICAL CORP		RETAIL-STORES	N	N	C
LIO	LIONEL CORP		RETAIL-STORES	N	N	C
PAG	PARGAS INC		RETAIL-STORES	N	N	C
PIR	PIER 1 IMPORTS INC		RETAIL-STORES	N	N	C
TAN	TANDY CORP		RETAIL-STORES	N	N	C
*	64057	6021	BK	D	BANK OF NEW YORK CO INC	*** MISSING ITEM(5)
*	66365	6021	BT	D	BANKERS TRUST NEW YORK CORP	*** MISSING ITEM(5)
*	161249	6021	CN	D	CHARTER NEW YORK CORP	*** MISSING ITEM(5)
*	161610	6021	CHB	D	CHASE MANHATTAN CORP	*** MISSING ITEM(5)
*	163798	6021	CHL	D	CHEMICAL NEW YORK CORP	*** MISSING ITEM(5)
*	173034	6021	FNC	D	CITICORP	*** MISSING ITEM(5)
*	564809	6021	MHC	D	MANUFACTURERS HANOVER CORP	*** MISSING ITEM(5)
*	616880	6021	JPM	D	MORGAN (J.P.) + CO	*** MISSING ITEM(5)
*	912883	6021	USTC	D	U S TRUST CORP	*** MISSING ITEM(5)
*	211485	6022	CIL	D	CONTINENTAL ILLINOIS CORP	*** MISSING ITEM(5)
*	319455	6022	FNB	D	FIRST CHICAGO CORP	*** MISSING ITEM(5)
*	335554	6022	FB	D	FIRST NATL BOSTON CORP	*** MISSING ITEM(5)
*	413841	6022	HBC	D	HARRIS BANKCORP INC	*** MISSING ITEM(5)
*	585518	6022	MNBT	D	MELLON NATL CORP	*** MISSING ITEM(5)
*	665559	6022	NTRS	D	NORTHERN TRUST CORP	*** MISSING ITEM(5)
*	820480	6022	SHAS	D	SHAWMUT CORP	*** MISSING ITEM(5)
*	857473	6022	STBK	D	STATE STREET BOSTON CORP	*** MISSING ITEM(5)
*	72723	6023	BBNK	D	BAYBANKS INC	*** MISSING ITEM(5)
*	124850	6023	CBCT	D	CBT CORP	*** MISSING ITEM(5)
*	211156	6023	CBYN	D	CONTINENTAL BANK-NORRISTOWN	*** MISSING ITEM(5)
*	315743	6023	FICR	D	FIDELCOR	*** MISSING ITEM(5)
*	316438	6023	FIDU	D	FIDELITY UNION BANCORP	*** MISSING ITEM(5)
*	319823	6023	FCMB	D	FIRST COMMERCIAL BK-HLOG CO	*** MISSING ITEM(5)
*	320076	6023	FEMP	D	FIRST EMPIRE STATE CORP	*** MISSING ITEM(5)
*	335742	6023	FNS	D	FIRST NATL STATE BANCORP	*** MISSING ITEM(5)
*	336072	6023	FPA	D	FIRST PENNSYLVANIA CORP	*** MISSING ITEM(5)
*	376115	6023	GIRA	D	GIRARD CO	*** MISSING ITEM(5)
*	391897	6023	GJBC	D	GREATER JERSEY BANCORP	*** MISSING ITEM(5)
*	416655	6023	HNAT	D	HARTFORD NATIONAL CORP	*** MISSING ITEM(5)
*	427210	6023	HRTG	D	HERITAGE BANCORP	*** MISSING ITEM(5)
*	441902	6023	HTCO	D	HOSPITAL TRUST CORP	*** MISSING ITEM(5)
*	456299	6023	INB	D	INDUSTRIAL NATL CORP	*** MISSING ITEM(5)
*	456398	6023	IBKT	D	INDUSTRIAL VALLEY BK + TRUST	*** MISSING ITEM(5)
*	533560	6023	LFBC	D	LINCOLN FIRST BANKS	*** MISSING ITEM(5)
*	568287	6023	MM	D	MARINE MIDLAND BANKS	*** MISSING ITEM(5)
*	597806	6023	MIDL	D	MIDLANTIC BANKS INC	*** MISSING ITEM(5)
*	635276	6023	NCFC	D	NATIONAL CENTRAL FINL CORP	*** MISSING ITEM(5)
*	644134	6023	NEBK	D	NEW ENGLAND MERCHANTS INC	*** MISSING ITEM(5)
*	717767	6023	PHNA	D	PHILADELPHIA NATL CORP	*** MISSING ITEM(5)
*	744026	6023	PROV	D	PROVIDENT NATL CORP	*** MISSING ITEM(5)
*	760719	6023	RNB	D	REPUBLIC NEW YORK CORP	*** MISSING ITEM(5)
*	909527	6023	UBNY	D	UNITED BANK CORP OF NEW YORK	*** MISSING ITEM(5)
*	910748	6023	UJB	D	UNITED JERSEY BANKS	*** MISSING ITEM(5)
*	10235	6024	ABNC	D	ALABAMA BANCORPORATION	*** MISSING ITEM(5)
*	29544	6024	ASEC	D	AMERICAN SECURITY CORP	*** MISSING ITEM(5)
*	482222	6024	ABAN	D	ATLANTIC BANCORP	*** MISSING ITEM(5)
*	596355	6024	BPOP	D	BANCO POPULAR DE PUERTO RICO	*** MISSING ITEM(5)
*	65446	6024	BKV	D	BANK OF VIRGINIA CO	*** MISSING ITEM(5)
*	68055	6024	BNET	D	BARNETT BANKS OF FLORIDA	*** MISSING ITEM(5)
*	173144	6024	CSGA	D	CITIZENS + SOUTHERN NATL BK	*** MISSING ITEM(5)
*	357183	6024	DMBK	D	DOMINION BANKSHARES CORP	*** MISSING ITEM(5)
*	317528	6024	FGL	D	FINANCIAL GENERAL BANKSHARES	*** MISSING ITEM(5)
*	318396	6024	FMCH	D	FIRST + MERCHANTS	*** MISSING ITEM(5)
*	318464	6024	FABC	D	FIRST ALABAMA BANCSHARES INC	*** MISSING ITEM(5)
*	320264	6024	FFBK	D	FIRST FLORIDA BANKS INC	*** MISSING ITEM(5)
*	320652	6024	FKYN	D	FIRST KENTUCKY NATIONAL	*** MISSING ITEM(5)
*	320806	6024	FMOB	D	FIRST MARYLAND BANCORP	*** MISSING ITEM(5)
*	335681	6024	FNHC	D	FIRST NATL HLDG CORP ATLANTA	*** MISSING ITEM(5)
*	337162	6024	FTEN	D	FIRST TENN NATL CORP	*** MISSING ITEM(5)
*	337358	6024	FUNC	D	FIRST UNION CORP (N.C.)	*** MISSING ITEM(5)
*	337477	6024	FVB	D	FIRST VIRGINIA BANKSHARES	*** MISSING ITEM(5)
*	338412	6024	FLAG	D	FLAGSHIP BANKS	*** MISSING ITEM(5)
*	341018	6024	FNBG	D	FLORIDA NATL BANKS OF FLA	*** MISSING ITEM(5)
*	574162	6024	MDNT	D	MARYLAND NATL CORP	*** MISSING ITEM(5)
*	628855	6024	NCNB	D	NCNB CORP	*** MISSING ITEM(5)
*	668087	6024	NWFN	D	NORTHWESTERN FINANCIAL	*** MISSING ITEM(5)
*	766566	6024	RIGS	D	RIGGS NATL BANK WASH D C	*** MISSING ITEM(5)
*	837046	6024	SCNC	D	SOUTH CAROLINA NATL CORP	*** MISSING ITEM(5)
*	841338	6024	STB	D	SOUTHEAST BANKING CORP	*** MISSING ITEM(5)
*	866635	6024	SNBK	D	SUN BANKS OF FLORIDA	*** MISSING ITEM(5)
*	880593	6024	TVBC	D	TENNESSEE VALLEY BANCORP	*** MISSING ITEM(5)
*	884280	6024	TDAT	D	THIRD NATIONAL CORP	*** MISSING ITEM(5)
*	898269	6024	TRGA	D	TRUST COMPANY OF GEORGIA	*** MISSING ITEM(5)

* 908068	6024	UPCH	D	UNION PLANTERS CORP	*** MISSING ITEM(5)
* 913164	6024	UVBK	D	UNITED VIRGINIA BANKSHARES	*** MISSING ITEM(5)
* 928033	6024	VNAT	D	VIRGINIA NATL BANKSHARES	*** MISSING ITEM(5)
* 929769	6024	WB	D	WACHOVIA CORP	*** MISSING ITEM(5)
* 26168	6025	AFLT	D	AMERICAN FLETCHER CORP	*** MISSING ITEM(5)
* 59571	6025	BOHI	D	BANCOHIO CORP	*** MISSING ITEM(5)
* 61599	6025	BDET	D	BANK OF COMMONWEALTH-DETROIT	*** MISSING ITEM(5)
* 152420	6025	CBAN	D	CENTRAL BANCORPORATION INC	*** MISSING ITEM(5)
* 156260	6025	CENB	D	CENTRAN CORP	*** MISSING ITEM(5)
* 186777	6025	CLVT	D	CLEVETRUST CORP	*** MISSING ITEM(5)
* 200525	6025	CBSH	D	COMMERCE BANCSHARES INC	*** MISSING ITEM(5)
* 251457	6025	OBNK	D	DETROITBANK CORP	*** MISSING ITEM(5)
* 294432	6025	EQK	D	EQUIMARK CORP	*** MISSING ITEM(5)
* 318657	6025	FBGO	D	FIRST BANC GROUP OF OHIO	*** MISSING ITEM(5)
* 319279	6025	FBKS	D	FIRST BANK SYSTEM INC	*** MISSING ITEM(5)
* 335558	6025	FNCH	D	FIRST NATL CHARTER CORP	*** MISSING ITEM(5)
* 335562	6025	FNAC	D	FIRST NATL CINCINNATI CORP	*** MISSING ITEM(5)
* 337354	6025	FUBC	D	FIRST UNION BANCORPORATION	*** MISSING ITEM(5)
* 337570	6025	FWB	D	FIRST WISCONSIN CORP	*** MISSING ITEM(5)
* 369100	6025	GBS	D	GENERAL BANCSHARES	*** MISSING ITEM(5)
* 446150	6025	HBAN	D	HUNTINGTON BANCSHARES	*** MISSING ITEM(5)
* 455011	6025	INAT	D	INDIANA NATIONAL CORP	*** MISSING ITEM(5)
* 565004	6025	MNTL	D	MANUFACTURERS NATL CORP	*** MISSING ITEM(5)
* 568236	6025	MCRP	D	MARINE CORP	*** MISSING ITEM(5)
* 571834	6025	MRIS	D	MARSHALL + ILSLEY CORP	*** MISSING ITEM(5)
* 587342	6025	MTRC	D	MERCANTILE BANCORPORATION	*** MISSING ITEM(5)
* 594563	6025	MNCO	D	MICHIGAN NATL CORP	*** MISSING ITEM(5)
* 635405	6025	NCTY	D	NATIONAL CITY CORP	*** MISSING ITEM(5)
* 635562	6025	NBD	D	NATIONAL DETROIT CORP	*** MISSING ITEM(5)
* 665748	6025	NSBC	D	NORTHERN STATES BANCORP	*** MISSING ITEM(5)
* 667332	6025	NOB	D	NORTHWEST BANCORPORATION	*** MISSING ITEM(5)
* 679833	6025	OKEN	D	OLD KENT FINANCIAL CORP	*** MISSING ITEM(5)
* 725197	6025	PITS	D	PITTSBURGH NATL CORP	*** MISSING ITEM(5)
* 833663	6025	SOCI	D	SOCIETY CORP	*** MISSING ITEM(5)
* 906042	6025	UCH	D	UNION COMMERCE CORP	*** MISSING ITEM(5)
* 907498	6025	UNBK	D	UNION NATL BANK PITTSBURGH	*** MISSING ITEM(5)
* 40465	6026	ABKP	D	ARIZONA BANK PHOENIX	*** MISSING ITEM(5)
* 196538	6026	COLC	D	COLORADO NATL BANKSHARES	*** MISSING ITEM(5)
* 319594	6026	FBI	D	FIRST CITY BANCORP (TEXAS)	*** MISSING ITEM(5)
* 320545	6026	FIB	D	FIRST INTL BANCSHARES	*** MISSING ITEM(5)
* 321072	6026	FNTL	D	FIRST NATL BANCORPORATION	*** MISSING ITEM(5)
* 336294	6026	FSCO	D	FIRST SECURITY CORP	*** MISSING ITEM(5)
* 337411	6026	FBFW	D	FIRST UNITED BANCORP	*** MISSING ITEM(5)
* 531090	6026	LIBN	D	LIBERTY NATIONAL CORP	*** MISSING ITEM(5)
* 587541	6026	MTD	D	MERCANTILE TEXAS CORP	*** MISSING ITEM(5)
* 760820	6026	RPT	D	REPUBLIC OF TEXAS CORP	*** MISSING ITEM(5)
* 844768	6026	SWB	D	SOUTHWEST BANCSHARES	*** MISSING ITEM(5)
* 882147	6026	TABS	D	TEXAS AMERICAN BANCSHARES	*** MISSING ITEM(5)
* 882315	6026	TCB	D	TEXAS COMMERCE BANCSHARES	*** MISSING ITEM(5)
* 909572	6026	UBKS	D	UNITED BANKS OF COLORADO	*** MISSING ITEM(5)
* 919796	6026	VNBK	D	VALLEY NATIONAL BANK-ARIZONA	*** MISSING ITEM(5)
* 59442	6027	BNC	D	BANCAL TRI-STATE CORP	*** MISSING ITEM(5)
* 66050	6027	BAM	D	BANKAMERICA CORP	*** MISSING ITEM(5)
* 226822	6027	CKN	D	CROCKER NATIONAL CORP	*** MISSING ITEM(5)
* 320536	6027	FHWN	D	FIRST HAWAIIAN INC	*** MISSING ITEM(5)
* 419695	6027	HWN	D	HAWAII BANCORP INC	*** MISSING ITEM(5)
* 750863	6027	RBAN	D	RAINIER BANCORP	*** MISSING ITEM(5)
* 811737	6027	SFC	D	SEAFIRST CORP	*** MISSING ITEM(5)
* 814823	6027	SPAC	D	SECURITY PACIFIC CORP	*** MISSING ITEM(5)
* 904853	6027	UNB	D	UNION BANCORP INC	*** MISSING ITEM(5)
* 911596	6027	USBC	D	U S BANCORP	*** MISSING ITEM(5)
* 949743	6027	WFC	D	WELLS FARGO + CO	*** MISSING ITEM(5)
* 957688	6027	WBC	D	WESTERN BANCORPORATION	*** MISSING ITEM(5)
AHM	AMMANSON (H.F.) + CO			SAVINGS + LOAN ASSOCIATIONS	
FFI	FINANCIAL FEDERATION			SAVINGS + LOAN ASSOCIATIONS	
FCF	FIRST-CHARTER FINANCIAL			SAVINGS + LOAN ASSOCIATIONS	
GFC	GIBRALTAR FINANCIAL CORP			SAVINGS + LOAN ASSOCIATIONS	
GMF	GREAT WESTERN FINANCIAL			SAVINGS + LOAN ASSOCIATIONS	
ICA	IMPERIAL CORP OF AMERICA			SAVINGS + LOAN ASSOCIATIONS	
UFL	UNITED FINANCIAL OF CALIF			SAVINGS + LOAN ASSOCIATIONS	
* 125569	6140	CIT	D	C.I.T. FINANCIAL CORP	*** MISSING ITEM(14)
CTY	CENTURY FACTORS INC			FINANCE	
HLR	HELLER (WALTER E.) INTL			FINANCE	
TLC	TALCOTT NATIONAL			FINANCE	
AIC	AMERICAN INVESTMENT CO			LICENSED SMALL LOAN LENDERS	
ARR	ARISTAR INC			LICENSED SMALL LOAN LENDERS	
BNL	BENEFICIAL CORP			LICENSED SMALL LOAN LENDERS	
CRO	CREDITRIFT FINANCIAL INC			LICENSED SMALL LOAN LENDERS	
DFC	DIAL CORP			LICENSED SMALL LOAN LENDERS	
FIN	FINANCIAL CORP OF AMERICA			LICENSED SMALL LOAN LENDERS	
HFC	HOUSEHOLD FINANCE CORP			LICENSED SMALL LOAN LENDERS	
LLC	LIBERTY-LOAN CORP			LICENSED SMALL LOAN LENDERS	

LAC	LINCOLN AMER CORP N Y	LICENSED	SMALL LOAN LENDERS
OFC	OXFORD FIRST CORP	LICENSED	SMALL LOAN LENDERS
AXP	AMERICAN EXPRESS	FINANCE	SERVICES
CLQ	CALIFORNIA LIFE CORP	FINANCE	SERVICES
CAC	COMMERCIAL ALLIANCE	FINANCE	SERVICES
FNH	FEDERAL NATL MORTGAGE ASSN	FINANCE	SERVICES
LTR	LOEWS CORP	FINANCE	SERVICES
MGI	MGIC INVESTMENT CORP	FINANCE	SERVICES
MLA	MIDLAND CO	FINANCE	SERVICES
REL	RELIANCE GROUP INC	FINANCE	SERVICES
RNX	REX-NORECO INC	FINANCE	SERVICES
TI	TICOR	FINANCE	SERVICES
TA	TRANSAMERICA CORP	FINANCE	SERVICES
BAC	BACHE GROUP INC	SECURITY + COMMODITY	BROKERS
DTL	DELTEC INTERNATIONAL LTD	SECURITY + COMMODITY	BROKERS
DLJ	DOONALDSON LUFKIN + JENRETTE	SECURITY + COMMODITY	BROKERS
AGE	EDWARDS (A.G.) + SONS	SECURITY + COMMODITY	BROKERS
EFH	HUTTON (E.F.) GROUP	SECURITY + COMMODITY	BROKERS
HER	MERRILL LYNCH + CO	SECURITY + COMMODITY	BROKERS
SHE	695629 6200 PWJ D PAINE WEBBER INC	SECURITY + COMMODITY	BROKERS
DMR	WITTER(D.) REYNOLDS ORG INC	SECURITY + COMMODITY	BROKERS
	8140 6312 AET D AETNA LIFE + CASUALTY CO	***	MISSING ITEM(7)
	28551 6312 ANAT D AMERICAN NATL FINL CORP	***	MISSING ITEM(5)
	123277 6312 BMAC D BUSINESS MENS ASSURANCE CO	***	MISSING ITEM(5)
	140186 6312 CPH D CAPITAL HOLDING CORP	***	MISSING ITEM(5)
	195774 6312 CACC D COLONIAL LIFE + ACCIDENT INS	***	MISSING ITEM(5)
	200165 6312 COMB D COMBINED INS CO OF AMER	***	MISSING ITEM(5)
	207579 6312 CGEN D CONNECTICUT GENL INS CO	***	MISSING ITEM(5)
	316441 6312 FUNI D FIDELITY UNION LIFE	***	MISSING ITEM(5)
	353784 6312 FLIF D FRANKLIN LIFE INS CO	***	MISSING ITEM(5)
	383730 6312 GELI D GOVERNMENT EMPLOYEES LIFE	***	MISSING ITEM(5)
	391900 6312 GSTN D GREAT SOUTHERN CORP	***	MISSING ITEM(5)
	402578 6312 GHC D GULF UNITED CORP	***	MISSING ITEM(5)
	454002 6312 ILIF D INDEPENDENT LIFE + ACCIDENT	***	MISSING ITEM(5)
	475070 6312 JP D JEFFERSON-PILOT CORP	***	MISSING ITEM(5)
	484836 6312 KCLI D KANSAS CITY LIFE INS CO	***	MISSING ITEM(5)
	513064 6312 LLIC D LAMAR LIFE CORP	***	MISSING ITEM(5)
	530370 6312 LC D LIBERTY CORP	***	MISSING ITEM(5)
	531099 6312 LNAT D LIBERTY NATL LIFE INS	***	MISSING ITEM(5)
	532032 6312 LIGA D LIFE INS CO OF GEORGIA	***	MISSING ITEM(5)
	534187 6312 LNC D LINCOLN NATIONAL CORP	***	MISSING ITEM(5)
	609023 6312 MONC D MONARCH CAPITAL CORP	***	MISSING ITEM(5)
	615318 6312 MONU D MONUMENTAL CORP	***	MISSING ITEM(5)
	629161 6312 NLT D NLT CORP	***	MISSING ITEM(5)
	637079 6312 NOLN D NATL OLD LINE INS CO	***	MISSING ITEM(5)
	668146 6312 NWNL D NORTHWESTERN NATL LIFE INS	***	MISSING ITEM(5)
	708849 6312 PENNA D PENNSYLVANIA LIFE CO	***	MISSING ITEM(5)
	743668 6312 PRLI D PROTECTIVE LIFE INS CO	***	MISSING ITEM(5)
	743889 6312 PACC D PROVIDENT LIFE + ACCIDENT	***	MISSING ITEM(5)
	760711 6312 RNAT D REPUBLIC NATL LIFE INS CO	***	MISSING ITEM(5)
	844447 6312 SFIN D SOUTHLAND FINANCIAL CORP	***	MISSING ITEM(5)
	845603 6312 SWLF D SOUTHWESTERN LIFE CORP	***	MISSING ITEM(5)
	894180 6312 TIC D TRAVELERS CORP	***	MISSING ITEM(5)
	911485 6312 USVC D UNITED SERVICES LIFE INS	***	MISSING ITEM(5)
	917318 6312 USH D USLIFE CORP	***	MISSING ITEM(5)
	939339 6312 WNT D WASHINGTON NATL CORP	***	MISSING ITEM(5)
	26357 6332 AGC D AMERICAN GENERAL INSURANCE	***	MISSING ITEM(5)
	26874 6332 AIGR D AMERICAN INTERNATIONAL GROUP	***	MISSING ITEM(5)
	126117 6332 CAF D CNA FINANCIAL CORP	***	MISSING ITEM(5)
	171232 6332 CHUB D CHUBB CORP	***	MISSING ITEM(5)
	211327 6332 CIC D CONTINENTAL CORP	***	MISSING ITEM(5)
	370639 6332 GREI D GENERAL REINSURANCE CORP DEL	***	MISSING ITEM(5)
	416704 6332 HBOL D HARTFORD STEAM BOILER INSPEC	***	MISSING ITEM(5)
	449744 6332 INA D INA CORP	***	MISSING ITEM(5)
	786429 6332 SAFC D SAFECO CORP	***	MISSING ITEM(5)
	792860 6332 STPL D ST PAUL COS	***	MISSING ITEM(5)
	911825 6332 FG D U S FIDELITY + GUARANTY	***	MISSING ITEM(5)
CBL	CORROON + BLACK CORP	INSURANCE AGENTS BROKERS+SER	
	228795 6400 CMF D CRUM + FORSTER	***	MISSING ITEM(15)
FBH	HALL (FRANK B.) + CO	INSURANCE AGENTS BROKERS+SER	
	470245 6400 JMS D JAMES (ERED S.) + CO	***	MISSING ITEM(15)
MMC	MARSH + MCLENNAN COS	INSURANCE AGENTS BROKERS+SER	
CBC	COLDWELL BANKER + CO	REAL ESTATE	
GDV	GDV INC	REAL ESTATE	
KB	KAUFMAN + BROAD INC	REAL ESTATE	
LR	LEE NATIONAL CORP	REAL ESTATE	
POL	PRESIDENTIAL REALTY CP-CL B	REAL ESTATE	
TIS	TISHMAN REALTY + CONSTRUCTN	REAL ESTATE	
ACC	AMERICAN CAPITAL CORP	SUBDIVID DEVELOP EX CEMETERY	
AXR	AMREP CORP	SUBDIVID DEVELOP EX CEMETERY	
CVL	CANAVERAL INTL CORP	SUBDIVID DEVELOP EX CEMETERY	

CVI	CENVILL COMMUNITIES	SUBDIVID	DEVELOP	EX	CEMETERY
CST	CHRISTIANA COMPANIES	SUBDIVID	DEVELOP	EX	CEMETERY
DLT	DELTONA CORP	SUBDIVID	DEVELOP	EX	CEMETERY
DCA	DEVELOPMENT CORP OF AMERICA	SUBDIVID	DEVELOP	EX	CEMETERY
FPO	FPA CORP	SUBDIVID	DEVELOP	EX	CEMETERY
HZN	HORIZON CORP	SUBDIVID	DEVELOP	EX	CEMETERY
ITI	ITI CORP (OHIO)	SUBDIVID	DEVELOP	EX	CEMETERY
ICF	INVESTMENT CORP-FLORIDA	SUBDIVID	DEVELOP	EX	CEMETERY
KC	KEY CO	SUBDIVID	DEVELOP	EX	CEMETERY
LML	LANDMARK LAND CO	SUBDIVID	DEVELOP	EX	CEMETERY
LVX	LEISURE TECHNOLOGY	SUBDIVID	DEVELOP	EX	CEMETERY
LEN	LENNAR CORP	SUBDIVID	DEVELOP	EX	CEMETERY
HMS	MILLER (H.) + SONS	SUBDIVID	DEVELOP	EX	CEMETERY
LBN	NELSON (L.B.) CORP	SUBDIVID	DEVELOP	EX	CEMETERY
OHC	ORIOLE HOMES	SUBDIVID	DEVELOP	EX	CEMETERY
PDC	PRESLEY COS	SUBDIVID	DEVELOP	EX	CEMETERY
PHM	PULTE HOMES CORP	SUBDIVID	DEVELOP	EX	CEMETERY
PGA	PUNTA GORDA ISLES-INC	SUBDIVID	DEVELOP	EX	CEMETERY
RMC	ROSSMOOR CORP	SUBDIVID	DEVELOP	EX	CEMETERY
RPB	ROYAL PALM BEACH COLONY	SUBDIVID	DEVELOP	EX	CEMETERY
SLG	SELIGMAN + ASSOCIATES	SUBDIVID	DEVELOP	EX	CEMETERY
SHA	SHAPELL INDUSTRIES	SUBDIVID	DEVELOP	EX	CEMETERY
SRO	SOUTHLAND ROYALTY CO	SUBDIVID	DEVELOP	EX	CEMETERY
BTM	BT MORTGAGE INVESTORS	REAL ESTATE	INVESTMENT	TRUST	
BRLT	BANKAMERICA REALTY INVESTORS	REAL ESTATE	INVESTMENT	TRUST	
BAY	BAY COLONY PROPERTIES CO	REAL ESTATE	INVESTMENT	TRUST	
CI	CI MORTGAGE GROUP	REAL ESTATE	INVESTMENT	TRUST	
CHR	CHASE MANHATTAN MTG + RLTY	REAL ESTATE	INVESTMENT	TRUST	
CZS	CITIZENS + SOUTHERN RLTY INVS	REAL ESTATE	INVESTMENT	TRUST	
CGM	CONNECTICUT GEN MTG + RLTY	REAL ESTATE	INVESTMENT	TRUST	
CUZ	COUSINS MORTGAGE + EQUITY	REAL ESTATE	INVESTMENT	TRUST	
DMG	DIVERSIFIED MTG INVESTORS	REAL ESTATE	INVESTMENT	TRUST	
EO	EQUITABLE LIFE MTG + REALTY	REAL ESTATE	INVESTMENT	TRUST	
FMEM	FIRST MEMPHIS REALTY TRUST	REAL ESTATE	INVESTMENT	TRUST	
FMTG	FIRST MTG INVESTORS	REAL ESTATE	INVESTMENT	TRUST	
FPM	FIRST PA MORTGAGE TRUST	REAL ESTATE	INVESTMENT	TRUST	
GGP	GENERAL GROWTH PROP	REAL ESTATE	INVESTMENT	TRUST	
HRE	HUBBARD REAL ESTATE INV	REAL ESTATE	INVESTMENT	TRUST	
INV	INSTITUTIONAL INVESTORS TR	REAL ESTATE	INVESTMENT	TRUST	
LOM	LOMAS + NETTLETON MTG INV	REAL ESTATE	INVESTMENT	TRUST	
MML	MASSHUTUAL MTG + RLTY INVS	REAL ESTATE	INVESTMENT	TRUST	
MYM	MONY-MORTGAGE INVESTORS	REAL ESTATE	INVESTMENT	TRUST	
MTG	MORTGAGE GROWTH INVESTORS	REAL ESTATE	INVESTMENT	TRUST	
MT	MORTGAGE TRUST OF AMERICA	REAL ESTATE	INVESTMENT	TRUST	
NAM	NORTH AMERICAN MTG INVESTOR	REAL ESTATE	INVESTMENT	TRUST	
NML	NORTHWESTERN MUTUAL LIFE MTG	REAL ESTATE	INVESTMENT	TRUST	
BFS	SAUL (B.F.) REAL ESTATE INV	REAL ESTATE	INVESTMENT	TRUST	
SMU	STATE MUTUAL INVESTORS	REAL ESTATE	INVESTMENT	TRUST	
TSI	TRI-SOUTH MORTGAGE INVS	REAL ESTATE	INVESTMENT	TRUST	
WRI	WACHOVIA REALTY-INVESTMENTS	REAL ESTATE	INVESTMENT	TRUST	
WFM	WELLS FARGO MTG + EQUITY TR	REAL ESTATE	INVESTMENT	TRUST	
INN	AMERICAN MOTOR INNS	HOTEL-MOTELS			
HLT	HILTON HOTELS CORP	HOTEL-MOTELS			
HIA	HOLIDAY INNS INC	HOTEL-MOTELS			
HMN	HOSPITALITY MOTOR INNS	HOTEL-MOTELS			
HYAT	HYATT CORP	HOTEL-MOTELS			
LQM	LA QUINTA MOTOR INNS	HOTEL-MOTELS			
PDQ	PRIME-MOTOR-INNS-INC	HOTEL-MOTELS			
RAM	RAMADA INNS	HOTEL-MOTELS			
RT A	RESORTS INTERNATIONAL-CL A	HOTEL-MOTELS			
SIH	SONESTA INTL HOTELS CORP	HOTEL-MOTELS			
UI	UNITED INNS INC	HOTEL-MOTELS			
WBB	WEBB (DEL E.) CORP	HOTEL-MOTELS			
WCO	WRATHER CORPORATION	HOTEL-MOTELS			
	* 93671 7200 HRB D BLOCK H + R INC				*** MISSING ITEM(15)
FRP	FAMILY RECORD PLAN INC	SERV-PERSONAL			
IFN	IFS INDUSTRIES INC	SERV-PERSONAL			
SAL	SELIGMAN + LATZ INC	SERV-PERSONAL			
SRV	SERVICE CORP INTERNATIONAL	SERV-PERSONAL			
BCO	BLESSINGS CORP	SERV-LINEN SUPPLY			
MNS	MEANS (F.W.) + CO	SERV-LINEN SUPPLY			
NAS	NATIONAL SERVICE INOS INC	SERV-LINEN SUPPLY			
SIU	SEARS INDUSTRIES INC	SERV-LINEN SUPPLY			
SVO	SERVISCO	SERV-LINEN SUPPLY			
CCA	COMBINED COMMUNICATIONS	SERV-ADVERTISING AGENCIES			
	* 34872 7311 FCB D FOOTE C	ONE + BELDING COMM			*** MISSING ITEM(15)
IPG	INTERPUBLIC GROUP OF COS	SERV-ADVERTISING AGENCIES			
OMD	ORMAND INDUSTRIES	SERV-ADVERTISING AGENCIES			
JWT	THOMPSON (J. WALTER) CO	SERV-ADVERTISING AGENCIES			
ALM	ALLIED MAINTENANCE	SERV-CLEAN+MAINT TO BLDG NEC			
ABM	AMERICAN BLDG MAINTENANCE	SERV-CLEAN+MAINT TO BLDG NEC			
NKC	NATIONAL-KINNEY CORP	SERV-CLEAN+MAINT TO BLDG NEC			

PBM	PRUDENTIAL BLDG MAINTENANCE	SERV-CLEAN+MAINT TO BLDG NEC	
ADR	APPLIED DATA RESEARCH	SERV-COMPUTER + DATA PROCESS	
AUD	AUTOMATIC DATA PROC	SERV-COMPUTER + DATA PROCESS	
BDR	BRADFORD NATIONAL CORP	SERV-COMPUTER + DATA PROCESS	
CHN	CHILTON CORP	SERV-COMPUTER + DATA PROCESS	
CIG	COMPUTER INVESTORS GROUP	SERV-COMPUTER + DATA PROCESS	
CSC	COMPUTER SCIENCES CORP	SERV-COMPUTER + DATA PROCESS	
DCL	DCL INC	SERV-COMPUTER + DATA PROCESS	
I	ITEL CORP	SERV-COMPUTER + DATA PROCESS	
LGN	LOGICON INC	SERV-COMPUTER + DATA PROCESS	
MNY	HDC CORP	SERV-COMPUTER + DATA PROCESS	
	* 635578 7370 NCS D NATIONAL CSS INC		*** MISSING ITEM(15)
ONL	ON-LINE SYSTEMS	SERV-COMPUTER + DATA PROCESS	
TYM	TYMSHARE INC	SERV-COMPUTER + DATA PROCESS	
WLY	WYLY CORP	SERV-COMPUTER + DATA PROCESS	
BBN	BOLT BERANEK + NEWMAN INC	SERV-RESEARCH+DEVELOPHNT LAB	
CLB	CORE LABORATORIES	SERV-RESEARCH+DEVELOPHNT LAB	
DGC	DIGICON INC	SERV-RESEARCH+DEVELOPHNT LAB	
FGN	FLOW GENERAL INC	SERV-RESEARCH+DEVELOPHNT LAB	
PLN	PLANNING RESEARCH CORP	SERV-RESEARCH+DEVELOPHNT LAB	
XOX	XONICS INC	SERV-RESEARCH+DEVELOPHNT LAB	
CDU	CORDURA CORP	SERV-MGMT CONSULTING+P R SER	
	* 264830 7392 DNB D DUN + BRADSTREET COS		*** MISSING ITEM(15)
EDS	ELECTRONIC DATA SYSTEMS	SERV-MGMT CONSULTING+P R SER	
JEC	JACOBS ENGINEERING GROUP INC	SERV-MGMT CONSULTING+P R SER	
MAC	MACDONALD (E.F.) CO	SERV-MGMT CONSULTING+P R SER	
SMG	SCIENCE MANAGEMENT CORP	SERV-MGMT CONSULTING+P R SER	
URS	URS CORP	SERV-MGMT CONSULTING+P R SER	
VTK	VIATECH INC	SERV-MGMT CONSULTING+P R SER	
	* 25411 7393 ADT D AMERICAN DISTRICT TELEGRAPH		*** MISSING ITEM(15)
BDA	BURNS INTL SECURITY SERVICE	SERV-DETECTIVE + PROTECTIVE	
PPD	PURULATOR INC	SERV-DETECTIVE + PROTECTIVE	
WAK	WACKENHUT CORP	SERV-DETECTIVE + PROTECTIVE	
CLC	CLC OF AMERICA	SERV-EQUIP RENTAL + LEASING	
OPF	OPF INC	SERV-EQUIP RENTAL + LEASING	
ITP	INTERPOOL LTD	SERV-EQUIP RENTAL + LEASING	
IMY	INTERWAY CORP	SERV-EQUIP RENTAL + LEASING	
PSC	PHILADELPHIA SUBURBAN CORP	SERV-EQUIP RENTAL + LEASING	
PTX	PIONEER TEXAS CORP	SERV-EQUIP RENTAL + LEASING	
TLX	TRANS-LUX CORP	SERV-EQUIP RENTAL + LEASING	
	* 912129 7394 USL D U S LEASING INTL INC		*** MISSING ITEM(7)
XTR	XTRA CORP	SERV-EQUIP RENTAL + LEASING	
ACS	AMERICAN CONSUMER INDUSTRIES	SERV-BUSINESS SERVICES N E C	
BKY	BERKEY PHOTO INC	SERV-BUSINESS SERVICES N E C	
DYN	DYNALECTRON CORP	SERV-BUSINESS SERVICES N E C	
EFX	EQUIFAX INC	SERV-BUSINESS SERVICES N E C	
FIL	FILM CORP OF AMERICA	SERV-BUSINESS SERVICES N E C	
FLX	FLEXI-VAN CORP	SERV-BUSINESS SERVICES N E C	
FOT	FOTOMAT CORP	SERV-BUSINESS SERVICES N E C	
FSP	FOX-STANLEY PHOTO PRODUCTS	SERV-BUSINESS SERVICES N E C	
JOB	GENERAL EMPLOY ENTERPRISES	SERV-BUSINESS SERVICES N E C	
HLL	HUDSON GENERAL CORP	SERV-BUSINESS SERVICES N E C	
NIEL	NIELSEN (A.C.) CO-CL A	SERV-BUSINESS SERVICES N E C	
PKR	PARKER PEN CO	SERV-BUSINESS SERVICES N E C	
PRY	PITTMAY CORP	SERV-BUSINESS SERVICES N E C	
ROL	REDLAW INC	SERV-BUSINESS SERVICES N E C	
ROL	ROLLINS INC	SERV-BUSINESS SERVICES N E C	
PIX	SCHOOL PICTURES INC	SERV-BUSINESS SERVICES N E C	
ALR	ALLRIGHT AUTO PARKS INC	SERV-AUTOMOTIVE REPAIR + SER	
GEL	GELCO CORP	SERV-AUTOMOTIVE REPAIR + SER	
RLC	REL CORP	SERV-AUTOMOTIVE REPAIR + SER	
BRD	RAGAN (BRAD) INC	SERV-AUTOMOTIVE REPAIR + SER	
RDR	RYDER SYSTEM INC	SERV-AUTOMOTIVE REPAIR + SER	
SNO	SANDGATE CORP	SERV-AUTOMOTIVE REPAIR + SER	
SAU	SAUNDERS LEASING SYSTEM INC	SERV-AUTOMOTIVE REPAIR + SER	
	* 806398 7500 ESH D SCHEIB EARL INC		*** MISSING ITEM(15)
WHT	WHITEHALL CORP	SERV-AUTOMOTIVE REPAIR + SER	
ANP	AMERICAN INTL PICTURES	SERV-MOTION PICTURE PRODUCTN	
CNE	CINEMA 5 LTD	SERV-MOTION PICTURE PRODUCTN	
CPS	COLUMBIA PICTURES INDS	SERV-MOTION PICTURE PRODUCTN	
FWY	FILMWAYS INC	SERV-MOTION PICTURE PRODUCTN	
MCA	MCA INC	SERV-MOTION PICTURE PRODUCTN	
HGM	METRO-GOLDWYN-MAYER INC	SERV-MOTION PICTURE PRODUCTN	
MOV	MOVIELAB INC	SERV-MOTION PICTURE PRODUCTN	
TK	TECHNICOLOR INC	SERV-MOTION PICTURE PRODUCTN	
TF	TWENTIETH CENTURY-FOX FILM	SERV-MOTION PICTURE PRODUCTN	
CNM	CINERAMA INC	SERV-MOTION PICTURE THEATRES	
GCN	GENERAL CINEMA CORP	SERV-MOTION PICTURE THEATRES	
INF	INFLIGHT SERVICES INC	SERV-MOTION PICTURE THEATRES	
SJR	SAN JUAN RACING ASSN	SERV-RACING INCL TRACK OPER	
DIS	DISNEY (WALT) PRODUCTIONS	SERV-MISC AMUSEMENT + RECREA	
GBM	GREAT LAKES RECREATION CO	SERV-MISC AMUSEMENT + RECREA	

HRR	HARRAH'S	SERV-MISC AMUSEMENT + RECREA
ICD	INTERCONTINENTAL DIVERSIFIED	SERV-MISC AMUSEMENT + RECREA
SBO	SHOWBOAT INC	SERV-MISC AMUSEMENT + RECREA
TCO	TREADWAY COS INC	SERV-MISC AMUSEMENT + RECREA
MNR	MANOR CARE INC	SERV-NURSING+PERSON CARE FAC
MEE	METROCARE INC	SERV-NURSING+PERSON CARE FAC
NMD	NATIONAL MEDICAL CARE	SERV-NURSING+PERSON CARE FAC
AMI	AMERICAN MEDICAL INTL	SERV-HOSPITALS
AAM	AMERICAN MEDICORP	SERV-HOSPITALS
BEV	SEVERLY ENTERPRISES	SERV-HOSPITALS
CNC	CENCO INC	SERV-HOSPITALS
CHD	CHARTER MEDICAL CORP	SERV-HOSPITALS
CMY	COMMUNITY PSYCHIATRIC CNTRS	SERV-HOSPITALS
DMN	DAMON CORP	SERV-HOSPITALS
FGG	FLAGG INDUSTRIES	SERV-HOSPITALS
HSP	HOSPITAL CORP OF AMERICA	SERV-HOSPITALS
HUM	HUMANA INC	SERV-HOSPITALS
HHS	HUNTINGTON HEALTH SERVICE	SERV-HOSPITALS
MDX	MEDENCO INC	SERV-HOSPITALS
MED	MEDFIELD CORP	SERV-HOSPITALS
LAB	METPATH INC	SERV-HOSPITALS
NHE	NATIONAL HEALTH ENTERPRISES	SERV-HOSPITALS
NME	NATIONAL MEDICAL ENTERPRISE	SERV-HOSPITALS
RHM	R H MEDICAL SERVICES	SERV-HOSPITALS
FSI	FLIGHTSAFETY INTERNATIONAL	SERV-EDUCATIONAL
NSY	NATIONAL SYSTEMS CORP	SERV-EDUCATIONAL
BKR	BAKER (MICHAEL) CORP	SERV-ENGINEERING + ARCHITECT
CDI	CDI CORP	SERV-ENGINEERING + ARCHITECT
DA	CRS DESIGN ASSOCIATES	SERV-ENGINEERING + ARCHITECT
GIT	GENGE INC	SERV-ENGINEERING + ARCHITECT
RMP	PARSONS (RALPH M.) CO	SERV-ENGINEERING + ARCHITECT
SW	STONE + WEBSTER INC	SERV-ENGINEERING + ARCHITECT
TT	TETRA TECH INC	SERV-ENGINEERING + ARCHITECT
AV	AVCO CORP	CONGLOMERATES
CNV	CITY INVESTING CO	CONGLOMERATES
COT	COLT INDUSTRIES INC	CONGLOMERATES
GW	GULF + WESTERN INDS INC	CONGLOMERATES
IU	IU INTL CORP	CONGLOMERATES
ITT	INTL TELEPHONE + TELEGRAPH	CONGLOMERATES
JUP	JUPITER INDUSTRIES	CONGLOMERATES
KI	KAISER INDUSTRIES CORP	CONGLOMERATES
KT	KATY INDUSTRIES	CONGLOMERATES
KDE	KIDDE (WALTER) + CO	CONGLOMERATES
LTV	LTV CORP	CONGLOMERATES
LIT	LITTON INDUSTRIES INC	CONGLOMERATES
NMT	NORTHWEST INDUSTRIES	CONGLOMERATES
SGN	SIGNAL COS	CONGLOMERATES
SKW	STUDEBAKER-NORTHINGTON INC	CONGLOMERATES
TDY	TELEDYNE INC	CONGLOMERATES
TGT	TENNECO INC	CONGLOMERATES
TXT	TEXTRON INC	CONGLOMERATES
TU	TRANS UNION CORP	CONGLOMERATES
UCO	UNION CORP	CONGLOMERATES
WKR	WHITTAKER CORP	CONGLOMERATES

2299 COMPANIES PROCESSED.

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PART II

THE EFFECT OF ENERGY R&D ON OPTIMAL OPEC PETROLEUM PRICES

1. INTRODUCTION

Throughout the history of world economies, there have been periods when man has encountered resource limitations. The impending limitation on energy resources is a contemporary example. In such circumstances, continued economic production in the affected sectors requires that substitutes for the limited resources be found. Sometimes substitutes are readily available for exploitation. In such a case, the limitation is not generally significant. In other cases, however, new technologies may be required to obtain or use the potential substitutes. A number of contemporary examples are available in the energy sector: A vast energy resource exists in the deuterium contained in sea water, however, its utilization requires the development of controlled thermonuclear fusion. The economic use of solar energy is another example. Whatever the situation, the existence or nonexistence of substitutes will have an important effect on the depletion of the limited resource.

As an illustration of this importance, consider petroleum reserves. Would current holders of petroleum reserves choose to conserve their present reserves if some new process were found that could soon provide inexhaustible, perfectly substitutable syn-crude at a very competitive price? Not likely; in the face of such a substitute, economic incentives would favor an accelerated consumption of the existing reserves while they were still precious.¹ While no such process appears imminent today, considerable expenditures are being allocated to research and develop technologies (such as nuclear, solar and shale oil recovery) which are at least imperfect or partial substitutes for petroleum products and might be

¹ So long as marginal net revenue to the holder did not fall below zero in any period.

produced at some time in the not-too-distant future at more or less competitive costs. It is reasonable to expect that some of these technologies will compete in the energy market against the remaining reserves of crude oil by, say, the year 2000 and, as such, reduce the demand for crude oil at that time. The development of these technologies, then, affects the value of reserves remaining beyond some future introduction date, inducing accelerated production before that date when compared to the situation in which such technologies would never be available. Such an acceleration is of considerable benefit to the consuming or oil importing nations as it results in higher imports at lower prices, thus increasing consumer surplus in the short term, not merely when the new energy source becomes available. A mathematical analysis of this phenomenon follows in the next section. To achieve this benefit requires the pursuit of a credible program of energy research that has a reasonable expectation of developing oil substitutes. Solar, advanced fission and fusion technologies all appear to be candidate substitutes. The question then is: How great is the effect?

Clearly, the phenomenon described above has relevance in decisions to allocate funds for energy research and development which are, in part, based upon economic merits. Previous studies have focused only on the economic benefits of actually implementing new technologies: cost-savings and/or increased output realizable once the technology becomes available. Of course, for long-range technologies, such benefits have to be discounted over a considerable time period back to the present, thus offering little economic justification for incurring substantial research and development costs now. The effect of the development of substitute technologies on (for example) current OPEC prices, on the other hand, offers benefits in the short run that have been so far overlooked.

The effect discussed above will, of course, not be felt by OPEC alone. All holders of depletable energy reserves--domestic petroleum, gas and coal, as well as uranium--will be affected by research and development on alternative energy sources. The analysis performed herein has, to date, been applied only to OPEC. This has been selected due to OPEC's large holdings and the somewhat adversary relationship between OPEC and the importing countries.

The analysis which follows draws upon the work of Dasgupta and Heal (1974), making several important extensions and applying it to the case of OPEC petroleum depletion. Implications for public policy are discussed.

2. OPTIMAL NONRENEWABLE RESOURCE DEPLETION PATTERNS

The following analysis assumes that resource holders wish to deploy their reserves so as to maximize the present value of net revenues received from those reserves. The analytical tool employed is the mathematical theory of optimal control, as presented in Takayama (1974). We first consider the no-substitutes case and then the case where substitutes could become available.

No Substitutes. This problem has already appeared in the literature, originally by Hotelling (1931), more recently and thoroughly by Weinstein and Zeckhauser (1975) among others. Kalyon (1975), Schmalensee (1976) and Pindyck (1977) have considered the problem as it pertains to OPEC in particular. Our own formulation is presented here for later reference.

The problem is stated as:²

$$\left. \begin{array}{l} \text{Max} \\ \{q(t)\} \end{array} \int_0^{\infty} e^{-\rho t} U(Q,q,t) dt \right\} \begin{array}{l} \text{subject to: } \dot{Q} = -q \\ q, Q \geq 0 \\ \text{with } Q(t=0) = Q_0 \text{ given} \end{array} \quad (2.1)$$

The problem, (2.1), is read: select the functional $q(t)$ which maximizes the present value of present and future utilities, $U(Q,q,t)$, from production subject to the constraints that total reserves, $Q(t)$, diminish at the rate at which production takes place, $q(t)$, and where neither production nor reserves can be negative. $Q(t)$

²The following notations are used: $\dot{x} = \frac{dx}{dt}$ and $F_x = \frac{\partial F}{\partial x}$.

is the state variable, $q(t)$ the control. ρ is the discount rate. Reserves, $Q(t)$, enter into the utility function since, frequently, extraction costs are related to the level of remaining reserves; time enters since demand for the resource may be dynamic.

By requiring that $U_q > 0$ for small q , the nonrenewability of the resource ($q \geq 0$) guarantees that there exists some time, $T < \infty$, where $Q=0$ and the state inequality constraint ($Q \geq 0$) becomes active. As the resource is nonrenewable, the problem then effectively ends at T , and T can replace infinity as the upper limit on the integral in (2.1). There is no a priori knowledge on what value T will take on. The utility function for the producer is taken to be profit, or revenues net of costs. (In the application that follows, OPEC is viewed as a single producer, a monopoly with respect to the sum of import demands from the importing countries.) A linear demand curve for the resource is assumed, but since demand may be changing, quantity demanded as a function of price is depicted as growing (or declining) exponentially over time. This yields the following demand curve specification.

$$p(t) = a_1 + a_2 e^{-\gamma t} q(t) \quad (2.2)$$

where $p(t)$ is the price associated with the consumption rate $q(t)$ and γ is the growth rate in demand.³ The cost-of-production function used assumes the form proposed by Kalymon (1975):

$$C(t) = b_1 q(t) + b_2 q^2(t) + b_3 Q(t) q(t), \quad (2.3)$$

where marginal production costs (C_q) increase as the rate of extraction increases ($C_{qq} > 0$: $b_2 > 0$) and increase as the level of reserves fall ($C_{qQ} < 0$: $b_3 < 0$).

Thus, for any point in time, producer utility is defined as:

³Where $p(t) = a_1 + a_2 g(t)q(t)$, $g(t) = e^{-\gamma t}$ is used here. However, in what follows, there is no restriction on the form of $g(t)$, as long as its time derivative can be specified.

$$\begin{aligned}
U(Q,q,t) &= p(t)q(t) - C(t) \\
&= (a_1 - b_1) q(t) + (a_2 e^{-\gamma t} - b_2) q^2(t) - b_3 Q(t) q(t),
\end{aligned}$$

or rewriting,

$$U(Q,q,t) = c_1 q(t) + h(t) q^2(t) - c_2 Q(t) q(t). \quad (2.4)$$

This yields the following marginal utilities:

$$U_q = c_1 + 2h(t) q(t) - c_2 Q(t) \quad (2.5)$$

$$U_Q = -c_2 q(t). \quad (2.6)$$

According to the problem formulation and the necessary conditions for optimality, the following equations result:

$$\begin{aligned}
\dot{\lambda} &= -U_Q e^{-\rho t} \\
&= c_2 q(t) e^{-\rho t}
\end{aligned} \quad (2.7)$$

$$\dot{Q} = -q(t) \quad (2.8)$$

$$\begin{aligned}
\lambda(t) &= U_q e^{-\rho t} \\
&= [c_1 + 2h(t) q(t) - c_2 Q(t)] e^{-\rho t}
\end{aligned} \quad (2.9)$$

$$\begin{aligned}
\lambda(T)q(T) &= U[Q(T), q(T), T] e^{-\rho T} \\
&= q(T) [c_1 + h(T) q(T) - c_2 Q(T)] e^{-\rho T}
\end{aligned} \quad (2.10)$$

$\lambda(t)$ is the adjoint or co-state variable (the Lagrangian multiplier) associated with the state variable constraint $\dot{Q} = -q(t)$, that is, the condition that production depletes the remaining reserves. Equations 2.7 through 2.9 describe the movement of the system up until the activation of the state variable constraint, that is, $0 \leq t \leq T^-$.

These equations are reducible to the following second order differential equation:

$$\ddot{Q} + \left[\frac{\dot{h}}{h(t)} - \rho \right] \dot{Q} - \frac{\rho c_2}{2h(t)} Q = - \frac{\rho c_1}{2h(t)} \quad (2.11)$$

Equation 2.10 describes the transversality condition at T^+ . An initial condition $Q(t=0) = Q_0$, is given and a terminal condition known: $Q(T) = 0$, by definition of T . T is not known and thus there is not yet sufficient information to solve the differential Equation 2.11. However, by use of the transversality condition (2.10) and the jump condition (necessitated by the state variable inequality constraint), it can be proved indirectly that $q(T) = 0$.⁴ Unfortunately, despite the fact that (2.11) is a linear differential equation, a closed form solution in an easily usable form is not readily obtained, thus its solution is obtained by numeric methods.

Substitute With a Stochastic Arrival Date. Research on long-range, inexhaustible (or practically so) energy alternatives such as solar, breeder or fusion technologies can be expected to impact the demand for OPEC petroleum starting from the time at which they become commercially feasible and economically competitive. It is assumed here that the attributes of the substitute technology, once available, and its effect on OPEC export demand are known. Unknown is the exact time of first commercial availability of the alternative. (This is the problem posed by Dasgupta and Heal and this discussion follows theirs.) This time has a

⁴According to Pontryagin et al. (1962), $\lambda^+(T) = \lambda^-(T)$ (that is, there is no jump) given the conditions as stated above. This permits equating $\lambda^+(T)$, Equation 2.10, with $\lambda^-(T)$ defined in (2.9). Assume $q(T) \neq 0$, divide (2.10) through by $q(T)$ and solving (2.9) for $q(T)$, substitute into (2.10). Noting that $Q(T) = 0$, this yields $\lambda^-(T) = C_1 e^{-\rho T}$. Direct substitution of this $\lambda^-(T)$ into (2.9), however, requires $q(T) = 0$ for equality. Thus $q(T) = 0$.

probability density function (pdf) which is exogenously given.⁵ The time of availability of the substitute, designated τ , takes on a pdf $\omega(t)$ with a corresponding cumulative distribution function $\Omega(t)$; formally $\Omega(t) = \Pr[\tau \leq t]$.⁶ Further define $\Phi(t) = 1 - \Omega(t)$; $\Phi(t)$ is the probability that the alternative technology is not yet available.

It has already been stated that at time τ the demand for the depletable resource changes in some known way. Thus, the utility function takes on two different forms prior to and after τ :

$$U(Q, q, t) = \begin{cases} V(Q, q, t) & t < \tau \\ W(Q, q, t) & t \geq \tau \end{cases}$$

$V(Q, q, t)$ and $W(Q, q, t)$ will take on the same properties as those already ascribed to $U(Q, q, t)$. Define $Y[Q(\tau), \tau]$:

$$Y[Q(\tau), \tau] = \max_{\tau} \int_{\tau}^{\infty} e^{-\rho(t-\tau)} W(Q, q, t) dt$$

subject to the same constraints as in (2.1), with τ and $Q(\tau)$ given. $Y[Q(\tau), \tau]$ is the maximum present value utility of the remaining reserves when the new technology becomes available at time τ . Integrating by parts, it can be shown that:⁷

$$\begin{aligned} E \left\{ \int_0^{\infty} e^{-\rho t} U(Q, q, t) dt \right\} &= \int_0^{\infty} \omega(\tau) \left\{ \int_0^{\tau} e^{-\rho t} V(Q, q, t) dt + e^{-\rho \tau} Y[Q(\tau), \tau] \right\} d\tau \\ &= \int_0^{\infty} e^{-\rho t} \left\{ \Phi(t) V(Q, q, t) + \omega(t) Y[Q(t), t] \right\} dt. \quad (2.12) \end{aligned}$$

⁵"Probability density function" is used loosely here, since the ultimate probability that a new technology will ever be commercially available may well be less than 1. This possibility is taken into account in this analysis.

⁶Restating the previous footnote, $\Omega(\infty) \leq 1$; strict equality is not enforced.

⁷This formulation is due to Dasgupta and Heal (1974).

If one assumes that the resource holders are expected profit maximizers, the problem with a stochastically-arriving substitute becomes one of maximizing (2.12) subject to the constraints in (2.1); (2.12) also shows the equivalence:

$$U(Q,q,t) = \Phi(t) V(Q,q,t) + \omega(t) Y[Q(t),t].$$

$V(Q,q,t)$, the utility function prior to substitute availability, takes on the same form as $U(Q,q,t)$ in the no-substitutes case, Equations 2.4 through 2.6.

The problem formulation and optimality conditions lead to the following equations, analogous to Equations 2.7 through 2.10:

$$\begin{aligned}\dot{\lambda} &= -[\Phi(t) V_Q - \omega(t) Y_Q] e^{-\rho t} \\ &= -[c_2 \Phi(t) \dot{Q} - \omega(t) Y_Q] e^{-\rho t}\end{aligned}\tag{2.13}$$

$$\dot{Q} = -q(t)\tag{2.14}$$

$$\begin{aligned}\lambda(t) &= \Phi(t) V_q e^{-\rho t} \\ &= \Phi(t) [c_1 + 2h(t) - c_2 Q(t)] e^{-\rho t}\end{aligned}\tag{2.15}$$

$$\begin{aligned}\lambda(T)q(T) &= \{\Phi(T)V(Q,q,T) + \omega(T) Y[Q(T),T]\} e^{-\rho T} \\ &= \Phi(T)q(T) e^{-\rho T} [c_1 + h(T)q(T)]\end{aligned}\tag{2.16}$$

Y_Q is the marginal value of an additional unit of remaining reserves evaluated at $\tau = t$; $Y[Q(T),T] = 0$, since there are no remaining reserves at T . Again the argument holds that $q(T) = 0$. Noting that $\dot{\Phi} = -\omega(t)$, the second order differential equation resulting from Equations 2.13 through 2.15 is:

$$\begin{aligned}\ddot{Q} + \left[\frac{\dot{h}}{h(t)} - \rho - \frac{\omega(t)}{\Phi(t)} \right] \dot{Q} - \frac{c_2}{2h(t)} \left[\rho + \frac{\omega(t)}{\Phi(t)} \right] Q(t) \\ = - \frac{c_1}{2h(t)} \left[\rho + \frac{\omega(t)}{\Phi(t)} \right] + \frac{Y_Q}{2h(t)} \left[\frac{\omega(t)}{\Phi(t)} \right]\end{aligned}\tag{2.17}$$

Equation 2.17 is very similar to its no-substitute analog, (2.11). The term $\frac{\omega(t)}{\phi(t)}$ is the conditional probability density that the time is at which the new technology becomes available is t , given that it has not already come. Noting that this conditional probability density is a constant for an exponential distribution, Dasgupta and Heal observed that if $\omega(t)$ were an exponential pdf and if Y_Q were zero, the substitute case reduces to the no-substitute case, only with a higher discount rate, where $\frac{\omega(t)}{\phi(t)} = \text{constant}$ is added to ρ . The amount added to ρ is the reciprocal of the expected value of the exponential pdf, such that, as the expected date of first availability of the alternative technology is moved closer to the present, the effect is merely to increase the discount rate.

Given these assumptions, it is clear that the expectation of a substitute in the future accelerates the production of the depletable resource back to the present and reduces the price according to the demand function by increasing the discount rate. Decreasing the mean time until availability of the new technology causes further expansion of production in the near term. Again the question remains, how large is the effect?

Unfortunately, the assumptions of an exponential pdf and no value to remaining reserves are not sufficiently realistic for practical applications. An exponential pdf has its mode at $\tau = 0$, an unrealistic representation of the availability pdf for most of the advanced energy technologies now being researched. Also, even if a new technology were able to produce extremely cheap energy, the marginal value of remaining petroleum reserves, Y_Q , would not be zero, although it could be relatively small. For example, petroleum will still have nearly unique value as a feedstock to petrochemical processes. Furthermore, Y_Q will increase as energy production costs associated with the new technology increase. Nonetheless, these restrictive assumptions offer considerable computational ease in obtaining solutions, and results are reported below for this case.

In order to solve the more complicated and more realistic problem as expressed in (2.17), it is necessary to develop a technique for deriving estimates of Y_Q (other than zero). Fortunately, this is straightforward. Going back to (2.1), let

$$J(Q_0, 0) = \max \int_0^{\infty} e^{-\rho t} U(Q, q, t) dt.$$

In this problem, the adjoint variable on the state, $\lambda(t)$, is the marginal contribution of the system state, Q , to the utility function, that is,

$$\lambda(t) = \frac{\partial J}{\partial Q(t)},$$

such that

$$\lambda_0 = \left. \frac{\partial J}{\partial Q} \right|_{t=0} .^8$$

Thus, the initial value of $\lambda(t)$, λ_0 , is the marginal value of an additional amount of initial reserves. Similarly, Y_Q is the λ_0 of problem (2.1), associated with the "new" utility function $W(Q, q, t)$. Y_Q is then calculated by solving (2.1) using $W(Q, q, t)$ and letting initial reserves for this sub-problem equal the existing reserves in the problem expressed by (2.17).

It is emphasized that the price/quantity trajectories resulting from Equations 2.11 and 2.17 are strictly pre-alternative trajectories. The post-alternative paths are solved for implicitly in the calculation of Y_Q for the "realistic" case of $Y_Q > 0$. For $Y_Q = 0$, the solution is trivial, as the remaining resource is assumed valueless.

⁸For a more detailed discussion, see Arrow and Kurz (1970), p. 35.

3. THE SUBSTITUTE TECHNOLOGY

The substitute technology has two attributes which are of particular importance to the analysis presented in this paper: the probability function associated with its date of first commercial availability and the way in which the advent of the technology affects the demand for the nonrenewable resource--here, OPEC petroleum.

Arrival of the Alternative Technology. As stated above, the date of first commercial availability of the technology is treated as a stochastic variable. As the probability of availability, for most advanced technologies, is zero up until some earliest possible arrival date, t_0 , any pdf which takes on positive values at or near $t = 0$ will have to be modified. This introduces a discontinuity in the derivative, but one which causes no difficulties. For most technologies, it seems reasonable to suppose that the pdf peaks shortly after t_0 , and tails away as time goes to infinity. The gamma distribution is particularly representative of this phenomenon and a modified form of the gamma is employed herein:⁹

$$\omega(t) = \begin{cases} \frac{1}{\epsilon^2} s e^{-s/\epsilon}, & s > 0; s = t - t_0 \\ 0 & , \text{otherwise.} \end{cases}$$

Using this function, the expected date of first commercial availability of the new technology would be $t_0 + 2\epsilon$.

⁹The gamma pdf is given as $f(t) = \frac{1}{\epsilon^{\alpha} \Gamma(\alpha)} t^{\alpha-1} e^{-t/\epsilon}$ for $t > 0$. With no appreciable loss of generality, α has been set equal to two.

Recall, however, that $\Omega(\infty) = \Omega^*$ may be less than unity. $\Omega(t)$ is the cumulative distribution function associated with $\omega(t)$. Ω^* is the ultimate probability that the substitute technology will ever become commercially operational. This can be achieved simply by multiplying the above modified gamma pdf by Ω^* :

$$\omega(t) = \begin{cases} \frac{\Omega^*}{\epsilon} s e^{-s/\epsilon}, & s > 0; s = t - t_0 \\ 0 & , \text{otherwise.} \end{cases} \quad (3.1)$$

To be precise $\omega(t)$ no longer has an expected value since it is not a true pdf for $\Omega^* < 1$. The parameter ϵ , however, can be related to, as the time at which $\omega(t)$ achieves its mode is $t_0 + \epsilon$. The cumulative distribution now assumes the form:

$$\Omega(t) = \Omega^* \left[-e^{-s/\epsilon} \left(\frac{s}{\epsilon} + 1 \right) + 1 \right], \quad s = t - t_0,$$

and $\Phi(t)$, the probability that the alternative is not yet available, is

$$\Phi(t) = \begin{cases} 1 - \Omega^* + \Omega^* e^{-s/\epsilon} \left(\frac{s}{\epsilon} + 1 \right), & s > 0; s = t - t_0 \\ 1 & , \text{otherwise.} \end{cases}$$

Effect of the Substitute Availability on the Nonrenewable Resource Demand.

The two key issues in how the substitute affects the demand for the nonrenewable resource are: (1) how much of the market will the substitute ultimately capture? and (2) how quickly after implementation of the first commercial plant will the new technology penetrate the market?

Up until the availability of the new technology, one could picture the demand for the resource growing exponentially--that is, the quantity demanded at a fixed price growing exponentially--at least for the time range of interest. Given the assumed linear demand curve, quantity demanded can be written

$$q(t) = \left[\frac{p(t) - a_1}{a_2} \right] g(t) \quad , \quad g(t) = e^{\gamma t} \text{ for } t < \tau$$

where γ is the demand growth rate. From the time of the first commercial availability it can be expected that the new energy technology (if economic) will begin to cut into the demand for the nonrenewable resource. The market penetration of the new technology is modeled to have the following effect on the resource demand growth after τ :

1. At the time of "full" implementation of the new technology, some fraction, δ , of the original resource market will have been captured, where $0 \leq \delta \leq 1$; the amount δ will ultimately depend upon the price charged for energy produced by the new technology, and it is included here as an exogenous input parameter.
2. The market for the new technology would not be captured immediately as capacity and accommodation would have to be developed over time.
3. The transition between the pre-alternative time to the post-alternative time will be a smooth one; if $g_1(t)$ is the "before" growth path and $g_2(t)$ is the "after" growth path, then one would expect at time τ (the introduction time)

$$g_1(\tau) = g_2(\tau)$$

$$\dot{g}_1(\tau) = \dot{g}_2(\tau).$$

These three conditions imply a curve such as that of Figure 1, which shows a logistic-type decay from the larger demand growth path to the smaller. A function which meets these requirements is

$$\begin{aligned} g_2(t) &= \delta e^{\gamma t} + e^{-\beta(t-\tau)^2} (e^{\gamma t} - \delta e^{\gamma t}) \\ &= e^{\gamma t} [\delta + e^{-\beta(t-\tau)^2} (1 - \delta)], \end{aligned} \tag{3.2}$$

where β is a parameter which represents the rate at which $g(t)$ decays from $e^{\gamma t}$ to $\delta e^{\gamma t}$. To relate β to some time parameter, consider the "half-life" of the old demand, that is, the time at which

FIGURE 3.1 DEMAND GROWTH PATHS AND TRANSITION
AFTER AVAILABILITY OF SUBSTITUTE

$$g_2(t) = \delta e^{\gamma t} + \frac{1}{2} (e^{\gamma t} - \delta e^{\gamma t})$$

$$= \frac{1}{2} (1 + \delta) e^{\gamma t},$$

and designate this time as t^* . Substituting into (3.2), dividing through by $e^{\gamma t^*}$, rearranging and taking logs

$$\ln \left(\frac{1}{2} \right) = -\beta (t^* - \tau)^2$$

or

$$\beta (t^*)^2 - 2\beta\tau t^* + (\beta\tau^2 + \ln \frac{1}{2}) = 0$$

which has the roots

$$t_1^*, t_2^* = \tau \pm \frac{1}{2\beta} \sqrt{4\beta^2\tau^2 - 4\beta(\beta\tau^2 + \ln \frac{1}{2})}$$

$$= \tau \pm \frac{1}{\beta} \sqrt{-\beta \ln \frac{1}{2}}$$

As only times greater than τ are of interest, the half-life (as defined) is

$$t^* = \tau + \frac{1}{\beta} \sqrt{-\beta \ln \frac{1}{2}}$$

Solving for β ,

$$\beta = - \frac{\ln \frac{1}{2}}{(t^* - \tau)^2},$$

It is also possible that the demand growth path after the introduction could move toward an exponential curve with growth rate less than γ . One would expect this to be the case if energy conservation procedures were introduced at the same time.

4. APPLICATION TO OPEC EXPORTS AND ENERGY RESEARCH AND DEVELOPMENT

All of the above discussion applies to the depletion of any nonrenewable resource in the presence of a potential substitute, so long as the parameters attributed to that substitute can be specified as above. The differential Equations 2.11 and 2.17, derive from the particular utility function form of (2.14), but this is quite general and other functional forms yield similar results.

In this section, consideration is focused on the application of the above analysis to the situation of the OPEC cartel faced with the development of energy alternatives to petroleum by its clients. In making this application, it is necessary to assume that OPEC optimizes prices with respect to market forces and that it is sensitive to the development of substitutes for its petroleum reserves. Reservations may be expressed about the profit-maximization assumption on the part of OPEC, but it is maintained that such profit maximization forces exert their effect on OPEC decision-making and that it can be expected that OPEC policies would respond to changes in such forces. Actual OPEC behavior corresponds very closely to that predicted by the analysis performed, even though no aspect of the formulation guarantees this. Additionally, the Shah of Iran has linked OPEC oil prices and U.S. energy development.¹⁰

Nonetheless, to the extent that OPEC is not governed strictly by the type of profit-maximization modeled here, one would expect discrepancies to arise

¹⁰ Responding to questions in an interview about holding down the price of oil, the Shah said, "So I am ready...to give you a break, provided you also take the necessary measures and steps for conservation and finding your sources of energy." Shah of Iran (1977).

between predictions of the model herein and actual OPEC behavior. Such differences may be due to either political or economic forces. Politically, desirable arrangements with importers, arms sales as an obvious example, provide incentive to maintain reasonable petroleum prices; on the other hand, an embargo is always possible, although unlikely. Economically, the arguments favor lower OPEC prices than those predicted by this model due to the fact that future OPEC petroleum demand growth is not truly exogenous with respect to OPEC prices, as assumed by the model described herein: (1) high petroleum prices adversely affect the short-run vitality of the world's economies, and energy demand growth can be expected to be affected by GNP growth; recession would also adversely affect the value of OPEC's foreign holdings; (2) high petroleum prices encourage more rapid development of substitutes for OPEC petroleum and reduce future OPEC petroleum demand. A priori, then, it is expected that the model predicts somewhat higher prices and lower petroleum exports in the near term.

OPEC-Specific Parameters. Having already adopted the form of the OPEC cost function proposed by Kalymon, his estimates for the cost parameters are also accepted. Additionally, this work takes his estimate of probable OPEC reserves as approximately twice proven reserves, that is, 877.6 billion barrels at the beginning of 1977. Referring back to (2.3), the cost parameters are: $b_1 = 4.29$, $b_2 = 0.0024$, $b_3 = 0.0048$.¹¹ On the demand side, the 1977 price/quantity position (approximately 11.26 billion barrels annually at \$13.66 per barrel) is taken to represent an equilibrium position and, thus, the 1977 demand curve is assumed to pass through

¹¹For production at 10 billion barrels per year, these parameters imply a marginal production cost of \$0.17 initially and \$1.12 after 200 billion barrels have been produced, as proposed by Kalymon.

that point.¹² A demand elasticity of -1.0 is employed and is felt to be a good estimate of the long-run demand. The growth rate of demand is treated parametrically. OPEC exports have historically grown at about 9 percent per year, but a rate of around 4 or even 3 percent seems more reasonable at this point in time.¹³ A "low growth" case of 2 percent per year is also considered. A discount rate of 4 percent is used for OPEC decisions.

¹² Another possible source of upward bias in price predictions. The 1977 equilibrium point may lie above the long-run demand curve if markets are still adjusting to the 1973 price increase and those (real dollar) increases that followed.

¹³ Total annual energy growth rates of around 4 percent seem to be currently anticipated for the U.S. Additionally, shifts away from petroleum consumption are being encouraged in the petroleum-importing countries.

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5. RESULTS

In presenting the results, reference is made to the "base case" which employs estimates of 4 percent annual demand growth, 4 percent annual discount rate, unitary elasticity of demand and initial petroleum reserve holdings of 877.6 billion barrels. Figure 5.1 shows the deployment of reserves over time as well as price and export paths for the 4 and 2 percent per year demand growth cases with no alternatives becoming available. In the former (base) case, reserves are exhausted in 55 years, with prices starting at \$15.62 per barrel, growing at about 0.5 percent per year initially and accelerating at nearly 1 percent per year after the turn of the century--considerably under the discount rate employed; annual exports peak in the year 2013 at 21.6 billion barrels. For the low growth case, prices start higher (\$16.03/bbl.), but increase more slowly (0.3 percent per year, increasing to 0.79 percent); exports never reach as high a level (slightly over 15 barrels per year over the years 2010 to 2025), but the resource lasts almost until the middle of the next century.

The general point of this paper is that the anticipation of substitutes causes price reductions in the near term; Dasgupta and Heal have shown for a restricted case how the introduction of substitutes in the future is identical to increasing the decision maker's discount rate--and so this effect is shown in Figure 5.2. Price/quantity trajectories for annual discount rates of 2, 4, 6, 8 and 10 percent are used in the base case and the low growth (2 percent) case in Figure 5.2(a) and 5.2(b), respectively. Obviously, these price/quantity changes are very substantial, resulting in increased consumer surpluses on the order of tens of billions of dollars. An increase in the effective discount rate of 2 percent requires the expected

FIGURE 5.1 TIME PATHS OF RESERVES, PRICE AND PRODUCTION FOR THE NO-SUBSTITUTES CASE

FIGURE 5.2 PRICE/QUANTITY TRAJECTORIES FOR DIFFERENT DISCOUNT RATES (SUBSTITUTES NOT EXPLICITLY CONSIDERED)

arrival date of the substitute to go from infinity down to 50 years or from 50 down to 25 years.¹⁴ (But recall the restrictive assumptions employed here!) The curves of Figure 5.2 show that this effect decreases as the discount rate increases, a type of diminishing marginal return.

In comparing the model results with actual OPEC behavior, several points are noted. First the base case predicts an optimal 1977 price of \$15.62 per barrel compared with the actual 1977 price of \$13.66 per barrel, but this is without expectation of future substitutes. If OPEC's expectation approximately conforms with an effective discount rate of 6 percent, which, for the base case, implies a perfect and very cheap substitute with a mean arrival time of 50 years, then the simple model predicts a 1977 optimal price of \$14.67 per barrel, about \$1.00 over actual. This is felt to be a fairly reasonable approximation given the reasons to expect an upward bias in the price predictions discussed in Section 4.

Before discussing potential price decreases which could result from realistic (and explicit) consideration of future substitute technologies, it is interesting to ask how the resource would be depleted if it were held by an economic planning agency which observed the same demand curve and had the same discount rate as OPEC, but the goal of which is to maximize social welfare, that is, consumer plus producer surplus. It is generally felt that monopolies cause over-conservation, and this is borne out for the particular case considered here. Compared with the monopoly-optimal price of \$15.62 per barrel in 1977, the social-optimal price is

¹⁴ An addition of n to the discount rate implies a reduction in expected arrival from infinity to $1/n$ years. Thus a 0.02 increase over the actual discount rate requires the substitute to have a mean arrival date of $1/0.02 = 50$ years.

only \$6.27 per barrel, with the resource lasting only 43 years.¹⁵ Clearly, forces which cause the price of OPEC oil to fall toward the socially optimal path will also provide social benefit.

OPEC Oil Price Benefits to Consuming Nations

Seven different technology alternatives are considered. It has also been assumed that a cheap, plentiful electric fuel source could ultimately reduce the demand for OPEC petroleum by 75 percent,¹⁶ and that it would take about 20 years before one-half of that transition had been made. Of course, any R&D programs having the attributes given here would have the same effect as the cases modeled here.

Figure 5.3 shows the price/quantity trajectory for Case 4 (see Table 5.1), as compared to the no-alternatives case. The effect of the expectation of this technology is to reduce the optimal petroleum price immediately by about \$0.20 per barrel, with a slight expansion in exports, too. Price decreases for the other cases are not as great. Even small price reductions lead, however, to large consumer surplus increases when one is discussing imports of 2 billion (United States) or 10 billion (all importers) barrels per year.

These benefits are reported in Table 5.1 for the cases studied. The benefits reported are expected increased consumers' surplus and derive from the following equation:

$$B = \sum_{t=0}^T (1 + \pi)^{-t} [C_S(t) - C_N(t)] \Phi(t),$$

¹⁵Of course, the same model imperfections outlined above also apply here and, thus, an upward bias in the price estimate could be expected.

¹⁶The reader is referred to Hazelrigg and Lietzke (1978) for further discussion of this estimate.

FIGURE 5.3 PRICE/QUANTITY TRAJECTORY FOR CASE 4

TABLE 5.1 BENEFITS TO OIL IMPORTERS DUE TO EXPECTATION OF ALTERNATIVE ENERGY SOURCES

PARAMETER	CASE 1		CASE 2		CASE 3		CASE 4		CASE 5		CASE 6	CASE 7
OPEC DEMAND GROWTH RATE (γ), %/YEAR	4	3	4	3	4	3	4	3	4	3	4	4
OPEC DISCOUNT RATE (ρ), %/YEAR	4		4		4		4		4		4	4
OPEC DEMAND ELASTICITY	-1		-1		-1		-1		-1		-1	-1
EARLIEST POSSIBLE COMMERCIAL AVAILABILITY, CALENDAR YEAR	1995		2005		1995		1985		1995		1995	1995
MOST LIKELY AVAILABILITY, CALENDAR YEAR	2005		2015		2005		1995		2000		2000	2000
ULTIMATE OPEC DEMAND REDUCTION DUE TO NEW TECHNOLOGY (δ), %	75		75		75		75		75		50	50
TIME REQUIRED FOR 50% MARKET PENETRATION BY NEW TECHNOLOGY (t^*), YEARS	20		20		20		20		20		15	15
PROBABILITY OF ULTIMATE COMMERCIAL IMPLEMENTATION OF NEW TECHNOLOGY (α^*), %	90		50		50		90		50		75	50
IMPORTERS DISCOUNT RATE (π), %/YEAR	7.5		7.5		7.5		7.5		7.5		7.5	7.5
BENEFIT TO U.S., \$ BILLIONS (1977 \$)	2.73	4.65	1.11	1.28	2.44	2.82	8.37	9.04	3.42	5.46	3.38	2.54
BENEFIT TO ALL IMPORTERS, \$ BILLIONS (1977 \$)	12.83	21.90	5.22	6.01	11.50	13.27	39.37	42.48	16.10	25.68	22.39	16.81

where $C_N(t)$ is the consumers' surplus in the t^{th} period for the no-substitutes case, and $C_S(t)$ is that for the substitute case modeled. π is the importers' discount rate, taken to be 7.5 percent, it is almost twice the rate assumed for OPEC, reflecting OPEC's surplus of foreign liquid assets, but considerably less than the 10 percent required by the Office of Management and Budget. $\Phi(t)$, recall, is the probability that the system is still on the path described by the model (the probability that the substitute is not available) and not yet on the post-substitute path. To the United States is attributed the same proportion of benefit that it takes in OPEC exports: 21 percent in 1977.

The benefit from a technology R&D program, of course, depends upon the attributes of expected resulting technology. The seven cases shown in Table 5.1 all are different collections of technology attributes. Case 2 may most closely represent the present fusion program, with only a 50 percent chance of eventual commercial success and with earliest possible commercial availability in 2005. Such a program yields over a billion dollars in expected benefit to the United States due to lower OPEC prices. Were a ten-year acceleration of the program possible, the expected benefits would increase by over \$1.3 billion (Case 3). Were a vastly improved fusion program available, one with probability of commercial success of 90 percent and earliest arrival in 1995 (Case 1), benefits would be almost 3 billion dollars. A ten-year acceleration of this program would yield additional benefits of \$5.5 billion (Case 4). Cases 5 through 7 show the effect of varying different parameters.

6. DISCUSSION AND POLICY IMPLICATIONS

OPEC Pricing

The research reported here has several implications. In general, these pricing predictions are very similar to those of Pindyck.¹⁷ OPEC appears to be employing nearly optimal production patterns. Given this, it is suggested that constant dollar price rises will be limited to no more than 1 percent (Pindyck suggests 2 percent) over the next 10 to 15 years because, as Pindyck succinctly notes, "Prices rising more rapidly than this would simply cause a loss in revenue for OPEC...." Further, the economically optimal price path has been shown to be sensitive to expectations about substitutes for the resource. Thus, it appears that it is necessary to take the expected availability of substitutes into account when forecasting the price of OPEC oil, and all nonrenewable resources in general. The fact that OPEC's price is so close to that which would be predicted based on the type of nonrenewable resource analysis performed herein also suggests that the 1973 price rise may have been due to an imposition of a depletion tax (due to recognition by the market of the depletable of oil--annual production exceeded average discovery rates for the first time around 1970), rather than, or in addition to, an assertion of already-existing monopoly power.

Energy Research and Development

The development of substitutes to petroleum has been shown to have large benefits to the consumers above and beyond any implementation benefits. It is suggested that this benefit could be as great as \$2.7 billion to the United States

¹⁷ Comparison is limited since his input estimates are not known.

and \$12.8 billion to the world for a Case 1 program. There is reason to expect that, other things equal, policy decisions which have not taken into account the phenomenon studied in this paper have underallocated funds for energy research and development. If the cost of speeding up such a program by 10 years (Case 4) is no greater than, say, \$5 billion, then such program is warranted. Alternatively, accelerating the Case 2 program, were it possible by 10 years (Case 3), appears to be worth "only" \$1.3 billion.

Externalities in the Development of Nonrenewable Resource Substitutes

More generally, the societal benefit from the development of substitutes to nonrenewable resources exceeds the private benefit. Any individual or group which invests in such R&D affects decisions of the resource holder who in turn lowers his price to all consumers, not just the developer.¹⁸ This phenomenon is similar in effect to inefficiencies in the return to inventive activity, argued by Arrow (1962), but for different reasons. In the latter case, knowledge or processes developed by one individual may be used later by others to compete with him. In the case at hand, the expectation of future competition (elicited perhaps by one individual) causes resource holders to sell at lower prices to all consumers, even if the developer is the only ultimate producer of the new substitute. The two effects may simultaneously impact private R&D activity. Thus, this phenomena offers further evidence in favor of the argument that R&D should partly be funded in the public sector.¹⁹ The fact that substitute development is inhibited is particularly critical in this area since nonrenewable resource prices tend to be rising already. Delays in substitute availability permit further, possibly destabilizing, price

¹⁸ Unless there is both very good price discrimination and very poor information.

¹⁹ Yet another part of the argument is that governments should be risk neutral (Arrow and Lind, 1970) which is important since results from R&D investments are inherently uncertain.

increases. There is no guarantee that prices will smoothly approach the "backstop technology" price of Nordhaus (1973) if that technology is not yet available. Prices may well rise beyond, only to fall again as the substitute becomes available, causing potentially significant inefficiencies. Optimal allocation of funds for substitute development would minimize these inefficiencies.

7. REFERENCES

- Arrow, K. J. and M. Kurz, Public Investment, the Rate of Return and Optimal Fiscal Policy, Baltimore, Maryland: Johns Hopkins, 1970.
- Arrow, K. J. and R. C. Lind, "Uncertainty and the Evaluation of Public Investments," Am. Econ. Rev., Vol. 60, 1970.
- Arrow, K. J., "Economic Welfare and the Allocation of Resources for Invention," in The Rate and Direction of Economic Activity: Economic and Social Factors, Universities-Nat. Bur. Econ. Res. Conference Series, Princeton, New Jersey, 1962.
- Dasgupta, P. and G. M. Heal, "The Optimal Depletion of Exhaustible Resources," Rev. Econ. Stud., Symposium, 1974.
- Energy Research and Development Administration, The LMFBR--Its Need and Timing, ERDA-38, 1975.
- Hazelrigg, G. A. and K. R. Lietzke, "New Approaches to the Economic Evaluation of Fusion Research," to be published in the Proceedings of the American Nuclear Society Conference, Santa Fe, New Mexico, May 9, 1978.
- Hotelling, H., "The Economics of Exhaustible Resources," Journal of Polit. Econ., 38, 1931.
- Kalymon, B., "Economic Incentives in OPEC Oil Pricing Policy," Journal of Dev. Econ., Vol. 2, 1973.
- Nordhaus, W. D., "The Allocation of Energy Resources," Brookings Papers on Economic Activities, Vol. 4, 1973.
- Pindyck, R. S., "The Economics of Oil Pricing," Wall Street Journal, December 20, 1977.
- Pontryagin, L. S., V. G. Boltyanskii, R.V. Gamkrelidze and E.F. Mischenko, The Mathematical Theory of Optimal Processes, New York and London: Interscience, 1962.
- Schmalensee, R., "Resource Exploitation Theory and the Behavior of the Oil Cartel," Eur. Econ. Rev., Vol. 7, 1976.
- Shah of Iran, Interview on ABC's "Issues and Answers," November 20, 1977.
- Takayama, A., Mathematical Economics, Hillsdale, Illinois: Dryden, 1974.
- Vanston, J. H., S. P. Nichols and R. M. Solands, "PAF--A New Probabilistic Computer-Based Technique for Technology Forecasting," University of Texas at Austin, 1976.

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