Interstate Natural Gas Pipeline Industry

2003 Cost of Capital Study

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Common Terms

CAPM	Capital Asset Pricing Model
CPI	Consumer Price Index
DCF	Discounted Cash Flow
EIA	Energy Information Administration
FERC	Federal Energy Regulatory Commission
GDP	Gross Domestic Product
GRI	Gas Research Institute
GSR	Gas Supply Realignment
GTI	Gas Technology Institute
IBES	Institutional Brokers Estimate System
INGPC	Interstate Natural Gas Pipeline Company
INGPI	Interstate Natural Gas Pipeline Industry
INGPPTF	Interstate Natural Gas Pipeline Property Tax Forum
NUOI	Net Utility Operating Income
RP	Risk Premium
SFV	Straight Fixed Variable
S&P	Standard & Poor's
VL	Value Line Investment Survey
WACC	Weighted Average Cost of Capital

2003 Cost of Capital Study of the Interstate Natural Gas Pipeline Industry for the Interstate Natural Gas Pipeline Property Tax Forum January 1, 2003

Purpose of the Cost of Capital Study

The purpose of the cost of capital study is to provide the Interstate Natural Gas Pipeline Property Tax Forum (INGPPTF) with a cost of capital study for the Interstate Natural Gas Pipeline Industry (INGPI) as of January 1, 2003, which can be used to capitalize the net cash flow for the typical interstate natural gas pipeline company for the purpose of estimating market value. The cost of capital derived in this study is an interstate natural gas pipeline industry percentage and is not representative of any particular interstate pipeline, rather a snapshot of the industry at January 1, 2003. Thus, we advise against its random use by anyone without first examining and determining the differences between the specific pipeline company and the typical pipeline industry represented by the cost of capital herein and adjusting for differences accordingly.

Introduction and Scope

This copyrighted study was prepared for the Interstate Natural Gas Pipeline Property Tax Forum and any use of this material by any entity other than those approved by the INGPPTF is expressively prohibited. In this study we have reviewed financial and economic information, analytical reports, and statistics in order to estimate the cost of capital of the Interstate Natural Gas Pipeline Industry as of January 1, 2003.

Executive Summary - Cost of Capital

Based on our analysis and investigation, we have calculated the rounded weighted average cost of capital (WACC) for the INGPI to be **11.90%** as of January 1, 2003. The cost of capital developed in this study is appropriate to use in discounting the after-tax operating cash flows projected as of January 1, 2003 for determination of the market value of the operating assets, tangible and intangible, of the INGPI. After-tax operating cash flows are known as earnings before the deduction of interest, depreciation and amortization and after the deduction of taxes and capital expenditures. For market valuation purposes, this level of cash flow is estimated typically by assuming that depreciation and amortization equals capital expenditures.

Thus, the cash flow to be discounted is assumed to be equal to what is commonly known in the INGPI as net utility operating income (NUOI). The detailed discussion of the derivation of the weighted average cost of capital along with supporting documentation begins on page 9.

Natural Gas Pipeline Property Tax Forum

The current members of the INGPPTF are listed below:

Algonquin Gas Transmission Company
Centerpoint Energy
CMS Energy
Colorado Interstate Gas Company
Columbia Gas/Gulf Transmission Corporation
Dominion Transmission Corp.
Duke Energy Corporation
El Paso Energy Corporation
Enron Corporation
Great Lakes Gas Transmission, L.P.
Gulf South Pipeline Company, L.P.
InterNorth
Kern River Gas Transmission
Kinder Morgan, Inc.
National Fuel Gas Supply Corporation
Northern Border Pipeline
Northern Natural Gas
Portland Natural Gas Transmission
Questar Regulated Services
Southern Star Central Corp.
Trans Canada Pipelines, Ltd.
Williams - Northwest Pipeline Corp.
Williams - Texas Gas Transmission Corp.
Williams - Transcontinental Gas Pipeline Co.
Williston Basin Interstate Pipeline Co.

Economic Outlook

General Economic Data - 2003

A review of 2002 indicates that the past year was both difficult and unusual for the United States economy. A year ago, consumers were struggling to understand the potential economic consequences of the events of September 11, 2001. At that time, it was unclear how consumers and businesses would react to the unprecedented shock as well as to the declines in equity markets and cutbacks in investment spending that had already been under way. Economic forecasts were lowered sharply and analysts feared that even these downward-revised projections might be undone by a significant drop in demand.

USA Today reported approximately1.7 million people have been out of work for six months or longer, the highest number since1994. Stocks fell a third year in a row in 2002 (losses topped $2.6 trillion), something not seen in more than 60 years. The only time stocks have fallen a fourth year in a row was in 1932, when the United States was in the grips of the Great Depression.[1]

A weak economy and widespread accounting irregularities fueled what by one measure has been the biggest year ever for corporate bankruptcies, with the value of 2002 filings soaring

[1] Armour, Stephanie, "Year brings hard lessons, alters priorities for many," *USA Today*, Money, Section B-1, December 31, 2002.

to a record $368 billion as of December 25, 2002, according to BankruptcyData.com. The number of public companies filing for Chapter 11 bankruptcy protection was actually higher in 2001, but when measured by assets, the 2002 filings - headed by such big names as WorldCom Inc., Global Crossing Ltd., Conseco Inc., Adelphia Communications Inc. and UAL Corp - shattered 2001's record by 42%.[2]

In summary, the year 2002 has seen the United States economy recovering from the recession that began in March of 2001, but the Country's economic engine is not yet firing on all cylinders as 2003 begins. The economic recovery observed during 2002 was slower than typical of post-World War II business cycles in the Unites States: The usual measures of economic health, such as employment and spending growth, have been mixed, and financial markets reflect a perception of increased risk. Heightened uncertainty about global economic growth and potential geopolitical events add to the economic head winds faced by the United States.[3]

2003 Forecast

A modest economic recovery should take firmer root in 2003, led by businesses expected to pour their recuperating profits into investment after two years of cost-cutting. That is the widely held view among 55 economists who participated in *The Wall Street Journal's* 2003 economic forecasting survey reported by Jon Hilsenrath and Constance Ford on January 2, 2003. At the same time, they point to a world filled with uncertainties: An extended conflict in Iraq or new rounds of terrorism, they say, could still derail the outlook for even modest growth.

The average forecast of the economists in *The Wall Street Journal (Journal)* survey calls for real gross domestic product -- the value of the nation's output, adjusted for inflation -- to grow at an annual rate of 2.7% in the first quarter, 3.2% in the second quarter and 3.7% in the final two quarters of the year. That would be slightly better than 2002 when the economy swung back and forth between strong and weak growth.[4] USA Today surveyed economists predicted essentially the same growth as the *Journal*.

Despite the growing optimism about corporate spending, most economists readily concede that the year ahead is filled with more than the usual number of risks. One is that the weak stock market could continue to weigh on business confidence. The most obvious risk is

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[2] Kristof, Kathy M., "2002: The year of fallen giants," *The Tennessean*, Section E-2, January 2, 2003.

[3] "Outlook Mixed for Southeast and Nation in 2003," *EconSouth*, Federal Reserve Bank of Atlanta, Fourth Quarter 2002, 2.

[4] Hilsenrath, Joe E. And Constance Mitchell Ford, "Economists Expect Spending by Business to Lead Recovery," *The Wall Street Journal*, January 2, 2003, 1.

something that economists can't easily punch into their economic models: the dual threats of war and terrorism. The U.S. began 2003 with a confrontation looming in Iraq, with North Korea threatening to restart its nuclear weapons program and with the risk of terrorism lingering just about everywhere. Twenty-six of the 55 *Journal* economists surveyed said that war and global uncertainties are their primary concerns for 2003.[5]

The mere presence of these uncertainties is already holding back the economy in important ways. The potential for war in the Middle East has pushed oil prices to two-year highs, to nearly $33 per barrel. Meanwhile the uncertainties weigh on business confidence, undermining the investment recovery that economists are counting on.

A slowly strengthening economy could lead to higher interest rates as the year progresses, but economists are reluctant to call too aggressively for a fast pickup in rates. They were burned making such a call for higher rates in 2002, when long-term rates kept falling and the Federal Reserve cut its benchmark federal funds rate to 1.25% even though the economy appeared to emerge from recession. Only six economists expect the Fed to cut rates further, some time between January and May. The rest, 49, said the Fed will not reduce rates again. Instead, most said rates will likely go up, with nearly half betting on a rate increase during the first half of this year and a similar number expecting a rate boost by the second half of this year.

Summary

Economists are leery of making definitive 2003 projections on all fronts due to the unusual recovery period the United States has been experiencing. What has historically happened after previous recessions during recovery periods has not occurred this time. According to the consensus among 55 economists surveyed by *The Wall Street Journal* and 58 top economists surveyed by *USA Today*, the United States economic recovery should gain moderate momentum in 2003,

An ugly combination of corporate scandal, a weak economy and poor profits during 2002 drove down the vast majority of stocks, leaving the damage widespread and the bright spots rare. A key theme resonating among business economists in *The Wall Street Journal* and *BusinessWeek* is the belief that 2003 will bring broader and more consistent economic growth--in short, a recovery that feels like one. A true recovery depends on the willingness of businesses and investors to take risks.[6]

The problem at the start of 2003 is that new uncertainties are reinforcing this risk-averse behavior. While hostilities with Iraq loom ever more imminent, worries over an oil-price spike

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[5] *Ibid.*

[6] Brown, Ken, "Scandals, "Weak Economy Crush Every Market Sector," *The Wall Street Journal online*, January 2, 2003.

have grown because of the strike in Venezuela, which supplies more than 10% of U.S. crude. At year end, oil was nearly $33 per barrel, a two-year high. Fresh concerns over North Korea's nuclear weapons program are casting another shadow. Simply put, until these unknowns are cleared away Corporate America won't contribute much to the recovery and without it chipping in, the economy cannot attain a higher, more fulfilling growth rate, hence elevated financial and business risk factors for 2003.[7]

2003 Economic Outlook - Natural Gas Pipeline Industry

For plenty of industries, the business cycle has been an article of faith. As sure as night follows day, recoveries follow recessions. And certain industries can expect a cyclical bounce in the early stages of a rebound, while others lag behind. But the economy's erratic path in 2002 and the uneven performance predicted by economists in 2003, make such conventional wisdom look ever more dubious, according to Industry Outlook 2003 in BusinessWeek, January 13, 2003.

The U.S. today is not only battling terrorism and preparing for war with Iraq but it is also still processing the stimulative effects of go-go Federal Reserve policy, years of productivity gains, and the ongoing shift toward services. As a result, the pattern of recession and recovery across industries has changed fundamentally. "The whole business cycle is different," says Carl Steidtmann, chief economist at Deloitte Research.[8]

The patterns of growth and decline surely will differ this year, as they have in every recovery or downturn. As more parts of the economy rise and fall with their own unique rhythms, the traditional business cycle increasingly may look, if not dead, at least ancient.

The interstate natural gas pipeline industry faces many of the same challenges in 2003 that they have faced in the last 30 years — future market growth, availability of gas supplies, pipeline safety and pipeline security. In the not too distant past convergence was a popular topic as many natural gas entities merged with power companies. Recently, most of these companies and much of the energy sector have been challenged by a different form of convergence according to Fred Fowler of Duke Energy Corporation in his report on the state of the pipeline industry in Pipeline & Gas Journal, December 2002.[9]

Fowler reported that since the summer of 2000, the pipeline industry has seen a declining economy, government intervention in energy markets, corporate scandals and investor mistrust,

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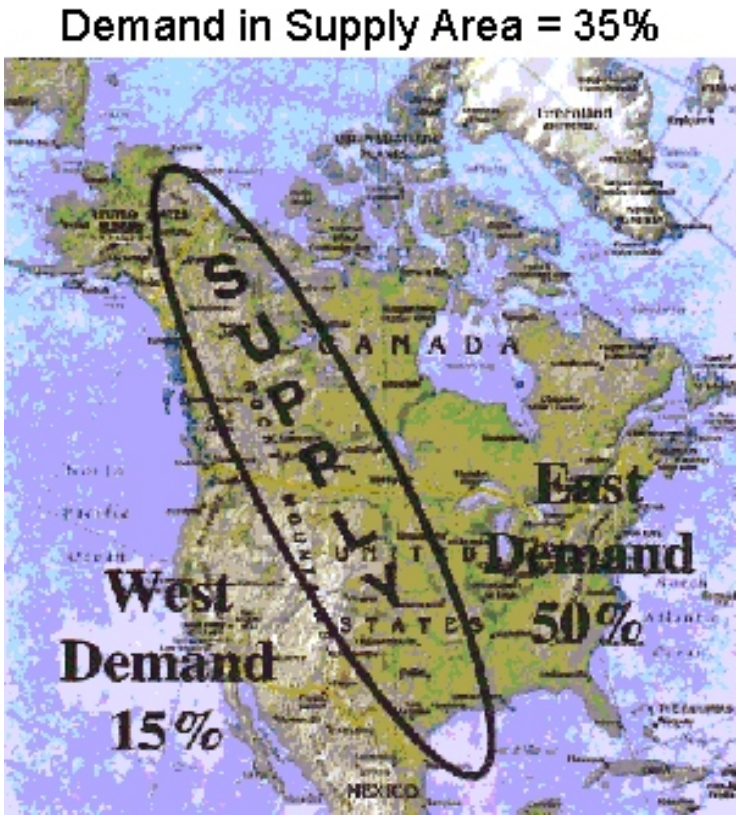
[7] Cooper, James C. And Kathleen Madigan, "When Will Corporate America Pry Open Its Wallet?," *BusinessWeek*, January 13, 2003, 29.

[8] "Industry Outlook," *BusinessWeek*, January 13, 2003, 95.

[9] Fowler, Fred J., "Same Questions Pose Challenges, Duke Chief Says," Pipeline & Gas Journal, December 2002, 10.

the call for more financial transparency, ratings agency criteria challenges, and legislation and regulatory actions and reactions, not to mention the impact of September 11, 2001. The dozen or so major players in the pipeline/merchant sector have lost almost $240 billion in market capitalization in last five months of 2001 and all of 2002 (seventeen months). Pipelines have deferred or canceled construction projects which is causing increased anxiety among the pipeline supplier group. The marketplace is highly charged and the pipeline industry is extremely fragile as 2003 unfolds.[10]



We reported in GRI's natural gas pipeline study two years ago that a new trend appeared to be emerging in the natural gas diversified industry, especially among the larger members, such as Exxon, El Paso, and Dynegy. This was the latest trend of convergence of gas and electric power through the marketing both of gas and electricity and the constructing of gas-fired merchant power plants along their pipelines and other places as well.

However, by 2003 bad news prevailed for the energy merchants. As reported in Value Line Investment Survey (Value Line), December 20, 2002, the ratings agencies recently downgraded the debt of El Paso, and the New York Stock Exchange has sent Dynegy a delisting warning, since its stock did not trade for as much as $1 for a 30-day period. They both may survive, as may Williams Companies, through asset sales and renegotiating debts. Sigourney Romaine, CFA of Value Line reported that, at present, the energy merchants look like speculative trading vehicles rather than appropriate common stock investments.[11]

The map of North America (NA) shows how the primary supply basins currently divide NA into two market areas. These supply basins, from north to south, include: Frontier, WCSB,

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[10] *Ibid.*

[11] Romaine, Sigourney B. CFA, "Natural Gas (Diversified) Industry," *Value Line Investment Survey*, December 20, 2002, 437.

Various US Rockies, San Juan, Anadarko, Permian, Various onshore Gulf of Mexico, and, Various offshore Gulf of Mexico. These basins represented 67 BCF/cI of the 73 BCF/d produced in 1999. About 15 percent of the market is to the west, and 50 percent to the east, of these supply basins. The other 35 percent is consumed in the supply regions, primarily along the US Gulf Coast. The study revealed surprising stability in these percentages, with a slight trend of 1-2 percent increase in demand regions by 2020.[12]

A positive long-term outlook for the natural gas industry is projected in the U.S. Energy Information Administration's (EIA) recently released Annual Energy Outlook 2003, which took the events of September 11, 2001, into consideration. During 2002 the energy markets were extremely volatile, with high prices for crude oil and natural gas and concerns for energy shortages. Those events are incorporated into the EIA's short-term projections, while the report notes that long-term volatility in the United States' energy markets is not expected to result from their impact or from the impacts of such future events as supply disruptions or severe weather. The report projects the use of natural gas to grow during the next 20 years, making this domestic fuel one of the fastest-growing forms of energy in the United States.

For the past 15 years, federal and state regulators have enacted policies to enhance competition in the natural gas industry. Initially, the Federal Energy Regulatory Commission (FERC) altered the ground rules by which the interstate natural gas pipelines did business with FERC Order 636. [*On April 8, 1992, the FERC issued Order 636 which brought about additional fundamental changes in the way natural gas pipelines conduct their businesses. The FERC's stated purpose of FERC Order 636 was to improve the competitive structure of the natural gas pipeline industry by, among other things, unbundling a pipeline's merchant role from its transportation services; ensuring "equality" of transportation services; ensuring that shippers and customers have equal access to all sources of gas; providing "no-notice" firm transportation services that are equal in quality to bundled sales service; and changing rate design methodology from modified fixed variable to straight fixed variable.*] As a result of FERC Order 636 and the snails pace at which deregulation in the interstate natural gas pipeline industry has progressed, the long-haul gas systems were provided powerful economic inducements to find merger partners to aid in the scurry for market share. This resulted in the fusion of the pipelines in the late 1980s and early 1990s. FERC Order 636 guidelines called for the pipelines to abandon their traditional calling as resellers, flowing dedicated gas volumes to utility systems, to venture into their new discipline as gas transporters for all comers (common carriers).

In FERC Order No. 637, the Commission amends its regulations in response to the growing development of more competitive markets for natural gas and the transportation of

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[12] "North American Supply Corridor," Interstate Natural Gas Association of America, January 29, 2003, http://www.ingaa.org/whatsnew.

natural gas. In the rule, the Commission is revising its current regulatory framework to improve the efficiency of the market and provide captive customers with the opportunity to reduce their cost of holding long-term pipeline capacity while continuing to protect against the exercise of market power. The rule revises Commission pricing policy to enhance the efficiency of the market by waiving price ceilings for short-term released capacity for a two-year period and permitting pipelines to file for peak/off-peak and term differentiated rate structures.

No one is certain what the future holds for the natural gas pipeline industry. Only time will tell. One caveat is that being bigger is not always the better part of a merger deal as evidenced by The Williams Companies, El Paso and others. Energy marketing has razor-thin margins and large scale does not necessarily lead to profits. As the process of regulatory change moves forward, there will inevitably be more increases in customer choice. All of the political and economic factors discussed in this section will affect the typical investor's cost of capital as the elements of business risk increases.

This tends to reaffirm industry concerns that the risk associated with debt and equity is changing as the surrogate parent of the natural gas pipeline companies (the regulators) initiate new regulations that affect the ways in which these companies compete in the marketplace. The additional risk attributable to the natural gas pipeline industry should be reflected in the development of the cost of capital.

Weighted Average Cost of Capital (WACC)

The cost of capital measures the return investors can expect on investments of comparable risk. Rational investors will not invest in a particular investment opportunity if the expected return on that opportunity is less than the cost of capital. The weighted average cost of capital (WACC) is also known in the appraisal and financial community as the opportunity cost of capital. The WACC is used primarily for making long-term capital investment decisions by investors and purchasers. Accordingly, the WACC is used by appraisers to estimate ***market value***.[13] To calculate market value, the appraiser discounts expected future income (cash flow) by the rate of return offered by comparable investment alternatives. [All of the annual "income" figures used in appraising income-producing properties are *cash flows* rather than accrual accounting incomes.[14]] This rate of return is often referred to as the discount rate, hurdle rate, or opportunity cost of capital.[15] The Appraisal Institute has defined opportunity cost as quoted below:

> *Opportunity cost is the net cost of opportunities not chosen or options foregone, denied or lost.* An investor who selects one investment forgoes the opportunity to invest in other available investments...Opportunity cost is related to the principle of substitution, and is particularly significant in estimating the rates of return necessary to attract capital. By analyzing and comparing the prospective rates of return offered by alternative investment opportunities, an appraiser can estimate the required rate of return for the property being appraised.[16]

The estimated cost of capital in this report for the Interstate Natural Gas Pipeline Industry as of January 1, 2003 is based on the generally accepted appraisal methodology known as the band of investment technique. The band of investment technique consists of the following steps:

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[13] Market value is defined by the Appraisal Institute as, "The most probable price, as of a specified date, in cash, or in terms equivalent to cash, or in other precisely revealed terms, for which the specified property rights should sell after reasonable exposure in a competitive market under all conditions requisite to fair sale, with the buyer and seller each acting prudently, knowledgeably, and for self-interest, and assuming that neither is under undue duress." See *The Appraisal of Real Estate*, 12th ed., (Chicago: Appraisal Institute, 2001), 22.

[14] William N. Kinnard, Jr., *Income Property Valuation*, (Lexington: Heath Lexington Books, 1982), 70.

[15] Richard A. Brealey and Stewart C. Meyers, *Principles of Corporate Finance*, 4th ed., (New York: McGraw-Hill, 1991), 13.

[16] *The Appraisal of Real Estate*, 11th ed., (Chicago: Appraisal Institute, 1996), 44.

1. Analyze and determine the appropriate capital structure.
2. Identify the appropriate cost for each financing band of the capital structure.
3. Weight the appropriate cost for each financing band by the relative proportion of the capital structure represented by each financing band.

The sum of the weighted costs for the financing bands represents the weighted average cost of capital. This weighted cost of capital is typically known as the discount rate in appraisal literature and the algebraic formula is shown in Figure 1.

$$K = (D \times D_r) + (E \times E_r)$$

where

K = *Weighted Average Cost of Capital*
D = *Proportion of Debt in Capital Structure*
D_r = *Cost of Debt*
E = *Proportion of Equity in Capital Structure*
E_r = *Cost of Equity*

Figure 1

In explaining the estimation of the cost of capital, Ibbotson Associates states:

> The cost of capital is always an expectational or forward-looking concept. While the past performance of an investment and other historical information can be good guides and are often used to estimate the required rate of return on capital, the expectations of future events are the only factors that actually determine the cost of capital. An investor contributes capital to a firm with the expectation that the business' future performance will provide a fair return on the investment. If past performance were the criterion most important to investors, no one would invest in start-up ventures. It should also be noted that the cost of capital is a function of the investment, not the investor.[17]

Cost of Capital Study Results

The cost of capital for the Interstate Natural Gas Pipeline Industry as of January 1, 2003 is estimated to be 11.87% (rounded to 11.90%) as the following chart indicates. Following the chart are explanations of the derivation of each of the component parts.

[17] *SBBI (Stocks, Bonds, Bills and Inflation)*, 2000 Yearbook: Valuation Edition, (Chicago: Ibbotson Associates, 2000), 9.

Capital	Portion	Cost	Product
Debt	35.00%	7.65%	2.68%
Equity	65.00%	14.14%	9.19%
Totals	100.00%		11.87%

Capital Structure

Economists and appraisers measure a firm's capital structure in terms of the market values of its debt and equity because that is the best measure of the amounts of debt and equity that investors have invested in the company on a going-forward basis. Furthermore, economists and appraisers generally agree that the goal of management is to maximize the value of the firm, where the value of the firm is the sum of the market value of the firm's debt and equity. Only by measuring a firm's capital structure in terms of market values can its managers choose a financing strategy that maximizes the value of the firm.

For estimating the cost of capital for the INGPI, it is appropriate to use the typical market capital structure for similar interstate natural gas pipeline companies. There is very little debate about this concept, however for clarity we note the following statement from Brigham and Gapenski.

> We are absolutely convinced that the procedures we recommend are correct — namely, firms should focus on market value capital structures and base their cost of capital calculations on market value weights. Because market values do change, it would be impossible to keep the actual capital structure on target at all times, but this fact in no way detracts from the validity of market value targets.[18]

In the appraisal process or in developing the cost of capital to be used in the appraisal process the appraiser must utilize the market capital structure for all types of appraisal. Even when public utilities are strictly regulated, it is necessary for the appraiser to use the market capital structure unless the book capital structure is found to be the same as the market capital structure. In the past often the book capital structure was quite similar to the market capital structure, however that is not the case today. Today the market capital structure varies significantly from the book capital structure for most interstate natural gas pipelines. Thus, investors are concerned with the capital structure they will use to finance the purchase of an interstate natural gas pipeline and that will always be the typical market capital structure.

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[18] Eugene F. Brigham and Louis C. Gapenski, *Financial Management*, 7th ed. (New York: The Dryden Press, 1994), 599.

It is also important to note what elements of capital comprise the makeup of the ***capital structure*** from an appraisal standpoint. The capital structure consists only of long-term debt, common stock, and where appropriate, preferred stock. The capital structure should not be confused with *financial structure* or any other term used in financial literature. To understand what elements comprise the capital structure it is important to define capital structure and financial structure, which are defined as follows:

> **CAPITAL STRUCTURE** corporation's financial framework, including LONG-TERM DEBT, PREFERRED STOCK, and NET WORTH. It is distinguished from FINANCIAL STRUCTURE, which includes additional sources of capital such as short-term debt, accounts payable, and other liabilities.[19]

> **FINANCIAL STRUCTURE** makeup of the right-hand side of a company's BALANCE SHEET, which includes all the ways its assets are financed, such as trade accounts payable and short-term borrowings as well as long-term debt and ownership equity. Financial structure is distinguished from CAPITAL STRUCTURE, which includes only long-term debt and equity.[20]

It is also important to note that neither accumulated depreciation or accumulated deferred income taxes are included in capital structure. Some appraisers have mistakenly included accumulated deferred income taxes in constructing a firm's capital structure. This is simply wrong for estimating the cost of capital and for appraisal purposes. The following quotation from *Financial Management* addresses this issue quite well:

> Since depreciation-generated funds have the same cost as the firm's WACC when retained earnings are used for the equity component, it is not necessary to consider them when estimating the WACC...Therefore, deferred taxes, like depreciation, have a cost equal to the firm's WACC using retained earnings as the equity component. Indeed, deferred taxes arise solely because a firm records a different depreciation expense on its tax books than on the books used to report income to shareholders... Deferred taxes are treated the same way as depreciation cash flows: they are not included when estimating the firm's WACC...[21]

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[19] John Downes and Jordan Elliot Goodman, *Dictionary of Finance and Investment Terms*, (New York: Barron's, 1985), 54.

[20] *Ibid.*, 132.

[21] Eugene F. Brigham and Louis C. Gapenski, *Financial Management*, 7th ed. (New York: The Dryden Press, 1994), 368-369.

The appropriate capital structure for use in estimating the INGPI's cost of capital is the expected capital structure that a typical purchaser would likely use to finance the purchase of the operating assets of a company within this industry. This typical purchaser would take into account the regulatory agency's allowed rate of return in analyzing the risk profile and selecting the market capital structure. Thus, an analysis of the typical market capital structure used in the interstate natural gas pipeline industry is appropriate. The market capital structure developed for the INGPI was calculated from information obtained from *Value Line Investment Survey* data base and *Standard & Poor's Research Insight* as of January 2003. The capital structure study involved the following companies we believe to be representative of the interstate natural gas transmission pipeline industry: 34 companies classified by *Value Line* as the natural gas (diversified) industry (from the *Value Line* full data base), using both *Value Line* and S&P data; 17 large companies from that group that have reported annual sales of at least $750 million; and seven (7) companies primarily natural gas pipelines from the interstate natural gas pipeline forum group, which have traded common stock listed by *Standard and Poor's*. The results indicate that the market capital structure for the industry is approximately 35% debt, essentially no preferred stock, and 65% equity. For each of the above mentioned groups of companies, we calculated the simple average and median capital structure for each grouping using data reported both by *Value Line* and *Standard & Poor's*. As many traditional interstate natural gas pipelines have become subsidiaries of other pipelines and other energy companies, there are now less members of the interstate natural gas pipeline forum group, which have traded common stock. Thus, we are inclined to give a little less consideration to the data from the forum group only.

For purposes of analysis we used the market capital structure for each company. The market value of the common equity portion of the capital structure was determined by multiplying the number of shares outstanding times the recent price reported by *Value Line* and/or *Standard & Poor's*. As surrogates for the market value of debt and preferred stock we substituted the book value of each. The market values of both debt and equity are always preferred, if available. Since the book value of debt is usually close to market value, book value is usually used for the debt weight. This is not true of equity.[22] Only a few companies in this industry have issued preferred stock and, like debt, we used book value as a surrogate for the market value of preferred stock. Our recent analysis indicates that book values for long-term debt and preferred stock are fairly reasonable approximations for market value at the present time, thus book value can be substituted as a reasonable proxy for the market value of debt and preferred stock capital.

The capital structure calculations can be found on the following four pages. As can be

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[22] *SBBI (Stocks, Bonds, Bills and Inflation)*, 2000 Yearbook: Valuation Edition, (Chicago: Ibbotson Associates, 2000), 21.

observed from the capital structure calculations using the natural gas transmission pipeline industry groupings described above, the indicators point to an approximate market capital structure of 35% debt (***D***) and 65% equity (***E***). (*Preferred stock was judged not to be of significant importance in the financing of companies in the overall interstate natural gas pipeline industry.*) We gave the most consideration to the median indicators (median figures being less influenced by extremes than averages) from the data groups made up of the Value Line Natural Gas Diversified Industry (All) and the Value Line Natural Gas Diversified Industry (Large[23]). We gave less consideration to the average figures in this particular calculation because the parent company information (notably Dynegy, El Paso Corp and Williams Companies) changed dramatically during the past few months due to heavy losses from energy trading. This same reasoning applies to the small group known as the Interstate Natural Gas Pipeline Forum Group, which is heavily influenced by a few companies with heavy energy trading losses.

[23] Large pipeline group made up of companies with annual sales of over $750 million.

Value Line Natural Gas Diversified Industry (All)
Capital Structure (VL Data) January 1, 2003

Company Name	Ticker	LTD %	PS %	CS %
Cabot Oil & Gas 'A'	COG	34.01%	0.00%	65.99%
Chesapeake Utilities Corp.	CPK	41.77%	0.00%	58.23%
Delta Natural Gas	DGAS	45.30%	0.00%	54.70%
Devon Energy	DVN	51.72%	1.01%	47.27%
Dorchester Hugoton	DHULZ	0.00%	0.00%	100.00%
Dynegy Inc. 'A'	DYN	69.48%	20.59%	9.93%
Eastern Amern Nat Gas Tr	NGT	0.00%	0.00%	100.00%
El Paso Corp.	EP	77.85%	0.00%	22.15%
El Paso Energy Partners	EPN	48.13%	5.34%	46.53%
Enterprise Products	EPD	29.93%	0.00%	70.07%
EOG Resources	EOG	19.09%	2.63%	78.28%
Equitable Resources	EQT	16.94%	0.00%	83.06%
KCS Energy	KCS	58.01%	6.17%	35.81%
Kinder Morgan	KMI	36.71%	0.00%	63.29%
Kinder Morgan Energy	KMP	31.70%	0.00%	68.30%
National Fuel Gas	NFG	38.31%	0.00%	61.69%
Northern Border Partners LP	NBP	44.73%	0.00%	55.27%
Ocean Energy	OEI	30.14%	0.00%	69.86%
ONEOK Inc.	OKE	59.36%	0.01%	40.63%
Patina Oil & Gas	POG	0.72%	0.00%	99.28%
Penn Virginia Corp.	PVA	14.57%	0.00%	85.43%
Petroleum Development Corp.	PETD	23.21%	0.00%	76.79%
Plains Resources	PLX	46.64%	5.28%	48.08%
Questar Corp.	STR	33.45%	0.00%	66.55%
San Juan Basin Rlty.	SJT	0.00%	0.00%	100.00%
Southwestern Energy	SWN	54.10%	0.00%	45.90%
TEPPCO Partners L.P.	TPP	49.58%	0.00%	50.42%
Trans Energy Inc	TSRG	27.13%	0.00%	72.87%
Universal Compression Holdings	UCO	28.71%	0.00%	71.29%
Vintage Petroleum	VPI	58.28%	0.00%	41.72%
Western Gas Res.	WGR	21.70%	9.35%	68.95%
Williams Coal Sm Gs	WTU	0.00%	0.00%	100.00%
Williams Cos.	WMB	86.37%	1.98%	11.65%
XTO Energy	XTO	24.12%	0.00%	75.88%
	Average	35.35%	1.54%	63.11%
	Median	33.73%	0.00%	66.27%

Source: Value Line CD Rom, January 2003.

Value Line Natural Gas Diversified Industry (Large)
Capital Structure (VL Data) January 1, 2003

Company Name	Ticker	LTD %	PS %	CS %
Devon Energy	DVN	51.72%	1.01%	47.27%
Dynegy Inc. 'A'	DYN	69.48%	20.59%	9.93%
El Paso Corp.	EP	77.85%	0.00%	22.15%
Enterprise Products	EPD	29.93%	0.00%	70.07%
EOG Resources	EOG	19.09%	2.63%	78.28%
Equitable Resources	EQT	16.94%	0.00%	83.06%
Kinder Morgan	KMI	36.71%	0.00%	63.29%
Kinder Morgan Energy	KMP	31.70%	0.00%	68.30%
National Fuel Gas	NFG	38.31%	0.00%	61.69%
Ocean Energy	OEI	30.14%	0.00%	69.86%
ONEOK Inc.	OKE	59.36%	0.01%	40.63%
Questar Corp.	STR	33.45%	0.00%	66.55%
TEPPCO Partners L.P.	TPP	49.58%	0.00%	50.42%
Vintage Petroleum	VPI	58.28%	0.00%	41.72%
Western Gas Res.	WGR	21.70%	9.35%	68.95%
Williams Cos.	WMB	86.37%	1.98%	11.65%
XTO Energy	XTO	24.12%	0.00%	75.88%
	Average	43.22%	2.09%	54.69%
	Median	36.71%	0.00%	63.29%

Interstate Natural Gas Pipeline Forum (Pipes)
Capital Structure (VL Data) January 1, 2003

Company Name	Ticker	LTD %	PS %	CS %
El Paso Corp.	EP	77.85%	0.00%	22.15%
Kinder Morgan Energy	KMP	31.70%	0.00%	68.30%
Kinder Morgan	KMI	36.71%	0.00%	63.29%
National Fuel Gas	NFG	38.31%	0.00%	61.69%
Northern Border Partners LP	NBP	44.73%	0.00%	55.27%
Questar Corp.	STR	33.45%	0.00%	66.55%
Williams Cos.	WMB	86.37%	1.98%	11.65%
	Average	49.88%	0.28%	49.84%
	Median	38.31%	0.00%	61.69%

Source: Value Line CD Rom, January 2003.

Value Line Natural Gas Diversified Industry (All)
Capital Structure (S&P Data) - January 1, 2003

Company Name	Ticker	LTD %	PS %	CS %
Cabot Oil & Gas Corp	COG	33.39%	0.00%	66.61%
Chesapeake Utilities Corp	CPK	42.97%	0.00%	57.03%
Delta Natural Gas Co Inc	DGAS	47.03%	0.00%	52.97%
Devon Energy Corp	DVN	51.56%	0.01%	48.44%
Dorchester Hugoton -Lp	DHULZ	0.00%	0.00%	100.00%
Dynegy Inc	DYN	72.39%	21.50%	6.12%
Eastern Amern Natural Gas Tr	NGT	0.00%	0.00%	100.00%
El Paso Corp	EP	79.82%	0.00%	20.18%
El Paso Energy Partners -Lp	EPN	50.16%	5.56%	44.28%
Enterprise Prods Prtner -Lp	EPD	28.01%	0.00%	71.99%
EOG Resources Inc	EOG	18.65%	2.53%	78.83%
Equitable Resources Inc	EQT	14.25%	0.00%	85.75%
KCS Energy Inc	KCS	62.49%	6.42%	31.09%
Kinder Morgan Energy -Lp	KMP	38.36%	0.00%	61.64%
Kinder Morgan Inc	KMI	37.08%	0.00%	62.92%
National Fuel Gas Co	NFG	40.77%	0.00%	59.23%
Northern Border Partnrs -Lp	NBP	46.23%	0.00%	53.77%
Ocean Energy Inc	OEI	29.08%	0.00%	70.91%
ONEOK Inc	OKE	58.36%	0.01%	41.63%
Patina Oil & Gas Corp	POG	0.71%	0.00%	99.29%
Penn Virginia Corp	PVA	14.33%	0.00%	85.67%
Petroleum Development Corp	PETD	23.91%	0.00%	76.09%
Plains Resources Inc	PLX	48.36%	3.91%	47.73%
Questar Corp	STR	34.09%	0.00%	65.91%
San Juan Basin Royalty Tr	SJT	0.00%	0.00%	100.00%
Southwestern Energy Co	SWN	54.53%	0.00%	45.47%
TEPPCO Partners LP	TPP	52.05%	3.73%	44.22%
Trans Energy Inc	3TSRG	31.39%	0.00%	68.61%
Universal Compression Hldgs	UCO	27.91%	0.00%	72.09%
Vintage Petroleum Inc	VPI	58.04%	0.00%	41.96%
Western Gas Resources Inc	WGR	22.70%	0.02%	77.28%
Williams Coal Seam Ryl Trust	WTU	0.00%	0.00%	100.00%
Williams Cos Inc	WMB	88.07%	1.94%	9.99%
XTO Energy Inc	XTO	23.79%	0.00%	76.21%
	Average	36.19%	1.34%	62.47%
	Median	35.59%	0.00%	64.42%

Source: S&P Research Insight CD Rom, January 2003.

Value Line Natural Gas Diversified Industry (Large)
Capital Structure (S&P Data) - January 1, 2003

Company Name	Ticker	LTD %	PS %	CS %
Devon Energy Corp	DVN	51.56%	0.01%	48.44%
Dynegy Inc	DYN	72.39%	21.50%	6.12%
El Paso Corp	EP	79.82%	0.00%	20.18%
Enterprise Prods Prtner -Lp	EPD	28.01%	0.00%	71.99%
EOG Resources Inc	EOG	18.65%	2.53%	78.83%
Equitable Resources Inc	EQT	14.25%	0.00%	85.75%
Kinder Morgan Energy -Lp	KMP	38.36%	0.00%	61.64%
Kinder Morgan Inc	KMI	37.08%	0.00%	62.92%
National Fuel Gas Co	NFG	40.77%	0.00%	59.23%
Ocean Energy Inc	OEI	29.08%	0.00%	70.91%
ONEOK Inc	OKE	58.36%	0.01%	41.63%
Questar Corp	STR	34.09%	0.00%	65.91%
TEPPCO Partners Inc	TPP	52.05%	3.73%	44.22%
Vintage Petroleum Inc	VPI	58.04%	0.00%	41.96%
Western Gas Resources Inc	WGR	22.70%	0.02%	77.28%
Williams Cos Inc	WMB	88.07%	1.94%	9.99%
XTO Energy Inc	XTO	23.79%	0.00%	76.21%
	Average	43.95%	1.75%	54.31%
	Median	38.36%	0.00%	61.64%

Interstate Natural Gas Pipeline Forum (Pipelines)
Capital Structure (S&P Data) - January 1, 2003

Company Name	Ticker	LTD %	PS %	CS %
El Paso Corp	EP	79.82%	0.00%	20.18%
Kinder Morgan Energy LP	KMP	38.36%	0.00%	61.64%
Kinder Morgan Inc	KMI	37.08%	0.00%	62.92%
National Fuel Gas Co	NFG	40.77%	0.00%	59.23%
Northern Border Partners LP	NBP	46.23%	0.00%	53.77%
Questar Corp	STR	34.09%	0.00%	65.91%
Williams Cos Inc	WMB	88.07%	1.94%	9.99%
	Average	52.06%	0.28%	47.66%
	Median	40.77%	0.00%	59.23%

Source: S&P Research Insight CD Rom, January 2003.

Cost of Debt

The expected return on debt, or the cost of debt capital (D_r), is the rate that investors would incur when financing the purchase of the operating assets of an interstate natural gas pipeline company. It is the cost of debt that is appropriate for the cost of capital study and it is relatively simple to estimate. Unlike the cost of equity, the required return on debt is directly observable in the market. It is best approximated by the current yield-to-maturity (yield) on the applicable debt. Often an average of recent yields is also used. The yield exemplifies the market's expectation of future returns. If the market's expectations of future debt returns were different from those implicit in the price, the market price of the debt would be bid up or down so that the market's expectations were reflected in the price.[24]

From information in *Mergent Bond Record* (January 2003), we found the Mergent bond rating to be **Baa** and the Standard & Poor's long-term senior debt rating to be **BBB** for the typical interstate natural gas pipeline. The yield for utility bonds rated Baa was **7.61%** as of December 31, 2002 and the yield for corporate bonds rated Baa was **7.45%** as of December 31, 2002. From this information we determined the appropriate cost of debt capital to be **7.60%**. The following tables were used to illustrate the long-term debt ratings for the Value Line Natural Gas Industry and yield to maturity (YTM) for public utility bonds and corporate bonds as reported in *Mergent Bond Record*.

[24] *Ibid*, 150.

Value Line Natural Gas Diversified Industry (All)

S&P and Mergent Long-Term Debt Ratings - January 1, 2003

Company Name	Ticker	S&P Rating	Numerical Rating	Mergent Rating	Numerical Rating
Cabot Oil & Gas Corp	COG				
Chesapeake Utilities Corp	CPK				
Delta Natural Gas Co Inc	DGAS				
Devon Energy Corp	DVN	BBB	11	Baa2	11
Dorchester Hugoton -Lp	DHULZ				
Dynegy Inc	DYN	B	17	Caa2	21
Eastern Amern Natural Gas Tr	NGT				
El Paso Corp	EP	BB	14	Ba2	14
El Paso Energy Partners -Lp	EPN	BB+	13	B1	16
Enterprise Prods Prtner -Lp	EPD	BBB	11	Baa2	11
EOG Resources Inc	EOG	BBB+	10	Baa1	10
Equitable Resources Inc	EQT	A	8	A2	8
KCS Energy Inc	KCS				
Kinder Morgan Energy -Lp	KMP	BBB+	10	Baa1	10
Kinder Morgan Inc	KMI	BBB	11	Baa2	11
National Fuel Gas Co	NFG	BBB+	10	A3	9
Northern Border Partnrs -Lp	NBP	A-	9	Baa2	11
Ocean Energy Inc	OEI	BBB-	12	Baa3	12
ONEOK Inc	OKE	A	8	Baa1	10
Patina Oil & Gas Corp	POG				
Penn Virginia Corp	PVA				
Petroleum Development Corp	PETD				
Plains Resources Inc	PLX	BB	14	B2	17
Questar Corp	STR	A	8	A2	8
San Juan Basin Royalty Tr	SJT				
Southwestern Energy Co	SWN	BBB	11	Ba2	14
TEPPCO Partners LP	TPP	BBB	11	Baa3	12
Trans Energy Inc	3TSRG				
Universal Compression Hldgs	UCO	BB-	15	B1	16
Vintage Petroleum Inc	VPI	BB-	15	B1	16
Western Gas Resources Inc	WGR	BB+	13	Ba3	15
Williams Coal Seam Ryl Trust	WTU				
Williams Cos Inc	WMB	B+	16	Caa1	20
XTO Energy Inc	XTO	BB+	13	Ba2	14
	Average	BBB-	12	Ba1	13
	Median	BBB	11	Baa3	12

Source: S&P Research Insight CD ROM & Mergent Bond Record, January 2003.

Value Line Natural Gas Diversified Industry (Large)
S&P and Mergent Long-Term Debt Ratings - January 1, 2003

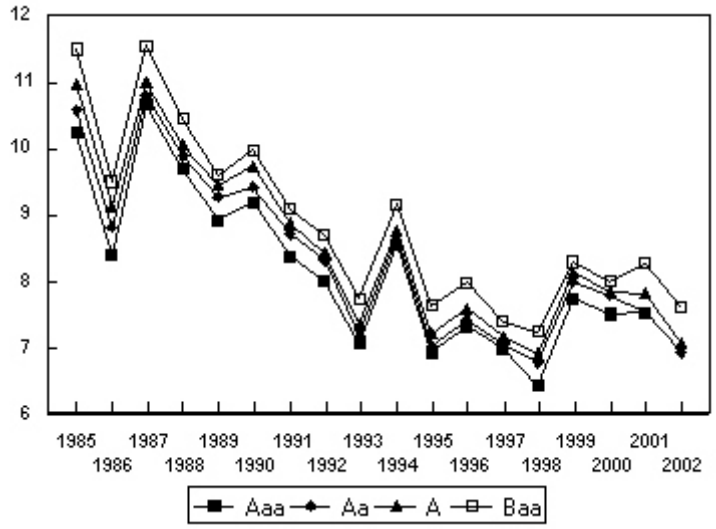
Company Name	Ticker	S&P Rating	Numerical Rating	Mergent Rating	Numerical Rating
Devon Energy Corp	DVN	BBB	11	Baa2	11
Dynegy Inc	DYN	B	17	Caa2	21
El Paso Corp	EP	BB	14	Ba2	14
Enterprise Prods Prtner -Lp	EPD	BBB	11	Baa2	11
EOG Resources Inc	EOG	BBB+	10	Baa1	10
Equitable Resources Inc	EQT	A	8	A2	8
Kinder Morgan Energy -Lp	KMP	BBB+	10	Baa1	10
Kinder Morgan Inc	KMI	BBB	11	Baa2	11
National Fuel Gas Co	NFG	BBB+	10	A3	9
Ocean Energy Inc	OEI	BBB-	12	Baa3	12
ONEOK Inc	OKE	A	8	Baa1	10
Questar Corp	STR	A	8	A2	8
TEPPCO Partners LP	TPP	BBB	11	Baa3	12
Vintage Petroleum Inc	VPI	BB-	15	B1	16
Western Gas Resources Inc	WGR	BB+	13	Ba3	15
Williams Cos Inc	WMB	B+	16	Caa1	20
XTO Energy Inc	XTO	BB+	13	Ba2	14
	Average	BBB-	12	Baa3	12
	Median	BBB	11	Baa2	11

Interstate Natural Gas Pipeline Forum (Pipes)
S&P and Mergent Long-Term Debt Ratings - January 1, 2003

Company Name	Ticker	S&P Rating	Numerical Rating	Mergent Rating	Numerical Rating
El Paso Corp	EP	BB	14	Ba2	14
Kinder Morgan Energy -Lp	KMP	BBB+	10	Baa1	10
Kinder Morgan Inc	KMI	BBB	11	Baa2	11
National Fuel Gas Co	NFG	BBB+	10	A3	9
Northern Border Partnrs -Lp	NBP	A-	9	Baa2	11
Questar Corp	STR	A	8	A2	8
Williams Cos Inc	WMB	B+	16	Caa1	20
	Average	BBB	11	Baa3	12
	Median	BBB+	10	Baa2	11

Source: S&P Research Insight CD ROM & Mergent Bond Record, January 2003.

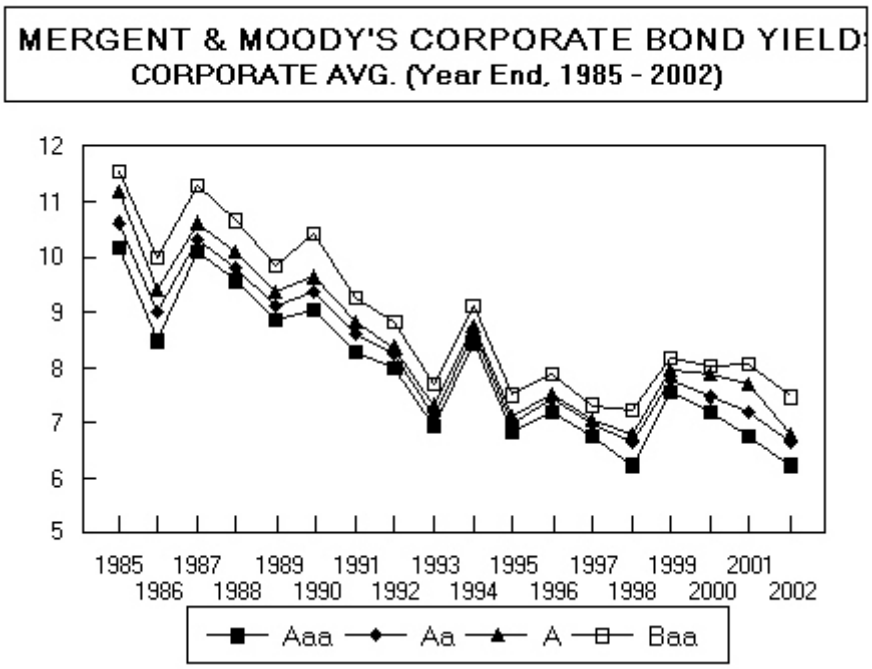
Mergent Utility Bond Yields
Public Utility Yields (1985-2002)
(YEAR END DATA)



PUBLIC UTILITY BOND YIELDS - Year End Data				
Year End Date	Aaa	Aa	A	Baa
1985	10.24	10.57	10.97	11.48
1986	8.41	8.81	9.12	9.49
1987	10.64	10.78	10.98	11.55
1988	9.67	9.90	10.06	10.44
1989	8.92	9.26	9.44	9.60
1990	9.18	9.42	9.73	9.96
1991	8.38	8.71	8.88	9.07
1992	8.01	8.32	8.43	8.69
1993	7.06	7.18	7.34	7.73
1994	8.55	8.69	8.76	9.16
1995	6.94	7.03	7.23	7.63
1996	7.33	7.44	7.59	7.98
1997	6.99	7.07	7.16	7.41
1998	6.43	6.78	6.91	7.24
1999	7.74	8.00	8.14	8.28
2000	7.51	7.79	7.84	8.01
2001	7.53	7.53	7.83	8.27
2002	—	6.94	7.07	7.61

Source: MERGENT & MOODY'S BOND RECORD, JANUARY - 1986 - 2003.

Mergent Corporate Bond Yields



1985 -2002				
MERGENT & MOODY'S CORP. BOND YIELDS CORPORATE AVERAGES - Year End Data				
Year End Date	**Aaa**	**Aa**	**A**	**Baa**
1985	10.16	10.63	11.19	11.58
1986	8.49	9.02	9.41	9.97
1987	10.11	10.33	10.62	11.29
1988	9.57	9.81	10.11	10.65
1989	8.86	9.11	9.39	9.82
1990	9.05	9.39	9.64	10.43
1991	8.31	8.61	8.82	9.26
1992	7.98	8.24	8.37	8.81
1993	6.93	7.12	7.31	7.69
1994	8.46	8.62	8.73	9.11
1995	6.82	6.99	7.13	7.49
1996	7.20	7.41	7.51	7.89
1997	6.76	6.99	7.05	7.32
1998	6.22	6.65	6.80	7.23
1999	7.55	7.78	7.96	8.19
2000	7.21	7.48	7.88	8.02
2001	6.76	7.19	7.70	8.05
2002	6.21	6.63	6.80	7.45

Source: MERGENT & MOODY'S BOND YIELDS, JANUARY 1985 -2003

Cost of Equity

In estimating the cost of equity capital, several methods are employed. The market cost of equity is often considered to be the most difficult part of computing the cost of capital because it relies on interpretation of projections by market analysts as well as the projections of the equity models used by the appraiser. The market cost of equity capital is equal to the rate of return *expected* by investors at their perceived level of risk for a company's equity. There are several methods used to estimate the cost of equity capital. The most common methods are the discounted cash flow method (DCF), the risk premium method (RP), and the capital asset pricing model (CAPM).

All estimates of the cost of equity rates fall into one of two classes. They are either (1) add-ons to an interest rate, or (2) ratios of return to investment. Add-on estimates of the cost of equity capital include RP and the CAPM. The DCF method is a ratio of return to investment.

After computing the cost of equity by the DCF, RP, and CAPM methods, the data was analyzed and reconciled to obtain the cost of equity capital without flotation costs to be **13.50%**. On the following page is a summary of the cost of equity calculations by each of the methods employed. The summary page is followed by an explanation of each method and the indicators found therein.

Summary of Cost of Equity Calculations

DCF Indicators - January 1, 2003

Company Groups	Value Line Data		S&P (IBES) Data	
	Average	Median	Average	Median
Value Line Natural Gas (Diversified) - All	13.82	13.66	14.72	13.66
Value Line Natural Gas (Diversified) - Large	13.87	14.10	14.65	13.02
Interstate Natural Gas Pipeline Forum (Pipes)	16.21	15.68	16.92	16.58
S&P Screened Comparables Group	13.57	13.08	13.27	13.37
Averages	14.37	14.13	14.89	14.16

The discounted cash flow model for above industry groups were calculated using Value Line data and Value Line earnings growth estimates and using S&P's Research Insight data with Institutional Brokers Estimate System (IBES) earnings growth.

General Risk Premium Indicators

Indicators	Rates		Risk Prem. Indicator
	Rf	Rp	
20-Year Treasury Bonds	5.05	7.00	12.05

Risk Premium Indicators by Groups

Indicators	Risk Premium	
	Average	Median
Natural Gas Diversified Industry (All)	14.63	13.09
Natural Gas Diversified Industry (Large)	14.63	13.09
Interstate Nat. Gas Pipeline Forum Group	15.86	15.89
Average	15.04	14.02

Risk Premium Formula: Ke = Rf + Rp

Risk Free Rate: Yield to maturity on each company's long-term bonds, *Mergent Bond Record*, January, 2003. Risk Premium: *SBBI*, Ibbotson Associates, 2003 Corporate Bond RP of 6.0%.

Capital Asset Pricing Model

Item	Rates			CAPM Indicator
	Rf	Rp	Beta	
CAPM Indicator *				
Long-Term Gov't Bonds	5.05	7.00	0.90	**11.35**
S&P 500 Expected Equity Cost (Ex Ante) CAPM Indicator				**13.29**

CAPM Formula: Ke = Rf + B(Rp)

* CAPM Indicator is based upon a *Value Line* beta of 0.90. Ibbotson & Associates, 2003 *SBBI* & *Risk Premia over Time Report*; WSJ, January 6, 2003, & Federal Reserve data January 2, 2003.

DCF Method

The discounted cash flow method of estimating the cost of equity is based on the formula shown in Figure 2. Our computations using the DCF method are based upon information from the *Standard and Poor's Research Insight* database, *Institutional Brokers Estimate System* (IBES), and the *Value Line Investment Survey* database. We began our analysis by screening the Standard and Poor's database of approximately 10,300 companies for companies with equal or slightly less risk than the risk of the typical interstate natural gas pipeline. As a measure of financial risk Standard and Poor's has placed a rating of **BBB-** on most of the long-term debt of companies comprising the natural gas pipeline industry. Our first screening process was to find all companies having a S&P senior debt rating of BBB- to BBB+ (the lowest to the highest rated BBB debt). This screening will give us a list of companies that have long-term debt which is believed to be either equal in risk or slightly less risky than the typical interstate natural gas pipeline. This measure is indicative of financial risk for the companies.

$$K_e = \frac{D_1}{P_0} + g$$

where

K_e = *Cost of equity*
D_1 = *Expected Dividend in year* 1
P_0 = *Current price of stock*
g = *Growth in dividends*

Figure 2

Next we screened the surviving group of companies by the return on net plant investment (before taxes). This is a measure of business risk and measures the ability of a company to compete in the market and maintain its rate of return before income taxes. From this calculation we screened out all companies varying more than fifty percent from the average return of the interstate natural gas pipelines industry.

Next we screened the surviving group of companies by their asset turnover ratios. The asset turnover ratio is found by dividing a company's total sales by its total assets. This ratio is indicative of the business risk faced by a company. It can be used to determine how competitive the company is within its industry and also how much capital must be invested to gain a dollar of sales. Thus, this ratio helps indicate the level of investment a competitor must invest to generate a competitive sales volume. Again, we excluded all companies which varied more than fifty percent from the average asset turnover ratio of the interstate natural gas pipelines industry.

Next we screened the surviving group of companies by their S&P adjusted betas. Beta is a measurement of the sensitivity of a company's stock price to the overall fluctuation in the Standard & Poor's 500 (S&P 500) Index Price. For example, a beta of 1.5 indicates that a company's stock price tends to rise (or fall) 1.5%, with a 1% rise (or fall) in the index price. The S&P adjusted beta of the interstate natural gas pipeline industry averages approximately 0.80 presently. Thus we excluded all companies with S&P adjusted betas less than 0.65 and greater

than 0.95. In our judgment, this range is a reasonable range of betas to use for comparison purposes in determining comparables of approximate risk to the natural gas pipelines. A table of risk screening data is shown below.

Pipeline Risk Screening Data - January 1, 2003
Value Line Natural Gas Diversified Industry (Large) S&P Data

Company Name	Ticker	S&P Debt Rating Letter	S&P Debt Rating Number	S&P Adj. Beta	Return on Net Invest.	Asset Turnover Ratio
Devon Energy Corp	DVN	BBB	11	0.79	3.21	0.30
Dynegy Inc	DYN	B	17	1.34	13.06	1.83
El Paso Corp	EP	BB	14	1.16	3.39	1.52
Enterprise Prods Prtner -Lp	EPD	BBB	11	0.47	20.07	1.44
EOG Resources Inc	EOG	BBB+	10	0.95	22.67	0.52
Equitable Resources Inc	EQT	A	8	0.63	18.00	0.71
Kinder Morgan Energy -Lp	KMP	BBB+	10	0.62	11.09	0.52
Kinder Morgan Inc	KMI	BBB	11	0.52	6.74	0.12
National Fuel Gas Co	NFG	BBB+	10	0.48	10.69	0.43
Ocean Energy Inc	OEI	BBB-	12	0.81	18.00	0.39
ONEOK Inc	OKE	A	8	0.59	9.02	1.03
Questar Corp	STR	A	8	0.75	10.69	0.50
TEPPCO Partners LP	TPP	BBB	11	0.46	11.19	1.92
Vintage Petroleum Inc	VPI	BB-	15	1.08	13.72	0.51
Western Gas Resources Inc	WGR	BB+	13	0.69	15.99	2.46
Williams Cos Inc	WMB	B+	16	1.29	14.62	0.28
XTO Energy Inc	XTO	BB+	13	0.94	24.87	0.45
Average		BBB-	12	0.80	13.35	0.88

Source: S&P Research Insight CD Rom, January 2003.

Surviving the screening process are nine (9) companies, which in general should be approximately of equal or slightly less risk when compared to the interstate natural gas pipeline industry. These companies are:

Ashland, Inc.
Cooper Tire & Rubber
Corn Products International, Inc.
Crompton Corp.
Noble Energy, Inc.
PPL Corp.
Rock-Tenn Co.
Waste Management, Inc.
Worthington Industries

In addition to performing a DCF analysis for the companies listed above of approximately equal or slightly less risk to the interstate natural gas pipelines, we performed additional DCF analyses on three other groups of companies, the Value Line natural gas (diversified) group (all companies), the Value Line natural gas (diversified) group (large companies – with over $750

million in annual sales), and the interstate natural gas pipeline forum group that are primarily pipelines. We used financial data from two independent sources, *Standard and Poor's Research Insight* database, and the *Value Line Investment Survey*. The two independent sources of data gave us two sets of growth estimates for all four groups of companies. The growth estimates considered were provided by *Value Line* and the *Institutional Brokers Estimate System* (IBES) through the *Standard and Poor's Research Insight* database. From these analysts' projections we calculated DCF indicators on all groupings and calculated a simple average and median indicator. We gave the most weight to the median indicator in each grouping. The median indicator is not affected by extreme values and outliers and thus is a very good indicator of central tendency of a representative sample of companies. We placed the most confidence in the estimates provided by the IBES projections, because these estimates were provided by a large group of financial analysts who monitor these companies.[25] It is our opinion, based on this documented data, that the appropriate cost of equity for the interstate natural gas pipeline industry by the DCF method is **14.25%** as of January 1, 2003. The result of all of the DCF analysis and research can be found below.

Summary of the DCF Method Indicators

Company Groups	Value Line Data		S&P (IBES) Data	
	Average	Median	Average	Median
Value Line Natural Gas (Diversified) - All	13.82	13.66	14.72	13.66
Value Line Natural Gas (Diversified) - Large	13.87	14.10	14.65	13.02
Interstate Natural Gas Pipeline Forum (Pipes)	16.21	15.68	16.92	16.58
S&P Screened Comparables Group	13.57	13.08	13.27	13.37
Averages	14.37	14.13	14.89	14.16

The discounted cash flow model for above industry groups were calculated using Value Line data and Value Line earnings growth estimates and using S&P's Research Insight data with Institutional Brokers Estimate System (IBES) earnings growth.

[25] The Institutional Brokers Estimate System (IBES) is a database provided through *Standard & Poor's Research Insight* of earnings expectations obtained from more than 3,500 security analysts from over 300 contributing firms.

Value Line Natural Gas Diversified Industry (All) VL Data
DCF Indicator (VL Data) - January 1, 2003

Company Name	Ticker	% Cur Yld	EPS Gth	DCF
Cabot Oil & Gas 'A'	COG	0.66	13.00	13.66
Chesapeake Utilities Corp.	CPK		6.00	
Delta Natural Gas	DGAS		3.00	
Devon Energy	DVN	0.44	8.50	8.94
Dorchester Hugoton	DHULZ			
Dynegy Inc. 'A'	DYN		(3.00)	
Eastern Amern Nat Gas Tr	NGT			
El Paso Corp.	EP	10.47	(5.50)	
El Paso Energy Partners	EPN		10.75	
Enterprise Products	EPD	7.60	6.50	14.10
EOG Resources	EOG	0.41	5.00	5.41
Equitable Resources	EQT	2.00	14.00	16.00
KCS Energy	KCS			
Kinder Morgan	KMI	0.96	23.50	24.46
Kinder Morgan Energy	KMP	7.27	12.50	19.77
National Fuel Gas	NFG	5.01	4.00	9.01
Northern Border Partners LP	NBP		7.83	
Ocean Energy	OEI	0.83	13.50	14.33
ONEOK Inc.	OKE	3.15	8.00	11.15
Patina Oil & Gas	POG	0.78	12.50	13.28
Penn Virginia Corp.	PVA		15.00	
Petroleum Development Corp.	PETD			
Plains Resources	PLX		5.00	
Questar Corp.	STR	2.59	9.00	11.59
San Juan Basin Rlty.	SJT			
Southwestern Energy	SWN		1.00	
TEPPCO Partners L.P.	TPP	8.33	6.00	14.33
Trans Energy Inc	TSRG			
Universal Compression Holdings	UCO		17.50	
Vintage Petroleum	VPI	1.59	(0.50)	
Western Gas Res.	WGR	0.57	21.50	22.07
Williams Coal Sm Gs	WTU			
Williams Cos.	WMB	1.27	(3.00)	
XTO Energy	XTO	0.16	9.00	9.16
	Average	3.01	8.17	13.82
	Median	1.43	8.00	13.66

Source: Value Line CD Rom, January 2003.

Value Line Natural Gas Diversified Industry (Large) VL Data
DCF Indicator (VL Data) - January 1, 2003

Company Name	Ticker	% Cur Yld	EPS Gth	DCF
Devon Energy	DVN	0.44	8.50	8.94
Dynegy Inc. 'A'	DYN		(3.00)	
El Paso Corp.	EP	10.47	(5.50)	
Enterprise Products	EPD	7.60	6.50	14.10
EOG Resources	EOG	0.41	5.00	5.41
Equitable Resources	EQT	2.00	14.00	16.00
Kinder Morgan	KMI	0.96	23.50	24.46
Kinder Morgan Energy	KMP	7.27	12.50	19.77
National Fuel Gas	NFG	5.01	4.00	9.01
Ocean Energy	OEI	0.83	13.50	14.33
ONEOK Inc.	OKE	3.15	8.00	11.15
Questar Corp.	STR	2.59	9.00	11.59
TEPPCO Partners L.P.	TPP	8.33	6.00	14.33
Vintage Petroleum	VPI	1.59	(0.50)	
Western Gas Res.	WGR	0.57	21.50	22.07
Williams Cos.	WMB	1.27	(3.00)	
XTO Energy	XTO	0.16	9.00	9.16
	Average	3.29	7.59	13.87
	Median	1.80	8.00	14.10

Interstate Natural Gas Pipeline Forum (Pipelines) VL Data
DCF Indicator (VL Data) - January 1, 2003

Company Name	Ticker	% Cur Yld	EPS Gth	DCF
El Paso Corp.	EP	10.47	(5.50)	
Kinder Morgan Energy	KMP	7.27	12.50	19.77
Kinder Morgan	KMI	0.96	23.50	24.46
National Fuel Gas	NFG	5.01	4.00	9.01
Northern Border Partners LP	NBP		7.83	
Questar Corp.	STR	2.59	9.00	11.59
Williams Cos.	WMB	1.27	(3.00)	
	Average	4.60	6.90	16.21
	Median	3.80	7.83	15.68

Source: Value Line CD Rom, January 2003.

Value Line Natural Gas Diversified Industry (All) S&P Data
DCF Indicator (S&P Data) - January 1, 2003

Company Name	Ticker	% Cur Yld	EPS Gth	DCF
Cabot Oil & Gas Corp	COG	0.71	10.00	10.71
Chesapeake Utilities Corp	CPK	6.37	6.00	12.37
Delta Natural Gas Co Inc	DGAS	5.66	3.00	8.66
Devon Energy Corp	DVN	0.48	11.00	11.48
Dorchester Hugoton -Lp	DHULZ			
Dynegy Inc	DYN	0.00	11.00	
Eastern Amern Natural Gas Tr	NGT			
El Paso Corp	EP	13.75	10.00	23.75
El Paso Energy Partners -Lp	EPN	10.67	10.00	20.67
Enterprise Prods Prtner -Lp	EPD	7.82	10.00	17.82
EOG Resources Inc	EOG	0.43	7.50	7.93
Oil & Gas Exploration & Prod	EQT	2.13	10.00	12.13
KCS Energy Inc	KCS			
Kinder Morgan Energy -Lp	KMP	7.76	11.25	19.01
Kinder Morgan Inc	KMI	1.14	20.00	21.14
National Fuel Gas Co	NFG	5.37	7.00	12.37
Northern Border Partnrs -Lp	NBP	9.08	7.50	16.58
Ocean Energy Inc	OEI	0.89	11.00	11.89
ONEOK Inc	OKE	3.49	8.00	11.49
Patina Oil & Gas Corp	POG	0.87	15.00	15.87
Penn Virginia Corp	PVA	2.89	16.55	19.44
Petroleum Development Corp	PETD			
Plains Resources Inc	PLX			
Questar Corp	STR	2.90	9.00	11.90
San Juan Basin Royalty Tr	SJT			
Southwestern Energy Co	SWN	0.00	15.00	
TEPPCO Partners LP	TPP	9.32	7.75	17.07
Trans Energy Inc	3TSRG			
Universal Compression Hldgs	UCO	0.00	15.00	
Vintage Petroleum Inc	VPI	1.74	15.00	16.74
Western Gas Resources Inc	WGR	0.60	10.20	10.80
Williams Coal Seam Ryl Trust	WTU			
Williams Cos Inc	WMB	1.66	12.00	13.66
XTO Energy Inc	XTO	0.19	15.00	15.19
	Average	3.69	10.91	14.72
	Median	1.94	10.10	13.66

Source: S&P Research Insight CD Rom, January 2003.

Value Line Natural Gas Diversified Industry (Large) D&P Data
DCF Indicator (S&P Data) - January 1, 2003

Company Name	Ticker	Yield	Growth	DCF
Devon Energy Corp	DVN	0.48	11.00	11.48
Dynegy Inc	DYN		11.00	
El Paso Corp	EP	13.75	10.00	23.75
Enterprise Prods Prtner -Lp	EPD	7.82	10.00	17.82
EOG Resources Inc	EOG	0.43	7.50	7.93
Equitable Resources Inc	EQT	2.13	10.00	12.13
Kinder Morgan Energy -Lp	KMP	7.76	11.25	19.01
Kinder Morgan Inc	KMI	1.14	20.00	21.14
National Fuel Gas Co	NFG	5.37	7.00	12.37
Ocean Energy Inc	OEI	0.89	11.00	11.89
ONEOK Inc	OKE	3.49	8.00	11.49
Questar Corp	STR	2.90	9.00	11.90
TEPPCO Partners Inc	TPP	9.32	7.75	17.07
Vintage Petroleum Inc	VPI	1.74	15.00	16.74
Western Gas Resources Inc	WGR	0.60	10.20	10.80
Williams Cos Inc	WMB	1.66	12.00	13.66
XTO Energy Inc	XTO	0.19	15.00	15.19
	Average	3.73	10.92	14.65
	Median	1.94	10.20	13.02

Interstate Natural Gas Pipeline Forum (Pipelines) S&P Data
DCF Indicator (S&P Data) - January 1, 2003

Company Name	Ticker	Yield	Growth	DCF
El Paso Corp	EP	13.75	10.00	23.75
Kinder Morgan Energy LP	KMP	7.76	11.25	19.01
Kinder Morgan Inc	KMI	1.14	20.00	21.14
National Fuel Gas Co	NFG	5.37	7.00	12.37
Northern Border Partners LP	NBP	9.08	7.50	16.58
Questar Corp	STR	2.90	9.00	11.90
Williams Cos Inc	WMB	1.66	12.00	13.66
	Average	5.95	10.96	16.92
	Median	5.37	10.00	16.58

Source: S&P Research Insight CD Rom, January 2003.

Pipeline Screened Comparables Group - VL Data
DCF Indicator (VL Data) - January 1, 2003

Company Name	Ticker	% Cur Yld	EPS Gth	DCF
Ashland Inc.	ASH	3.81	1.50	5.31
Cooper Tire & Rubber	CTB	2.68	14.50	17.18
Crompton Corp.	CK	3.30		
Noble Energy	NBL	0.44	15.00	15.44
PPL Corp.	PPL	4.03	6.50	10.53
Rock-Tenn 'A'	RKT	2.37	12.50	14.87
Waste Management	WMI	0.04	8.00	8.04
Worthington Inds.	WOR	4.39	21.50	25.89
Corn Products Int'l	CPO	1.29	10.00	11.29
	Average	2.48	11.19	13.57
	Median	2.68	11.25	13.08

Pipeline Screened Comparables Group - S&P Data
DCF Indicator (S&P Data) - January 1, 2003

Company Name	Ticker	Yield	Growth	DCF
Ashland Inc	ASH	4.15	7.60	11.75
Cooper Tire & Rubber	CTB	3.07	12.00	15.07
Corn Products Intl Inc	CPO	1.46	10.00	11.46
Crompton Corp	CK	3.68	9.50	13.18
Noble Energy Inc	NBL	0.48	13.50	13.98
PPL Corp	PPL	4.40	6.00	10.40
Rock-Tenn Co	RKT	2.47	10.90	13.37
Waste Management Inc	WMI	0.05	15.00	15.05
Worthington Industries	WOR	4.64	10.50	15.14
	Average	2.71	10.56	13.27
	Median	3.07	10.50	13.37

Source: S&P Research Insight CD Rom, January 2003.

Risk Premium Method

The risk premium method is a standard method of estimating the cost of equity (K_e) based on the formula in Figure 3. This method sums two elements of risk — a risk free rate, which is the price of time (the reward for deferring consumption and for not exposing funds to risk), and a risk premium, which is the additional reward for assuming risk. The nominal risk free rate includes the real risk free rate and an inflation premium. The risk premium includes an interest rate risk, business risk, financial risk, and liquidity risk. All of these elements are included when calculating equity cost by the risk premium method.

$$K_e = R_f + R_p$$

where

K_e = *Cost of equity*
R_f = *Risk free rate*
R_p = *Risk premium*

Figure 3

Our risk premium calculations included computations for two categories of risk premium indicators — general indicators and indicators for the Value Line Natural Gas Diversified (all) group, the Value Line Natural Gas Diversified (large) group, and Interstate Natural Gas Pipeline Forum (Pipes) group. Our risk premiums were derived from the 2003 edition of *Stocks, Bonds, Bills and Inflation* (SBBI), published by Ibbotson Associates. Our relevant current 'safe rates' for the general indicators were derived from the sources footnoted below.[26] The 'safe rates' used for each company within the company groupings were the average yields to maturity for the long-term debt (20+ years to maturity) of each company quoted in *Mergent Bond Record* (January, 2003). The average yield to maturity for each company's bonds was added to the SBBI corporate bond risk premium to obtain an individual estimate for each company in the group. Thus, the risk premium indicators for the individual groups are specific for each company within the group and, thus, as individualized as possible for each company.

The general Risk Premium (or equity build-up method) indicators, using the risk premium from *SBBI* published by Ibbotson Associates, Inc., indicates a cost of equity capital of 12.05%.

The range for all calculations of risk premiums using the indicators by specific company groups are between 13.09% and 15.89%. This measurement involved the use of the average and median long-term yields to maturity for company bonds with at least 20 years to maturity plus the corporate bond risk premium of 6.0%. A conservative view of these results would indicate a risk premium correlated indicator for the specific companies to be approximately 14.50%.

For the general indicators discussed above the indicator using the long-term government bonds is deemed appropriate because a purchase of an interstate natural gas pipeline company is

[26] Ibbotson & Associates, 2003 SBBI & Risk Premia over Time Report: 2003, *The Wall Street Journal*, January 6, 2003, and The Federal Reserve, January 2, 2003.

considered a long-term commitment of capital, and thus the long-term bond risk premium would be much more indicative of the cost of long-term equity capital than any short-term indicator.

The long-term bond risk premium indicators are well supported by the estimates derived from the specific indicators from the yields to maturity of all of the groups of interstate natural gas pipeline industry bonds with 20 years or more to maturity. We believe the appropriate cost of equity for the typical interstate natural gas pipeline by the risk premium method as of January 1, 2003 is **13.70%** as of January 1, 2003. This conclusion gives weight and consideration to all indicators. A summary of the cost of equity indicators by the risk premium method (or equity build-up method) is below and the supporting data begins on the following page.

Risk Premium (Build-Up Method) Indicator

General Risk Premium Indicators

Indicators	Rates		Risk Prem.
	Rf	Rp	Indicator
20-Year Treasury Bonds	5.05	7.00	12.05

Risk Premium Indicators by Groups

Indicators	Risk Premium Indicators	
	Average	Median
Natural Gas Diversified Industry (All)	14.63	13.09
Natural Gas Diversified Industry (Large)	14.63	13.09
Interstate Nat. Gas Pipeline Forum Group	15.86	15.89
Average	15.04	14.02

Risk Premium Formula: Ke = Rf + Rp; Risk Free Rate: Yield to maturity on each company's long-term bonds, Mergent Bond Record, January, 2003; Risk Premium: *Risk Premia over Time Report*, 2003, Ibbotson Associates, Corporate Bond RP of 6.0%.

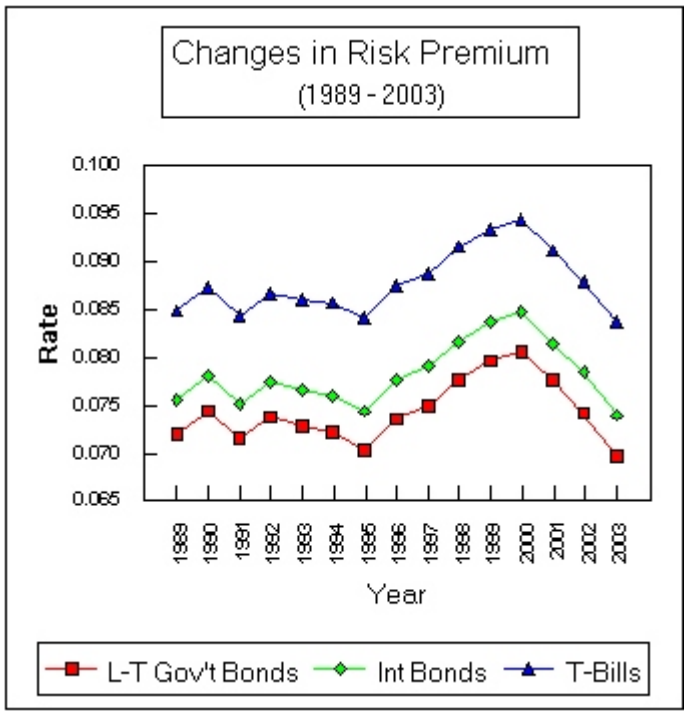
Table 1 **Total Returns, Income Returns and Capital Appreciation** **Summary Statistics of Annual Returns**

From 1926 to 2002

Series	Geometric Mean	Arithmetic	Standard Deviation
Large Company Stocks			
Total Returns	10.2	12.2	20.5
Income	4.3	4.3	1.5
Capital Appreciation	5.7	7.6	19.8
Ibbotson Small Company Stocks			
Total Returns	12.1	16.9	33.2
Mid-Cap Stocks*			
Total Returns	11.0	13.8	25.1
Income	4.2	4.2	1.6
Capital Appreciation	6.6	9.4	24.3
Low-Cap Stocks*			
Total Returns	11.2	15.2	29.9
Income	3.8	3.8	1.9
Capital Appreciation	7.3	11.2	29.1
Micro-Cap Stocks*			
Total Returns	12.1	18.2	39.3
Income	2.7	2.7	1.8
Capital Appreciation	9.4	15.4	38.7
Long-Term Corporate Bonds			
Total Returns	5.9	6.2	8.7
Long-Term Government Bonds			
Total Returns	5.5	5.8	9.4
Income	5.2	5.2	2.8
Capital Appreciation	0.1	0.4	8.2
Intermediate-Term Government Bonds			
Total Returns	5.4	5.6	5.8
Income	4.8	4.8	3.0
Capital Appreciation	0.5	0.6	4.5
Treasury Bills			
Total Returns	3.8	3.8	3.2
Inflation	3.0	3.1	4.4

Total return is equal to the sum of income return, capital appreciation return, and reinvestment return.
**Source: Center for Research in Security Prices, University of Chicago.*

Changes in Risk Premium & Summary Calculations



RISK PREMIUM CALCULATION FOR COST OF EQUITY	
L-T Govt Bonds	
Risk Premium*	7.0%
Applicable Rate**	5.1%
Indicated Cost of Equity	12.1%

Intermediate Gov't Bonds	
Risk Premium*	7.4%
Applicable Rate**	3.1%
Indicated Cost of Equity	10.5%

T-Bills	
Risk Premium*	8.4%
Applicable Rate**	1.2%
Indicated Cost of Equity	9.6%

Avg. Risk Premium Indicator = 10.7%

Source: Ibbotson & Associates, Inc. & Risk Premia over Time Report: 2003 Wall Street Journal, Jan. 6, 2003, Fed. Res., T&A (2003)

RISK PREMIUM			
Year	**L-T Gov't**	**Intermediate**	**T-Bills**
1989	0.0721	0.0757	0.0850
1990	0.0745	0.0781	0.0873
1991	0.0716	0.0752	0.0842
1992	0.0739	0.0775	0.0867
1993	0.0728	0.0766	0.0861
1994	0.0722	0.0761	0.0858
1995	0.0704	0.0743	0.0842
1996	0.0736	0.0776	0.0876
1997	0.0750	0.0790	0.0888
1998	0.0776	0.0817	0.0915
1999	0.0797	0.0837	0.0935
2000	0.0807	0.0847	0.0945
2001	0.0776	0.0816	0.0912
2002	0.0742	0.0784	0.0879
2003	0.0697	0.0740	0.0837

Value Line Natural Gas Diversified Industry (All)

Yield to Maturity for Long-Term Debt - January 1, 2003

Company Name	Ticker	Mergent Rating	Numerical Rating	YTM* 20+ Bonds	Risk Prem. Indicator
Cabot Oil & Gas Corp	COG				
Chesapeake Utilities Corp	CPK				
Delta Natural Gas Co Inc	DGAS				
Devon Energy Corp	DVN	Baa2	11		
Dorchester Hugoton -Lp	DHULZ				
Dynegy Inc	DYN	Caa2	21		
Eastern Amern Natural Gas Tr	NGT				
El Paso Corp	EP	Ba2	14	9.89	15.89
El Paso Energy Partners -Lp	EPN	B1	16		
Enterprise Prods Prtner -Lp	EPD	Baa2	11		
EOG Resources Inc	EOG	Baa1	10		
Equitable Resources Inc	EQT	A2	8	6.49	12.49
KCS Energy Inc	KCS				
Kinder Morgan Energy -Lp	KMP	Baa1	10	6.82	12.82
Kinder Morgan Inc	KMI	Baa2	11		
National Fuel Gas Co	NFG	A3	9		
Northern Border Partnrs -Lp	NBP	Baa2	11		
Ocean Energy Inc	OEI	Baa3	12		
ONEOK Inc	OKE	Baa1	10	7.09	13.09
Patina Oil & Gas Corp	POG				
Penn Virginia Corp	PVA				
Petroleum Development Corp	PETD				
Plains Resources Inc	PLX	B2	17		
Questar Corp	STR	A2	8		
San Juan Basin Royalty Tr	SJT				
Southwestern Energy Co	SWN	Ba2	14		
TEPPCO Partners LP	TPP	Baa3	12		
Trans Energy Inc	3TSRG				
Universal Compression Hldgs	UCO	B1	16		
Vintage Petroleum Inc	VPI	B1	16		
Western Gas Resources Inc	WGR	Ba3	15		
Williams Coal Seam Ryl Trust	WTU				
Williams Cos Inc	WMB	Caa1	20	12.88	18.88
XTO Energy Inc	XTO	Ba2	14		
	Average	Baa3	13	8.63	14.63
	Median	Baa2	12	7.09	13.09

Source: S&P Research Insight CD ROM & Mergent Bond Record, January 2003.

* Yield to Maturity for bonds with 20 years or more to maturity.

Value Line Natural Gas Diversified Industry (Large)

Yield to Maturity for Long-Term Debt - January 1, 2003

Company Name	Ticker	Mergent Rating	Numerical Rating	YTM* 20+ Bonds	Risk Prem. Indicator
Devon Energy Corp	DVN	Baa2	11		
Dynegy Inc	DYN	Caa2	21		
El Paso Corp	EP	Ba2	14	9.89	15.89
Enterprise Prods Prtner -Lp	EPD	Baa2	11		
EOG Resources Inc	EOG	Baa1	10		
Equitable Resources Inc	EQT	A2	8	6.49	12.49
Kinder Morgan Energy -Lp	KMP	Baa1	10	6.82	12.82
Kinder Morgan Inc	KMI	Baa2	11		
National Fuel Gas Co	NFG	A3	9		
Ocean Energy Inc	OEI	Baa3	12		
ONEOK Inc	OKE	Baa1	10	7.09	13.09
Questar Corp	STR	A2	8		
TEPPCO Partners LP	TPP	Baa3	12		
Vintage Petroleum Inc	VPI	B1	16		
Western Gas Resources Inc	WGR	Ba3	15		
Williams Cos Inc	WMB	Caa1	20	12.88	18.88
XTO Energy Inc	XTO	Ba2	14		
	Average	Baa2	12	8.63	14.63
	Median	Baa2	11	7.09	13.09

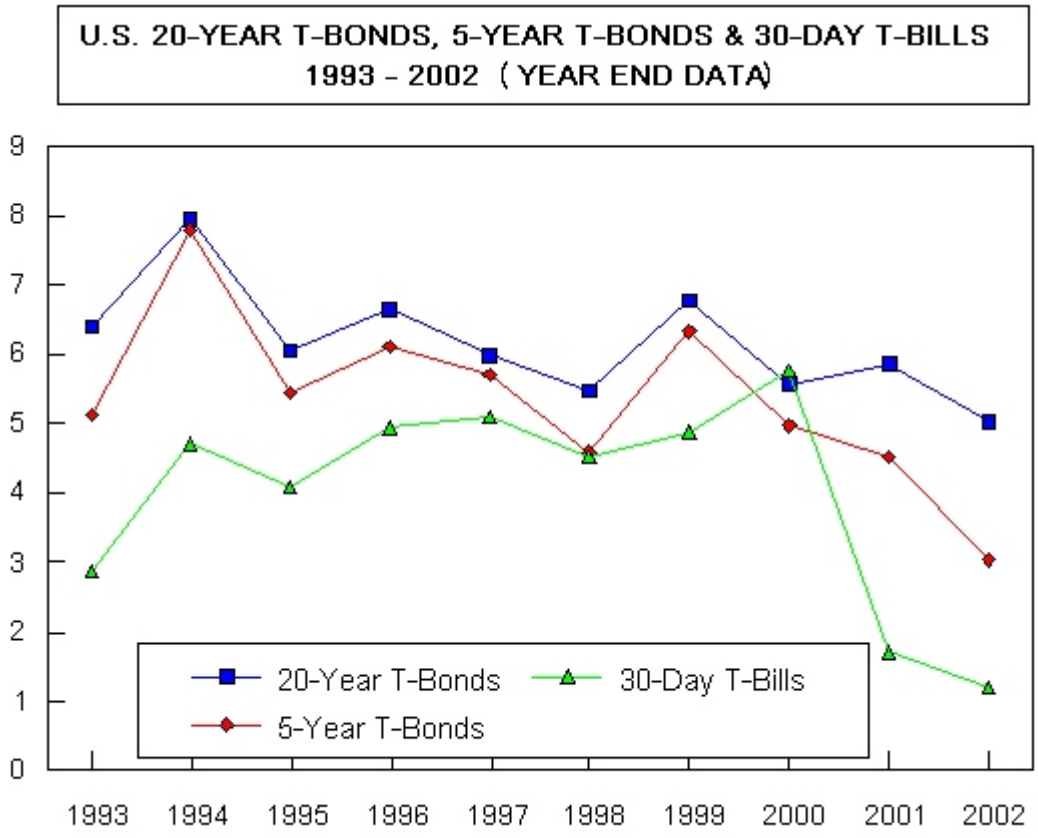
Interstate Natural Gas Pipeline Forum (Pipes)

Yield to Maturity for Long-Term Debt - January 1, 2003

Company Name	Ticker	Mergent Rating	Numerical Rating	YTM* 20+ Bonds	Risk Prem. Indicator
El Paso Corp	EP	Ba2	14	9.89	15.89
Kinder Morgan Energy -Lp	KMP	Baa1	10	6.82	12.82
Kinder Morgan Inc	KMI	Baa2	11		
National Fuel Gas Co	NFG	A3	9		
Northern Border Partnrs -Lp	NBP	Baa2	11		
Questar Corp	STR	A2	8		
Williams Cos Inc	WMB	Caa1	20	12.88	18.88
	Average	Baa1	12	9.86	15.86
	Median	Baa1	11	9.89	15.89

Source: S&P Research Insight CD ROM & Mergent Bond Record, January 2003.

* Yield to Maturity for bonds with 20 years or more to maturity.



US 20-Year T-Bonds, 5-Year T-Bonds, and 30-Day T-Bills

Year End Date	20-Year T-Bonds	5 -Year T-Bonds	30-DAY T-Bills
1993	6.41	5.14	2.89
1994	7.96	7.81	4.72
1995	6.06	5.44	4.08
1996	6.67	6.12	4.93
1997	5.99	5.72	5.09
1998	5.47	4.59	4.54
1999	6.80	6.33	4.89
2000	5.58	4.98	5.76
2001	5.86	4.52	1.70
2002	5.05	3.05	1.18

Source: WSJ, first issue of each respective year & Fed. Reserve.

Capital Asset Pricing Model

The capital asset pricing model (CAPM) is a generally accepted method of estimating the cost of equity (K_e) based on the formula shown in Figure 4. It is the preferred method of estimating the cost of equity by many analysts *(it is recommended by Ibbotson Associates in their SBBI publication*). The CAPM method is much like the risk premium method, however the risk premium is adjusted by beta before it is added to the appropriate risk level. The two elements of risk are a risk free rate, which is the price of time (the reward for postponing consumption and for not exposing funds to risk), and a risk premium, which is the additional compensation for assuming risk. The nominal risk free rate includes the real risk free rate and an inflation premium. The risk premium includes an interest rate risk, business risk, financial risk, and liquidity risk. All of these elements are accounted for when we calculate the cost of equity using the CAPM method.

$$K_e = R_f + \beta R_p$$

where

K_e = *Cost of equity*
R_f = *Risk free rate*
β = *Beta*
R_p = *Risk premium*

Figure 4

Our *ex post* CAPM calculations were based upon the long-term risk premium using the entire period data provided by Ibbotson Associates, which includes data from 1926 through 2002. The CAPM calculations, like the calculations for the risk premium method are more reliable when long-term rates are used. The short-term and medium-term indicators which rely on 30-day T-bills and 5-year T-bonds are not believed to be as reliable when appraising a property such as the typical interstate natural gas pipeline, which requires a long-term commitment of funds by the investor. This is particularly true under current market conditions of business and financial risk.

Our 'safe rates' for the CAPM calculations were derived as described in the risk premium method discussed earlier. Our beta estimate of 0.90 was based on observing the average, median, and market weighted average betas from each of the groups. The average and median betas are shown in Figure 5. Our risk premiums were derived from the 2003 edition of SBBI. Finally, we calculated a forward-looking (*ex ante*) CAPM indicator by deriving an expected risk premium from the S&P 500 companies. The *ex ante* CAPM

Group of Companies	Avg.	Med.
Value Line Betas		
VL Nat Gas (all)	0.90	0.75
VL Nat Gas (large)	1.07	0.90
Nat Gas PL Forum (pipes)	1.01	0.75

Figure 5 - Value Line Betas

indicator is a good check on the reliability of the standard CAPM because it is forward looking. All prospective investment in interstate natural gas pipeline companies is based on an expectation of future benefits. This is consistent with the fundamental principle underlying the income approach which is the principle of anticipation. In order to perform the *ex ante* CAPM indicator we derived the expected cost of equity for the companies making up the S&P 500 (which are expected to pay dividends). We developed the weighted average cost of capital (weighted by market value) for the S&P 500, which was 14.21%. We believe this market weighted average is appropriate because the monthly fundamental beta is estimated based upon the sensitivity of a company's stock price to the overall fluctuation in the Standard & Poor's 500 (S&P 500) Index Price (with the S&P 500 being the surrogate for the market in general). The market weighted average gives most weight to the highest market value stocks and is a very good indicator of the central tendency of the overall market cost of capital.

The general CAPM indicator, using the risk premium from *SBBI* published by Ibbotson Associates, Inc. and the pipeline industry beta of 0.90, indicates a cost of equity capital of approximately 11.35%. To help determine the reasonableness of the general historical or *ex post* indicator we also computed an *ex ante* or forward-looking CAPM indicator. The ex ante CAPM indication of the cost of equity was 13.29%.

Based upon the analysis presented and considering all the relevant facts we believe the appropriate cost of equity capital indicated by the CAPM method is **12.50%** as of January 1, 2003. This conclusion gives weight and consideration to all indicators, with slightly more weight to the ex ante indicator. A summary of the CAPM indicators and the supporting data begins on the following page.

Summary of CAPM Indicators

Item	Rates			CAPM Indicator
	Rf	Rp	Beta	
CAPM Indicator *				
Long-Term Gov't Bonds	5.05	7.00	0.90	**11.35**
S&P 500 Expected Equity Cost (Ex Ante) CAPM Indicator				**13.29**

CAPM Formula: Ke = Rf + B(Rp)
* CAPM Indicator is based upon a Value Line beta of 0.90. Ibbotson & Associates, 2003 SBBI & *Risk Premia over Time Report*; *Wall Street Journal*, January 6, 2003, & Federal Reserve data January 2, 2003.

Upon correlation of the CAPM indicators using long-term government bonds with the ex ante CAPM indicator the cost of equity capital by the capital asset pricing model is 12.75% for the Interstate Natural Gas Pipeline as of January 1, 2003.

Beginning on the following page are the *Value Line* betas for the various companies in the Natural Gas Diversified Industry (all), the Natural Gas Diversified Industry (large), and the Interstate Natural Gas Pipeline Forum (Pipes) groups.

Value Line Natural Gas Diversified Ind. (All) Beta
Beta (Value Line) - January 1, 2003

Company Name	Ticker	Beta
Cabot Oil & Gas 'A'	COG	1.00
Chesapeake Utilities Corp.	CPK	0.45
Delta Natural Gas	DGAS	0.50
Devon Energy	DVN	0.90
Dorchester Hugoton	DHULZ	0.55
Dynegy Inc. 'A'	DYN	2.65
Eastern Amern Nat Gas Tr	NGT	0.50
El Paso Corp.	EP	1.40
El Paso Energy Partners	EPN	0.70
Enterprise Products	EPD	0.70
EOG Resources	EOG	0.90
Equitable Resources	EQT	0.75
KCS Energy	KCS	1.20
Kinder Morgan	KMI	0.75
Kinder Morgan Energy	KMP	0.70
National Fuel Gas	NFG	0.75
Northern Border Partners LP	NBP	0.55
Ocean Energy	OEI	1.25
ONEOK Inc.	OKE	0.90
Patina Oil & Gas	POG	1.00
Penn Virginia Corp.	PVA	0.65
Petroleum Development Corp.	PETD	0.75
Plains Resources	PLX	0.80
Questar Corp.	STR	0.75
San Juan Basin Rlty.	SJT	0.60
Southwestern Energy	SWN	0.65
TEPPCO Partners L.P.	TPP	0.65
Trans Energy Inc	TSRG	
Universal Compression Holdings	UCO	1.00
Vintage Petroleum	VPI	1.20
Western Gas Res.	WGR	0.80
Williams Coal Sm Gs	WTU	0.55
Williams Cos.	WMB	2.15
XTO Energy	XTO	0.95
	Average	0.90
	Median	0.75

Source: Value Line CD Rom, January 2003.

VL Natural Gas Diversified Ind. (Large) Beta
Beta (Value Line) - January 1, 2003

Company Name	Ticker	Beta
Devon Energy	DVN	0.90
Dynegy Inc. 'A'	DYN	2.65
El Paso Corp.	EP	1.40
Enterprise Products	EPD	0.70
EOG Resources	EOG	0.90
Equitable Resources	EQT	0.75
Kinder Morgan	KMI	0.75
Kinder Morgan Energy	KMP	0.70
National Fuel Gas	NFG	0.75
Ocean Energy	OEI	1.25
ONEOK Inc.	OKE	0.90
Questar Corp.	STR	0.75
TEPPCO Partners L.P.	TPP	0.65
Vintage Petroleum	VPI	1.20
Western Gas Res.	WGR	0.80
Williams Cos.	WMB	2.15
XTO Energy	XTO	0.95
	Average	1.07
	Median	0.90

Interstate Nat. Gas PL Forum (Pipelines) Beta
Beta (Value Line) - January 1, 2003

Company Name	Ticker	Beta
El Paso Corp.	EP	1.40
Kinder Morgan Energy	KMP	0.70
Kinder Morgan	KMI	0.75
National Fuel Gas	NFG	0.75
Northern Border Partners LP	NBP	0.55
Questar Corp.	STR	0.75
Williams Cos.	WMB	2.15
	Average	1.01
	Median	0.75

Source: Value Line CD Rom, January 2003.

Ex Ante CAPM Indicator

Cost of Equity Indication Using Expected Risk Premium

Weighted Average Cost of Equity for S&P 500 = Market Required Cost of Equity

CAPM Calculations:

S&P 500 Expected Equity Cost (Wt. Avg)	14.21		**LT Gov't Bond Yield**		**Cost of Equity by CAPM**
Current Yield on L-T Gov't. Bonds	5.05				
Expected Equity Risk Premium	9.16				
Beta	0.90				
Adjusted Risk Premium	8.24	Plus	5.05	Equals	13.29

Note: Forward-looking CAPM (Ex Ante) uses the weighted average expected return on the S&P 500 as the expected market return. The current US Government bond yield is deducted from the weighted average expected return to obtain the expected risk premium. The current beta is applied to the expected risk premium and the result is added to the current US Government bond yield to obtain the indicated cost of equity by the CAPM method.

(Calculations for expected market return for S&P 500 can be found on following page.)

Source: Standard & Poor's Research Insight (January 2003)

Standard & Poor's Research Insight & I/B/E/S (S&P 500) - Jan. 1, 2003						
Company Name	Expected Dividend	Recent Price	Yield %	Growth Rate %	Equity Cost %	Market Value
3M CO	2.77	123.30	2.24	11.50	13.74	48,111
ABBOTT LABORATORIES	1.06	40.00	2.65	12.60	15.25	62,502
ACE LIMITED	0.75	29.34	2.56	13.75	16.31	7,706
ADOBE SYSTEMS INC.	0.06	24.80	0.23	15.00	15.23	5,860
AETNA INC	0.05	41.12	0.11	15.00	15.11	6,190
AFLAC INC	0.28	30.12	0.92	15.00	15.92	15,547
AIR PRODUCTS & CHEMICALS INC	0.92	42.75	2.15	9.50	11.65	9,714
ALBERTO-CULVER CO -CL B	0.40	50.40	0.79	11.00	11.79	2,899
ALBERTSONS INC	0.84	22.26	3.76	10.00	13.76	8,440
ALCOA INC	0.69	22.78	3.03	15.00	18.03	19,232
ALLEGHENY ENERGY INC	1.81	7.56	23.89	5.00	28.89	950
ALLEGHENY TECHNOLOGIES INC	0.26	6.23	4.10	6.50	10.60	502
ALLERGAN INC	0.44	57.62	0.77	22.50	23.27	7,458
ALLSTATE CORP	0.92	36.99	2.50	10.00	12.50	26,002
ALLTEL CORP	1.51	51.00	2.96	8.00	10.96	15,863
AMBAC FINANCIAL GP	0.46	56.24	0.81	14.00	14.81	5,960
AMERADA HESS CORP	1.30	55.05	2.36	8.40	10.76	4,911
AMEREN CORP	2.62	41.57	6.29	3.00	9.29	6,386
AMERICAN ELECTRIC POWER	2.50	27.33	9.13	4.00	13.13	9,260
AMERICAN EXPRESS	0.36	35.35	1.01	12.00	13.01	46,461
AMERICAN INTERNATIONAL GROUP	0.21	57.85	0.37	14.00	14.37	150,907
AMERISOURCEBERGEN CORP	0.12	54.31	0.22	20.00	20.22	5,808
AMSOUTH BANCORPORATION	1.00	19.20	5.22	9.00	14.22	6,824
ANADARKO PETROLEUM CORP	0.46	47.90	0.96	15.00	15.96	11,909
ANHEUSER-BUSCH COS INC	0.87	48.40	1.80	12.00	13.80	41,426
AON CORP	0.67	18.89	3.56	12.00	15.56	5,856
APACHE CORP	0.42	56.99	0.74	5.75	6.49	8,205
APPLERA CORP APPLIED BIOSYS	0.20	17.54	1.11	15.00	16.11	3,670
ARCHER-DANIELS-MIDLAND CO	0.26	12.40	2.11	9.00	11.11	8,020
ASHLAND INC	1.18	28.53	4.15	7.60	11.75	1,947
AT&T CORP	0.88	26.11	3.38	17.50	20.88	20,115
AUTODESK INC	0.13	14.30	0.94	12.50	13.44	1,622
AUTOMATIC DATA PROCESSING	0.55	39.25	1.39	14.00	15.39	23,506
AVERY DENNISON CORP	1.61	61.08	2.64	12.00	14.64	6,707
AVON PRODUCTS	0.90	53.87	1.66	12.00	13.66	12,672
BAKER-HUGHES INC	0.53	32.19	1.64	15.00	16.64	10,806
BALL CORP	0.40	51.19	0.77	10.00	10.77	2,909
BANK OF AMERICA CORP	2.82	69.57	4.05	10.00	14.05	104,125
BANK OF NEW YORK CO INC	0.86	23.96	3.58	13.00	16.58	17,402
BANK ONE CORP	0.92	36.55	2.53	10.00	12.53	42,566
BARD (C.R.) INC	0.99	58.00	1.70	12.00	13.70	2,998
BAUSCH & LOMB INC	0.58	36.00	1.60	11.00	12.60	1,942
BAXTER INTERNATIONAL INC	0.67	28.00	2.39	15.00	17.39	16,612
BB&T CORP	1.28	36.99	3.47	10.50	13.97	17,702
BEAR STEARNS COMPANIES INC	0.76	59.40	1.28	12.00	13.28	5,711
BECTON DICKINSON & CO	0.44	30.69	1.43	10.00	11.43	7,812
BELLSOUTH CORP	0.84	25.87	3.23	4.60	7.83	48,081
BEMIS CO	1.14	49.63	2.31	10.00	12.31	2,628
BIOMET INC	0.12	28.66	0.40	15.00	15.40	7,445

Standard & Poor's Research Insight & I/B/E/S (S&P 500) - Jan. 1, 2003						
Company Name	Expected Dividend	Recent Price	Yield %	Growth Rate %	Equity Cost %	Market Value
BLACK & DECKER CORP	0.55	42.89	1.29	15.00	16.29	3,455
BLOCK H & R INC	0.83	40.20	2.06	15.00	17.06	7,182
BOEING CO	0.78	32.99	2.37	15.00	17.37	26,370
BOISE CASCADE CORP	0.64	25.22	2.55	7.00	9.55	1,596
BRISTOL MYERS SQUIBB	1.22	23.15	5.27	9.00	14.27	44,843
BROWN-FORMAN -CL B	1.62	65.36	2.48	8.15	10.63	4,519
BRUNSWICK CORP	0.55	19.86	2.77	10.00	12.77	1,790
BURLINGTON NORTHERN SANTA FE	0.52	26.01	2.01	9.00	11.01	9,818
BURLINGTON RESOURCES INC	0.62	42.65	1.44	12.00	13.44	8,587
CAMPBELL SOUP CO	0.67	23.47	2.87	7.00	9.87	9,633
CAPITAL ONE FINL CORP	0.13	29.72	0.43	20.00	20.43	6,594
CARDINAL HEALTH INC	0.12	59.19	0.20	20.00	20.20	26,196
CARNIVAL CORP	0.47	24.95	1.90	13.00	14.90	14,640
CATERPILLAR INC	1.57	45.72	3.43	12.00	15.43	15,736
CENTERPOINT ENERGY INC	0.68	8.50	7.98	6.00	13.98	2,587
CENTEX CORP	0.18	50.20	0.37	15.00	15.37	3,093
CENTURYTEL INC	0.24	29.38	0.80	12.00	12.80	4,190
CHARTER ONE FINL INC	0.99	28.73	3.43	12.00	15.43	6,493
CHEVRONTEXACO CORP	3.01	66.48	4.52	7.40	11.92	71,011
CHUBB CORP	1.57	52.20	3.00	12.00	15.00	8,929
CIGNA CORP	1.50	41.12	3.65	13.60	17.25	5,732
CINCINNATI FINANCIAL CORP	0.98	37.55	2.61	10.00	12.61	6,064
CINERGY CORP	1.89	33.72	5.60	5.00	10.60	5,634
CINTAS CORP	0.30	45.75	0.64	18.00	18.64	7,784
CIRCUIT CITY STORES INC	0.08	7.42	1.08	15.00	16.08	1,559
CITIGROUP INC	0.82	35.19	2.34	14.50	16.84	177,948
CLOROX CO/DE	0.97	41.25	2.35	10.00	12.35	9,076
CMS ENERGY CORP	0.75	9.44	7.93	4.00	11.93	1,360
COCA-COLA CO	0.89	43.84	2.03	11.00	13.03	108,684
COCA-COLA ENTERPRISES	0.18	21.72	0.83	12.00	12.83	9,760
COLGATE-PALMOLIVE CO	0.81	52.43	1.54	12.00	13.54	28,221
COMERICA INC.	2.11	43.24	4.88	10.00	14.88	7,555
COMPUTER ASSOCIATES INTL INC	0.09	13.50	0.68	15.00	15.68	7,739
CONAGRA FOODS INC	1.08	25.01	4.31	9.00	13.31	13,430
CONOCOPHILLIPS	1.73	48.39	3.57	8.00	11.57	32,752
CONSOLIDATED EDISON INC	2.31	42.82	5.39	4.00	9.39	9,489
CONSTELLATION ENERGY GRP INC	1.03	27.82	3.69	7.00	10.69	4,583
COOPER INDUSTRIES LTD	1.55	36.45	4.26	11.00	15.26	3,359
COOPER TIRE & RUBBER	0.47	15.34	3.07	12.00	15.07	1,128
COORS (ADOLPH) -CL B	0.90	61.25	1.47	10.00	11.47	2,146
COUNTRYWIDE FINANCIAL CORP	0.54	51.65	1.05	13.00	14.05	6,528
CRANE CO	0.43	19.93	2.17	8.00	10.17	1,187
CSX CORP	0.45	28.31	1.58	12.00	13.58	6,031
CUMMINS INC	1.30	28.13	4.61	8.00	12.61	1,167
CVS CORP	0.26	24.97	1.04	12.50	13.54	9,812
DANA CORP	0.04	11.76	0.37	10.00	10.37	1,747
DANAHER CORP	0.12	65.70	0.18	15.00	15.18	10,013
DARDEN RESTAURANTS INC	0.09	20.45	0.45	15.00	15.45	3,495
DEERE & CO	0.97	45.85	2.11	10.00	12.11	10,940

Standard & Poor's Research Insight & I/B/E/S (S&P 500) - Jan. 1, 2003						
Company Name	Expected Dividend	Recent Price	Yield %	Growth Rate %	Equity Cost %	Market Value
DELPHI CORP	0.31	8.05	3.83	10.00	13.83	4,495
DELTA AIR LINES INC	0.11	12.10	0.88	7.00	7.88	1,493
DEVON ENERGY CORP	0.22	45.90	0.48	11.00	11.48	7,206
DILLARDS INC -CL A	0.17	15.86	1.09	8.00	9.09	1,279
DISNEY (WALT) CO	0.24	16.31	1.45	13.00	14.45	33,308
DOLLAR GENERAL CORP	0.15	11.95	1.23	15.10	16.33	3,983
DOMINION RESOURCES INC	2.76	54.90	5.03	7.00	12.03	16,866
DONNELLEY (R R) & SONS CO	1.09	21.77	5.01	9.00	14.01	2,467
DOVER CORP	0.61	29.16	2.09	13.00	15.09	5,900
DOW CHEMICAL	1.46	29.70	4.92	9.00	13.92	27,060
DOW JONES & CO INC	1.11	43.23	2.57	11.00	13.57	3,545
DTE ENERGY CO	2.20	46.40	4.75	7.00	11.75	12,314
DU PONT (E I) DE NEMOURS	1.53	42.40	3.60	9.00	12.60	42,124
DUKE ENERGY CORP	1.18	19.54	6.05	7.50	13.55	17,915
EASTMAN CHEMICAL CO	1.89	36.77	5.15	7.50	12.65	2,843
EASTMAN KODAK CO	1.92	35.04	5.47	6.50	11.97	10,224
EATON CORP	1.94	78.11	2.48	10.00	12.48	5,616
ECOLAB INC	0.66	49.50	1.32	13.00	14.32	6,414
EL PASO CORP	0.96	6.96	13.75	10.00	23.75	4,169
ELECTRONIC DATA SYSTEMS CORP	0.67	18.43	3.65	12.00	15.65	8,780
EMERSON ELECTRIC CO	1.74	50.85	3.43	11.00	14.43	21,400
ENGELHARD CORP	0.44	22.35	1.97	10.00	11.97	2,856
ENTERGY CORP	1.51	45.59	3.32	8.00	11.32	10,122
EOG RESOURCES INC	0.17	39.92	0.43	7.50	7.93	4,612
EQUIFAX INC	0.09	23.14	0.39	12.00	12.39	3,292
EQUITY OFFICE PROPERTIES TR	2.01	24.98	8.04	0.40	8.44	10,284
EXELON CORP	1.87	52.77	3.54	6.00	9.54	17,044
EXXON MOBIL CORP	0.99	34.94	2.83	7.50	10.33	235,108
FAMILY DOLLAR STORES	0.31	31.21	0.98	18.00	18.98	5,396
FANNIE MAE	1.50	64.33	2.34	14.00	16.34	64,060
FED HOME LOAN MORTG CORP	1.00	59.05	1.70	14.00	15.70	40,976
FEDEX CORP	0.23	54.22	0.42	13.00	13.42	16,168
FIFTH THIRD BANCORP	1.19	58.55	2.02	14.00	16.02	33,829
FIRST DATA CORP	0.09	35.41	0.26	15.00	15.26	26,633
FIRST TENNESSEE NATL CORP	1.32	35.94	3.67	10.00	13.67	4,513
FIRSTENERGY CORP	1.61	32.97	4.87	7.00	11.87	9,813
FLEETBOSTON FINANCIAL CORP	1.54	24.30	6.34	10.00	16.34	25,505
FLUOR CORP	0.72	28.00	2.56	12.00	14.56	2,250
FORD MOTOR CO	0.42	9.30	4.52	5.00	9.52	16,408
FORTUNE BRANDS INC	1.20	46.51	2.59	11.50	14.09	6,942
FPL GROUP INC	2.46	60.13	4.09	6.00	10.09	10,975
FRANKLIN RESOURCES INC	0.34	34.08	1.01	14.50	15.51	8,789
GANNETT CO	1.06	71.80	1.47	10.00	11.47	19,190
GAP INC	0.10	15.52	0.66	15.00	15.66	13,718
GENERAL DYNAMICS CORP	1.34	79.37	1.69	12.00	13.69	15,948
GENERAL ELECTRIC CO	0.86	24.35	3.54	13.50	17.04	242,270
GENERAL MILLS INC	1.21	46.95	2.59	10.40	12.99	17,273
GENERAL MOTORS CORP	2.10	36.86	5.70	5.00	10.70	20,658
GENUINE PARTS CO	1.25	30.80	4.07	8.00	12.07	5,379

Standard & Poor's Research Insight & I/B/E/S (S&P 500) - Jan. 1, 2003						
Company Name	Expected Dividend	Recent Price	Yield %	Growth Rate %	Equity Cost %	Market Value
GEORGIA-PACIFIC CORP	0.53	16.16	3.28	6.00	9.28	4,041
GILLETTE CO	0.71	30.36	2.36	10.00	12.36	32,060
GOLDEN WEST FINANCIAL CORP	0.38	71.81	0.53	12.00	12.53	11,020
GOLDMAN SACHS GROUP INC	0.54	68.10	0.80	13.00	13.80	32,266
GOODRICH CORP	0.89	18.32	4.85	11.00	15.85	2,109
GOODYEAR TIRE & RUBBER CO	0.51	6.81	7.44	5.50	12.94	1,194
GRAINGER (W W) INC	0.81	51.55	1.56	12.00	13.56	4,714
GREAT LAKES CHEMICAL CORP	0.39	23.88	1.63	8.00	9.63	1,199
HALLIBURTON CO	0.57	18.71	3.07	15.00	18.07	8,165
HANCOCK JOHN FINL SVCS INC	0.36	27.90	1.28	12.00	13.28	8,038
HARLEY-DAVIDSON INC	0.17	46.20	0.36	18.00	18.36	13,982
HARTFORD FINL SVCS GRP INC	1.21	45.43	2.66	12.00	14.66	11,592
HASBRO INC	0.13	11.55	1.15	11.00	12.15	2,000
HCA INC	0.09	41.50	0.22	15.00	15.22	21,256
HEALTH MANAGEMENT ASSOC	0.09	17.90	0.51	15.00	15.51	4,272
HEINZ (H J) CO	1.75	32.87	5.32	8.00	13.32	11,550
HERSHEY FOODS CORP	1.44	67.44	2.14	10.00	12.14	7,130
HEWLETT-PACKARD CO	0.35	17.36	2.03	10.00	12.03	52,973
HILTON HOTELS CORP	0.09	12.71	0.72	15.00	15.72	4,783
HOME DEPOT INC	0.28	24.02	1.15	15.00	16.15	55,865
HONEYWELL INTERNATIONAL INC	0.86	24.00	3.59	15.00	18.59	19,705
HOUSEHOLD INTERNATIONAL INC	1.14	27.81	4.10	14.00	18.10	13,169
HUNTINGTON BANCSHARES	0.69	18.71	3.69	8.00	11.69	4,407
ILLINOIS TOOL WORKS	1.05	64.86	1.62	14.50	16.12	19,875
IMS HEALTH INC	0.09	16.00	0.57	14.00	14.57	4,495
INGERSOLL-RAND CO LTD	0.76	43.06	1.77	12.00	13.77	7,285
INTEL CORP	0.09	15.57	0.60	17.00	17.60	103,836
INTERPUBLIC GROUP OF COS	0.43	14.08	3.05	13.00	16.05	5,430
INTL BUSINESS MACHINES CORP	0.66	77.50	0.85	10.00	10.85	130,982
INTL FLAVORS & FRAGRANCES	0.67	35.10	1.90	11.00	12.90	3,311
INTL PAPER CO	1.07	34.97	3.06	7.00	10.06	16,774
ITT INDUSTRIES INC	0.67	60.69	1.11	12.00	13.11	5,572
J P MORGAN CHASE & CO	1.51	24.00	6.29	11.00	17.29	47,916
JANUS CAPITAL GROUP INC	0.04	13.07	0.34	12.25	12.59	2,908
JEFFERSON-PILOT CORP	1.33	38.11	3.49	10.00	13.49	5,468
JOHNSON & JOHNSON	0.94	53.71	1.74	14.25	15.99	159,550
JOHNSON CONTROLS INC	1.63	80.17	2.04	13.50	15.54	7,132
KB HOME	0.34	42.85	0.78	12.00	12.78	2,052
KELLOGG CO	1.10	34.27	3.21	9.00	12.21	13,991
KERR-MCGEE CORP	1.94	44.30	4.39	8.00	12.39	4,447
KEYCORP	1.30	25.14	5.16	8.00	13.16	10,682
KEYSPAN CORP	1.92	35.24	5.46	8.00	13.46	5,005
KIMBERLY-CLARK CORP	1.31	47.47	2.76	9.00	11.76	24,416
KINDER MORGAN INC	0.48	42.27	1.14	20.00	21.14	5,145
KNIGHT-RIDDER INC	1.19	63.25	1.87	9.75	11.62	5,209
LEGGETT & PLATT INC	0.60	22.44	2.66	15.00	17.66	4,367
LEHMAN BROTHERS HOLDINGS INC	0.40	53.29	0.76	12.00	12.76	12,653
LILLY (ELI) & CO	1.38	63.50	2.17	11.00	13.17	71,334
LIMITED BRANDS INC	0.34	13.93	2.46	14.00	16.46	7,287

Standard & Poor's Research Insight & I/B/E/S (S&P 500) - Jan. 1, 2003						
Company Name	Expected Dividend	Recent Price	Yield %	Growth Rate %	Equity Cost %	Market Value
LINCOLN NATIONAL CORP	1.43	31.58	4.54	12.00	16.54	5,591
LINEAR TECHNOLOGY CORP	0.25	25.72	0.97	25.00	25.97	8,024
LIZ CLAIBORNE INC	0.25	29.65	0.85	12.00	12.85	3,168
LOCKHEED MARTIN CORP	0.48	57.75	0.84	10.00	10.84	26,339
LOEWS CORP	0.64	44.46	1.44	7.00	8.44	8,245
LOWES COS	0.10	37.50	0.26	20.00	20.26	29,285
MARATHON OIL CORP	1.00	21.29	4.69	8.60	13.29	6,597
MARRIOTT INTL INC	0.32	32.87	0.98	15.00	15.98	7,816
MARSH & MCLENNAN COS	1.27	46.21	2.74	13.00	15.74	24,818
MARSHALL & ILSLEY CORP	0.70	27.38	2.57	10.00	12.57	5,978
MASCO CORP	0.64	21.05	3.06	15.00	18.06	10,357
MATTEL INC	0.06	19.15	0.29	12.25	12.54	8,373
MAXIM INTEGRATED PRODUCTS	0.10	33.04	0.30	25.00	25.30	10,585
MAY DEPARTMENT STORES CO	1.03	22.98	4.50	8.80	13.30	6,624
MAYTAG CORP	0.81	28.50	2.84	12.50	15.34	2,224
MBIA INC	0.77	43.86	1.75	13.00	14.75	6,365
MBNA CORP	0.32	19.02	1.69	15.00	16.69	24,301
MCDONALDS CORP	0.26	16.08	1.61	10.00	11.61	20,411
MCGRAW-HILL COMPANIES	1.14	60.44	1.89	12.00	13.89	11,713
MCKESSON CORP	0.29	27.03	1.07	20.00	21.07	7,869
MEDTRONIC INC	0.29	45.60	0.64	16.00	16.64	55,637
MELLON FINANCIAL CORP	0.58	26.11	2.23	12.00	14.23	11,252
MERCK & CO	1.57	56.61	2.77	9.00	11.77	127,121
MEREDITH CORP	0.40	41.11	0.97	10.75	11.72	2,039
MERRILL LYNCH & CO	0.72	37.95	1.91	13.00	14.91	32,806
METLIFE INC	0.24	27.04	0.87	12.00	12.87	18,936
MGIC INVESTMENT CORP/WI	0.11	41.30	0.27	10.50	10.77	4,150
MOLEX INC	0.12	23.04	0.50	15.00	15.50	4,136
MONSANTO CO	0.53	19.25	2.74	10.00	12.74	5,032
MOODYS CORP	0.21	41.29	0.50	15.00	15.50	6,239
MORGAN STANLEY	1.04	39.92	2.60	13.00	15.60	43,338
MOTOROLA INC	0.18	8.65	2.07	12.00	14.07	19,903
NATIONAL CITY CORP	1.32	27.32	4.82	8.00	12.82	16,717
NEW YORK TIMES CO -CL A	0.60	45.73	1.32	12.00	13.32	6,926
NEWELL RUBBERMAID INC	0.94	30.33	3.10	12.00	15.10	8,109
NEWMONT MINING CORP	0.23	29.03	0.79	20.00	20.79	10,229
NICOR INC	1.94	34.03	5.70	5.50	11.20	1,498
NIKE INC -CL B	0.64	44.47	1.44	14.25	15.69	7,435
NISOURCE INC	1.22	20.00	6.09	5.00	11.09	5,376
NORDSTROM INC	0.44	18.97	2.32	10.00	12.32	2,569
NORFOLK SOUTHERN CORP	0.30	19.99	1.51	8.00	9.51	7,758
NORTH FORK BANCORPORATION	1.12	33.74	3.31	11.60	14.91	5,449
NORTHERN TRUST CORP	0.77	35.05	2.19	13.00	15.19	7,743
NORTHROP GRUMMAN CORP	1.76	97.00	1.81	10.00	11.81	17,706
NUCOR CORP	0.87	41.30	2.12	15.00	17.12	3,229
OCCIDENTAL PETROLEUM CORP	1.09	28.45	3.84	9.30	13.14	10,724
OMNICOM GROUP	0.92	64.60	1.42	15.00	16.42	12,149
PACCAR INC	0.86	46.13	1.87	8.00	9.87	5,346
PALL CORP	0.40	16.68	2.42	12.00	14.42	2,051

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Company Name	Expected Dividend	Recent Price	Yield %	Growth Rate %	Equity Cost %	Market Value
PARKER-HANNIFIN CORP	0.81	46.13	1.75	12.00	13.75	5,445
PAYCHEX INC	0.52	27.90	1.86	18.00	19.86	10,499
PENNEY (J C) CO	0.54	23.01	2.35	8.00	10.35	6,174
PEOPLES ENERGY CORP	2.19	38.65	5.66	5.25	10.91	1,375
PEPSI BOTTLING GROUP INC	0.05	25.70	0.18	15.00	15.18	7,208
PEPSICO INC	0.67	42.22	1.59	12.00	13.59	72,916
PERKINELMER INC	0.32	8.25	3.90	15.00	18.90	1,042
PFIZER INC	0.60	30.57	1.97	16.00	17.97	188,377
PHARMACIA CORP	0.62	41.80	1.49	15.00	16.49	54,044
PHILIP MORRIS COS INC	2.82	40.53	6.95	10.00	16.95	83,842
PINNACLE WEST CAPITAL	1.80	34.09	5.29	6.00	11.29	3,082
PITNEY BOWES INC	1.30	32.66	3.97	10.00	13.97	7,725
PLUM CREEK TIMBER CO INC	1.47	23.60	6.23	5.00	11.23	4,363
PNC FINANCIAL SVCS GROUP INC	2.08	41.90	4.97	8.50	13.47	11,909
PPG INDUSTRIES INC	1.86	50.15	3.70	8.00	11.70	8,497
PPL CORP	1.53	34.68	4.40	6.00	10.40	5,617
PRAXAIR INC	0.84	57.77	1.45	10.00	11.45	9,342
PRICE (T. ROWE) GROUP	0.76	27.28	2.79	12.00	14.79	3,339
PRINCIPAL FINANCIAL GRP INC	0.28	30.13	0.93	12.00	12.93	10,151
PROCTER & GAMBLE CO	1.80	85.94	2.10	10.00	12.10	111,662
PROGRESS ENERGY INC	2.31	43.35	5.33	6.00	11.33	10,282
PROGRESSIVE CORP-OHIO	0.11	49.63	0.23	14.00	14.23	10,808
PRUDENTIAL FINANCIAL INC	0.44	31.74	1.39	10.00	11.39	17,969
PUBLIC SERVICE ENTRP	2.29	32.10	7.13	6.00	13.13	7,212
PULTE HOMES INC	0.18	47.87	0.37	11.40	11.77	2,930
RADIOSHACK CORP	0.25	18.74	1.33	13.00	14.33	3,156
RAYTHEON CO	0.90	30.75	2.91	12.00	14.91	12,481
REGIONS FINL CORP	1.25	33.36	3.76	8.00	11.76	7,377
RJ REYNOLDS TOBACCO HLDGS	4.07	42.11	9.66	7.00	16.66	3,714
ROCKWELL AUTOMATION	0.73	20.71	3.54	11.00	14.54	3,850
ROCKWELL COLLINS INC	0.40	23.26	1.73	12.00	13.73	4,193
ROHM & HAAS CO	0.92	32.48	2.84	10.00	12.84	7,181
RYDER SYSTEM INC	0.65	22.44	2.91	9.00	11.91	1,400
SAFECO CORP	0.81	34.67	2.35	10.00	12.35	4,744
SARA LEE CORP	0.67	22.51	2.97	7.90	10.87	17,551
SBC COMMUNICATIONS INC	1.13	27.11	4.18	5.00	9.18	90,011
SCHERING-PLOUGH	0.73	22.20	3.31	8.00	11.31	32,559
SCHLUMBERGER LTD	0.86	42.09	2.05	15.00	17.05	24,440
SCHWAB (CHARLES) CORP	0.05	10.85	0.47	16.50	16.97	14,579
SCIENTIFIC-ATLANTA INC	0.04	11.86	0.37	10.00	10.37	1,830
SEARS ROEBUCK & CO	1.01	23.95	4.21	9.50	13.71	7,576
SEMPRA ENERGY	1.08	23.65	4.57	8.00	12.57	4,845
SHERWIN-WILLIAMS CO	0.66	28.25	2.34	10.20	12.54	4,234
SIGMA-ALDRICH	0.40	48.70	0.81	10.00	10.81	3,491
SLM CORP	1.14	103.86	1.10	14.00	15.10	15,947
SNAP-ON INC	1.10	28.11	3.91	10.00	13.91	1,642
SOUTHERN CO	1.44	28.39	5.07	5.00	10.07	19,965
SOUTHTRUST CORP	0.75	24.85	3.04	11.00	14.04	8,619
SOUTHWEST AIRLINES	0.02	13.90	0.15	14.00	14.15	10,768

Standard & Poor's Research Insight & I/B/E/S (S&P 500) - Jan. 1, 2003						
Company Name	Expected Dividend	Recent Price	Yield %	Growth Rate %	Equity Cost %	Market Value
SPRINT FON GROUP	0.52	14.48	3.57	3.40	6.97	13,392
ST PAUL COS	1.28	34.05	3.75	10.00	13.75	7,712
STANLEY WORKS	1.15	34.58	3.32	12.50	15.82	3,052
STARW'D HOTELS&RESORTS WRL	0.97	23.74	4.07	15.00	19.07	4,735
STATE STREET CORP	0.60	39.00	1.53	14.50	16.03	12,650
STRYKER CORP	0.14	67.12	0.21	20.00	20.21	13,287
SUNOCO INC	1.07	33.18	3.22	7.00	10.22	2,533
SUNTRUST BANKS INC	1.87	56.92	3.29	9.00	12.29	16,145
SUPERVALU INC	0.61	16.51	3.71	7.50	11.21	2,207
SYMBOL TECHNOLOGIES	0.02	8.22	0.29	20.00	20.29	1,969
SYNOVUS FINANCIAL CP	0.68	19.40	3.50	15.00	18.50	5,750
SYSCO CORP	0.51	29.79	1.70	15.00	16.70	19,566
TARGET CORP	0.28	30.00	0.92	15.00	15.92	27,263
TECO ENERGY INC	1.49	15.47	9.64	5.00	14.64	2,717
TEMPLE-INLAND INC	1.37	44.81	3.06	7.00	10.06	2,407
TEXAS INSTRUMENTS INC	0.10	15.01	0.68	20.00	20.68	26,016
TEXTRON INC	1.46	42.99	3.39	12.00	15.39	5,910
TIFFANY & CO	0.19	23.91	0.79	18.00	18.79	3,471
TJX COMPANIES INC	0.14	19.52	0.71	15.00	15.71	10,255
TORCHMARK CORP	0.40	36.53	1.08	10.00	11.08	4,326
TRIBUNE CO	0.50	45.46	1.09	12.75	13.84	13,856
TUPPERWARE CORP	0.97	15.08	6.42	10.00	16.42	880
TXU CORP	0.54	18.68	2.88	7.50	10.38	5,933
TYCO INTERNATIONAL LTD	0.06	17.08	0.34	15.00	15.34	34,090
U S BANCORP	0.86	21.22	4.04	10.00	14.04	40,648
UNION PACIFIC CORP	1.02	59.87	1.71	11.00	12.71	15,164
UNION PLANTERS CORP	1.45	28.14	5.17	9.00	14.17	5,575
UNITED PARCEL SERVICE INC	0.87	63.08	1.37	14.00	15.37	29,673
UNITED STATES STEEL CORP	0.22	13.12	1.65	8.00	9.65	1,342
UNITED TECHNOLOGIES CORP	1.09	61.94	1.76	11.30	13.06	29,339
UNITEDHEALTH GROUP INC	0.04	83.50	0.04	17.50	17.54	25,422
UNOCAL CORP	0.87	30.58	2.85	9.00	11.85	7,886
UNUMPROVIDENT CORP	0.65	17.54	3.70	10.00	13.70	4,236
UST INC	2.04	33.43	6.09	6.00	12.09	5,647
VERIZON COMMUNICATIONS	1.62	38.75	4.19	5.40	9.59	106,626
VF CORP	1.09	36.05	3.02	9.00	12.02	3,917
VISTEON CORP	0.25	6.96	3.66	6.00	9.66	905
VULCAN MATERIALS CO	1.05	37.50	2.81	12.00	14.81	3,807
WACHOVIA CORP	1.14	36.44	3.14	10.00	13.14	49,570
WAL-MART STORES	0.34	50.51	0.68	14.00	14.68	222,949
WALGREEN CO	0.18	29.19	0.60	17.00	17.60	29,917
WASHINGTON MUTUAL INC	1.25	34.53	3.63	12.00	15.63	32,654
WASTE MANAGEMENT INC	0.01	22.92	0.05	15.00	15.05	13,951
WELLS FARGO & CO	1.25	46.87	2.68	12.00	14.68	79,299
WENDY'S INTERNATIONAL INC	0.27	27.07	1.01	13.50	14.51	3,124
WEYERHAEUSER CO	1.71	49.21	3.48	7.00	10.48	10,774
WHIRLPOOL CORP	1.48	52.22	2.83	8.50	11.33	3,561
WILLIAMS COS INC	0.04	2.70	1.66	12.00	13.66	1,395
WINN-DIXIE STORES INC	0.22	15.28	1.44	10.00	11.44	2,151

Standard & Poor's Research Insight & I/B/E/S (S&P 500) - Jan. 1, 2003						
Company Name	Expected Dividend	Recent Price	Yield %	Growth Rate %	Equity Cost %	Market Value
WORTHINGTON INDUSTRIES	0.71	15.24	4.64	10.50	15.14	1,307
WRIGLEY (WM) JR CO	0.91	54.88	1.66	11.00	12.66	12,350
WYETH	1.03	37.40	2.76	12.00	14.76	49,585
XCEL ENERGY INC	0.80	11.00	7.30	7.00	14.30	4,389
XL CAPITAL LTD	2.11	77.25	2.74	12.50	15.24	10,494
ZIONS BANCORPORATION	0.90	39.35	2.28	12.00	14.28	3,573
Avg Weighted by: Market Value-Mnthly					14.21	

Flotation Cost Adjustment

Flotation costs are the costs associated with issuing debt and equity. They are made up of several types of costs including underwriter's fees, legal expenses, cost of preparing the prospectus, etc. Flotation costs can be accounted for either by amortizing the cost (reducing the cash flow to discount), or by including them in the cost of capital. Many studies have been made regarding the amount of flotation costs for debt and equity capital.[27]

An adjustment for flotation cost must be made even if the issuing company has no plans to ever issue any additional securities. The following illustration is quoted by Roger A. Morin, PhD, *Regulatory Finance: Utilities' Cost of Capital*, (Arlington, VA: Public Utilities Reports, Inc., 1994), p. 170.] and fully addresses this issue.

> Brigham, Aberwald, and Gapenski (1985) performed an excellent analysis regarding the need for a flotation cost adjustment. The following illustration adapted from Brigham, Aberwald, and Gapenski (1985) shows that: (1) even if no further stock issues are contemplated, the flotation adjustment is still permanently required to keep shareholders whole, and (2) flotation costs are only recovered if the rate of return is applied to total equity, including retained earnings, in all future years, even if no future financing is contemplated.
>
> The flotation cost adjustment process is shown here in Tables 1 through 3 using illustrative market data.
>
> The assumptions used in the computation are shown in Table 1. The stock is selling in the market for $25, and investors expect the firm to pay a dividend of $2.25, which will grow at a rate of 5% thereafter. The traditional DCF cost of equity is thus k = D/P + g = 2.25/25 +.05 = 14%, or $3.50 in the first year. Nine percent of the 14%, or $2.25, will come from dividends, so that the remaining 5%, or $1.25, must then come from capital gains. To get a capital gain of $1.25 from $1.188 of retained earnings, the earnings retained must clearly earn more than 14%. Therefore, if the firm sells me a share of stock incurring a flotation cost of 5%, the traditional DCF cost of equity adjusted for flotation cost is thus ROE = D/P(1-f) + g =.09 /.95 +.05 = 14.47%

[27] See Brigham and Gapenski, *Financial Management Theory and Practice*, 7th ed., (Dryden Press: New York), 869., Richard H. Pettway, "A Note on the Flotation Costs of New Equity Capital Issues of Electric Companies," *Public Utilities Fortnightly*, March 18, 1982, and Jay R. Ritter, "The Costs of Going Public," *Journal of Financial Economics*, December 1987.

Table 1

ASSUMPTIONS

Issue Price =	$25.00
Flotation Cost =	5.00%
Dividend Yield =	9.00%
Growth =	5.00%
Equity Return =	14.00
Allowed Return on Equity	14.47%

Table 2

Year	Com Stock Book Val (1)	Retained Earnings (2)	Total Equity (3)	Stock Price (4)	M/B Ratio (5)	EPS (6)	DPS (7)	Payout (8)
1	$23.75	$0.00	$23.75	$25.00	1.0526	$3.44	$2.25	65.45%
2	23.75	1.19	24.94	26.25	1.0526	3.61	2.36	65.45%
3	23.75	2.43	26.18	27.56	1.0526	3.79	2.48	65.45%
4	23.75	3.74	27.49	28.94	1.0526	3.98	2.60	65.45%
5	23.75	5.12	28.87	30.39	1.0526	4.18	2.73	65.45%
6	23.75	6.56	30.31	31.91	1.0526	4.39	2.87	65.45%
7	23.75	8.08	31.83	33.50	1.0526	4.61	3.02	65.45%
8	23.75	9.67	33.42	35.18	1.0526	4.84	3.17	65.45%
9	23.75	11.34	35.09	36.94	1.0526	5.08	3.32	65.45%
10	23.75	13.09	36.84	38.78	1.0526	5.33	3.49	65.45%
		Growth(%) =	**5.00**	**5.00**		**5.00**	**5.00**	

Table 2 above demonstrates that only if the company is allowed to earn 14.47% on total equity (Column 3) will investors earn their cost of equity of 14%. Column 1 shows the initial common stock account, while Column 2 shows the cumulative retained earnings balance, starting at zero, and steadily increasing from the retention of earnings. Total equity in Column 3 is the sum of common stock capital and retained earnings. The stock price in Column 4 is obtained from the seminal DCF formula: D /(k - g). Earnings per share in Column 6 is simply the allowed return of **14.47%** times the total common equity base. Dividends start at $2.25 and grow at 5% thereafter, which they must do if investors are to earn a 14% return. The dividend payout ratio remains constant, as per the assumption of the DCF model. All quantities, stock price, book value, earnings, and dividends grow at a 5% rate.

Only if the company is allowed to earn 14.47% on equity do investors earn 14%. For example, if the company is allowed only 14%, the stock price drops from $26.25 to $26.13 in the second year, inflicting a loss on shareholders. This is shown in **Table 3**. The growth rate drops from 5% to 4.53%. Thus, investors only earn 9% + 4.53% = 13.53% on their investment. It is noteworthy that the

adjustment is always required each and every year, whether or not new stock issues are sold in the future, and that the allowed return on equity must be earned on total equity, including retained earnings, for investors to earn the cost of equity.[28]

Table 3

BOY Year	Com Stock Book Val	Retained Earnings	Total Equity	Stock Price	M/B Ratio	EPS	DPS	Payout
1	$23.75	$0.00	$23.75	$25.00	1.0526	$3.33	$2.25	67.67%
2	23.75	1.08	24.83	26.13	1.0526	3.48	2.35	67.67%
3	23.75	2.20	25.95	27.31	1.0526	3.63	2.46	67.67%
4	23.75	3.37	27.12	28.55	1.0526	3.80	2.57	67.67%
5	23.75	4.60	28.35	29.84	1.0526	3.97	2.69	67.67%
6	23.75	5.88	29.63	31.19	1.0526	4.15	2.81	67.67%
7	23.75	7.23	30.98	32.61	1.0526	4.34	2.93	67.67%
8	23.75	8.63	32.38	34.08	1.0526	4.53	3.07	67.67%
9	23.75	10.09	33.84	35.62	1.0526	4.74	3.21	67.67%
10	23.75	11.62	35.37	37.24	1.0526	4.95	3.35	67.67%
		Growth(%) =	**4.53**	**4.53**		**4.53**	**4.53**	

Additionally, Dr. Roger Ibbotson refers to flotation cost in his book, Stocks, Bonds, Bills and Inflation, when he discusses the cost of capital. He states the following:

> Although the cost of capital estimation techniques set forth later in this book are applicable to rate setting, certain adjustments may be necessary. One such adjustment is for flotation costs (amounts that must be paid to underwriters by the issuer to attract and retain capital).[29]

All of these studies essentially reach the conclusion that a flotation cost adjustment must be made when estimating the cost of capital. The flotation costs associated with debt for large issues conservatively are approximately 1%. For relatively large issues of equity, the flotation costs range from a low of 2% to as much as 6%.

The amount of flotation costs used in this cost of capital study are 1% for debt and 4.50% for equity. From information derived from *Public Utility Finance Tracker* we determined the average flotation cost associated with the issuance of long-term debt and common stock of natural gas and natural gas transmission companies. We found the average issuance cost of long-term debt to be 1.11% and the average issuance cost of common equity to be 4.58%. We believe that the typical flotation cost associated with the issuance of large

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[28] Roger A. Morin, PhD, *Regulatory Finance: Utilities' Cost of Capital*, (Arlington, VA: Public Utilities Reports, Inc., 1994), p. 170. (emphasis added)

[29] *Stocks, Bonds, Bills and Inflation: 1999 Yearbook, Valuation Edition* (Chicago: Ibbotson & Associates, Inc., 1999), p. 34.

amounts of securities would be slightly smaller than the flotation cost associated with the issuance of smaller amounts of securities. Therefore, we selected 1.00% and 4.50% to be representative of the typical flotation cost associated with the issuance of long-term debt and common stock securities respectively.

On the following pages are the schedules detailing the long-term debt and common stock flotation costs.

Debt Issuance Cost
Natural Gas/Transmission Utilities (1997 - 2002)

Company	Type of Utility	Issuance Date	Amount Offered ($000)	Price to Public ($/100)	Net Proceeds	Issuance Cost
Michigan Con Gas Company	Gas	14-May-97	15,000	100.000	96.8683	3.23%
Michigan Con Gas Company	Gas	15-May-97	30,000	100.000	99.2467	0.76%
Michigan Con Gas Company	Gas	15-May-97	40,000	100.000	99.3605	0.64%
Seagull Energy Corp.	Gas	25-Sep-97	150,000	99.544	98.5437	1.02%
SONAT Inc.	Gas	25-Sep-97	100,000	99.748	99.0970	0.66%
Southern Natural Gas Co.	Gas	25-Sep-97	100,000	99.891	99.2393	0.66%
Laclede Gas	Gas	16-Oct-97	25,000	98.682	98.3519	0.34%
Kn Energy Inc.	Gas	22-Oct-97	150,000	100.000	99.3740	0.63%
Northern Illinois Gas Co.	Gas	23-Oct-97	50,000	99.500	98.9960	0.51%
Enron Oil & Gas Co.	Gas	25-Nov-97	100,000	99.709	99.0580	0.66%
Consolidated Natural Gas Co.	Gas	09-Dec-97	300,000	99.190	98.3143	0.89%
SONAT	Gas	27-Jan-98	100,000	99.531	98.8790	0.66%
SONAT	Gas	29-Jan-98	100,000	99.787	98.9115	0.89%
KN Energy, Inc.	Gas	04-Mar-98	500,000	99.784	98.9081	0.89%
KN Energy, Inc.	Gas	04-Mar-98	150,000	99.496	98.3701	1.14%
Coastal Corp.	Gas	02-Jun-98	200,000	99.882	99.2314	0.66%
Coastal Corp.	Gas	02-Jun-98	200,000	99.661	98.7854	0.89%
Wisconsin Gas Co.	Gas	19-Jan-99	50,000	99.252	98.6020	0.66%
No. Illinois Gas Co.	Gas	02-Feb-99	50,000	100.000	99.3500	0.65%
Providence Gas Co.	Gas	04-Feb-99	15,000	100.000	96.8500	3.25%
Cascade Natural Gas Corp.	Gas	15-Mar-99	15,000	100.000	99.2500	0.76%
Laclede Gas Co.	Gas	28-May-99	25,000	100.000	99.5020	0.50%
Mich. Consolidated Gas Co.	Gas	04-Jun-99	55,000	100.000	96.8500	3.25%
Williams Co.	Gas	21-Jul-99	700,000	99.075	98.2000	0.89%
Williams Communication Grp.	Gas	30-Sep-99	1,500,000	99.249	96.7490	2.58%
Indiana Gas Co.	Gas	04-Oct-99	30,000	100.000	99.3750	0.63%
Northwest Natural Gas	Gas	09-Dec-99	20,000	100.000	99.2500	0.76%
SEMCO Energy	Gas	12-Apr-00	30,000	100.000	97.2500	2.83%
New Jersey Gas Co.	Gas	29-Jun-00	10,000	100.000	99.2500	0.76%
New Jersey Gas Co.	Gas	05-Jul-00	10,000	100.000	96.8500	3.25%
New Jersey Gas Co.	Gas	01-Jul-00	15,000	100.000	97.6000	2.46%
Northwest Natural Gas	Gas	29-Aug-00	20,000	100.000	99.2500	0.76%
Northwest Natural Gas	Gas	06-Sep-00	20,000	100.000	99.2500	0.76%
Northwest Natural Gas	Gas	06-Sep-00	10,000	100.000	99.2500	0.76%
Northwest Natural Gas	Gas	27-Nov-00	25,000	100.000	99.3750	0.63%
Agl Capital Corp	Gas	23-Feb-01	300,000	99.578	98.9280	0.66%
Oneok, Inc	Gas	03-Apr-01	400,000	99.912	99.2620	0.65%
Atmos Energy Corp	Gas	15-May-01	350,000	99.940	99.2900	0.65%
Semco Energy	Gas	18-Jun-01	60,000	100.000	97.5000	2.56%
Questar Gas Co.	Gas	03-Oct-01	60,000	100.000	99.3750	0.63%
Northwest Natural Gas	Gas	26-Mar-02	40,000	100.000	99.375	0.63%
Northwest Natural Gas	Gas	24-Sep-02	30,000	100.000	99.250	0.76%
UGI Utilities Inc.	Gas	25-Sep-02	20,000	100.000	99.375	0.63%
California Gas Co.	Gas	02-Oct-02	250,000	99.897	99.247	0.65%
					Average	1.11%
					Selected	1.00%

Source: Public Utility Finance Tracker, February 1999 - 2002.

Common Stock Issuance Cost
Natural Gas/Transmission Utilities (1990 - 2002)

	Type of	Issuance	Number of Shares	Price to	Net	Issuance
Consolidated Natural Gas	Gas	08-Jan-90	3,500	45.50	44.24	2.85%
Washington Energy	Gas	17-Jan-90	1,750	20.13	19.26	4.52%
Colonial Gas	Gas	15-May-90	600	21.50	20.27	6.07%
Atlanta Gas Light	Gas	05-Dec-90	1,000	31.38	30.00	4.60%
Washington Energy	Gas	04-Feb-91	2,650	19.00	18.21	4.34%
Piedmont Natural Gas	Gas	03-Apr-91	1,250	28.50	27.36	4.17%
Panhandle Eastern	Gas	18-Jul-91	13,800	10.75	10.27	4.67%
Bay State Gas Co.	Gas	13-Mar-92	1,550	23.25	22.28	4.35%
El Paso Natural Gas Co.	Gas	12-May-92	5,000	19.00	17.77	6.92%
New Jersey Resources Co.	Gas	15-Sep-92	1,500	22.25	21.27	4.61%
Washington Energy Co.	Gas	29-Sep-92	2,750	21.00	20.19	4.01%
Equitable Resources	Gas	22-Sep-93	2,400	38.50	37.25	3.36%
Brooklyn Union Gas	Gas	29-Sep-93	1,700	25.75	24.77	3.96%
S.E. Michigan Gas Ent.	Gas	19-Jan-94	650	20.50	19.62	4.49%
Connecticut Energy Corp.	Gas	03-Mar-94	900	20.13	19.22	4.71%
Mobile Gas Service Corp.	Gas	14-Sep-94	400	22.00	20.30	8.37%
Northwest Natural Gas	Gas	15-Feb-95	1,000	29.75	28.59	4.06%
MCN Corp.	Gas	14-Mar-95	5,000	17.88	17.21	3.86%
Piedmont Natural Gas	Gas	20-Mar-95	1,500	20.00	19.14	4.49%
Laclede Gas	Gas	15-May-95	1,550	19.00	18.12	4.86%
United Cities	Gas	08-Jun-95	1,200	14.50	13.88	4.47%
Atlanta Gas Light	Gas	12-Jun-95	1,300	33.63	32.51	3.43%
WICOR, INC.	Gas	05-Dec-95	1,100	31.88	30.63	4.06%
Connecticut Natural Gas	Gas	05-Jun-96	640	23.25	22.19	4.78%
Delta Natural Gas	Gas	15-Jul-96	350	16.00	15.07	6.17%
Tejas Gas	Gas	22-Jul-96	3,075	35.00	33.42	4.73%
KN Energy	Gas	31-Jul-96	3,100	32.25	31.01	4.00%
Cascade Natural Gas	Gas	13-Aug-96	1,350	15.25	14.45	5.54%
Energen	Gas	17-Jan-97	1,500	29.50	28.39	3.91%
KCS Energy	Gas	29-Jan-97	3,000	39.00	36.91	5.66%
Energen	Gas	18-Sep-97	1,200	35.50	34.16	3.92%
COHO Energy, Inc.	Gas	29-Sep-97	8,585	10.50	9.87	6.38%
Fall River Gas Co.	Gas	30-Oct-97	340	13.25	12.06	9.87%
Connecticut Energy Corp.	Gas	12-Nov-97	900	24.25	23.17	4.66%
Roanoke Gas Co.	Gas	22-Feb-98	166	20.00	18.67	7.12%
KN Energy	Gas	04-Mar-98	11,000	52.00	49.90	4.21%
Enron Corp.	Gas	05-May-98	15,000	50.00	48.47	3.16%
Laclede Gas Co.	Gas	05-May-99	1,100	50.00	49.34	1.35%
SEMCO	Gas	12-Jun-00	9,000	10.00	9.60	4.17%
WGL Holdings Co.	Gas	26-Jun-01	1,790	26.73	25.80	3.47%
Utilicorp	GAS	25-Jan-02	11,000	23.00	22.28	3.25%
Calpine Corporation	GAS	24-Apr-02	66,000	11.50	11.13	3.30%
MDU Resources Group	GAS	19-Nov-02	2,100	24.00	23.30	3.00%
MDU Resources Group	GAS	29-Nov-02	2,100	24.00	23.16	3.63%
					Average	4.58%
					Selected	4.50%

Source: Public Utility Finance Tracker, February 1999 - 2002.

Incorporating the flotation costs found on the previous pages into our cost of capital study is accomplished as shown in the table below.

Corp. Tax Rate =			38.00%	Flotation Cost Adjustment			
Capital	**Portion**	**Cost**	**Product**	**Flot. Cost**	**Divisor**	**Adj Cost**	**Product**
Debt	35.00%	7.60%	2.66%	1.00%	99.38%	7.65%	2.68%
Equity	65.00%	13.50%	8.78%	4.50%	95.50%	14.14%	9.19%
Totals	100.00%		11.44%				11.87%

The flotation cost adjustment for debt considers the tax deductibility of interest cost and the divisor for debt is obtained by subtracting the debt flotation cost times 1 minus the approximate corporate tax rate from 100% shown as follows: 1 - (0.01 x (1 - 0.38)) = 99.38%. Next we divide cost of debt of 7.60% by the divisor to obtain the flotation cost adjusted cost of debt, which is then multiplied times the debt portion of the capital structure to obtain the product of 2.68%. The divisor for the equity cost is 1 minus the equity flotation costs (100% - 4.50% = 95.50%). Next we divide cost of equity of 13.50% by the divisor to obtain the flotation cost adjusted cost of equity, which is then multiplied times the equity portion of the capital structure to obtain the product of 9.19%. The sum of the two products is 11.87% (rounded to **11.90%**) and is the cost of capital for the typical interstate natural gas pipeline after accounting for flotation costs.

Supplement to the Cost of Capital Study

The income approach is based on the principle of anticipation primarily and involves converting dollars of expected future income into present value. The execution of the income approach involves the selection of the appropriate capitalization method, estimation of the expected income, and estimation of a proper capitalization rate which matches the income to be capitalized. The basic income formula is shown in the box to the right.

$$Value = \frac{Income}{Rate}$$

Income-producing property is typically purchased for investment purposes, and the projected net income stream is the critical factor affecting its market value. An investor purchasing income-producing property is in effect trading a sum of present dollars for the right to a stream of future dollars. There is a relationship between the two, and the connecting link is the process of capitalization. Because future dollars are worth less than present dollars, the anticipated future dollars are discounted to a present worth on some basis that reflects the risk and the waiting time involved.

The historical development of the income approach reflects a movement away from an initial emphasis on physical components of value toward a greater emphasis on investment components. The initial division of capitalization was between the concept of value as income divided by a rate (straight capitalization) and as income multiplied by a factor (annuity capitalization). Contemporary income appraisal theory revolves around two categories of capitalization methods — *direct* capitalization and *yield* capitalization.

Rates of Return

The typical investor's objective in any investment is to ultimately receive more than the amount invested. The investor thus wants a complete return ***of*** all capital invested and, in addition, a fair return ***on*** the capital invested. Thus, the investor expects to completely recoup his investment and be fairly compensated for the use of his capital. The return of capital is usually referred to as the recapture of the initial capital investment. The return on capital is usually referred to as the compensation an investor receives for the use of his capital until the capital is recaptured.

All rates of return can be classified as either 1) ***income rates*** or 2) ***yield rates***. An example of an income rate is the ***overall capitalization rate (R_o)***. An example of a yield rate is the property's ***overall yield rate***, which is synonymous with the ***discount rate*** and the ***cost of capital***. Under certain conditions, the income and yield rates for a property are equal even though they are not conceptually equal.

Categories of Capitalization

There are two categories (sometimes called methods) of capitalization which can be used in the income approach — ***direct*** and ***yield*** capitalization. Each category is based on sound appraisal theory and each is theoretically different in application. Direct capitalization is accomplished by the use of an *overall capitalization rate* ($\mathbf{R_o}$). The overall capitalization rate is actually the percent that a single year's income (usually the first year's income) represents as compared to market value. Yield capitalization is accomplished through the use of an *overall yield rate* ($\mathbf{Y_o}$). The overall yield rate is conceptually the weighted average of the interest rate for long-term debt and the equity yield rate and is also known as the *weighted average cost of capital (**WACC**)* or *discount rate (**r**)*. Unlike the overall capitalization rate, the overall yield rate is not necessarily the percent of market value that the first year's income represents. However, under certain circumstances the overall capitalization rate and the overall yield rate are identical.

Direct Capitalization

Direct capitalization is a method of converting one year's income into value in one direct step, usually by dividing the income estimate by the appropriate income rate. It is the present worth of the future earnings that gives a proper indication of value by the income approach. Typically the income capitalized is the estimated net utility operating income expected in the following year. Net utility operating income for public utilities is defined as the income representing the amount available to pay the debt costs and equity costs for the property. Public utility regulatory commissions (both state and federal) recognize that net utility operating income is the level of income necessary to pay the cost of capital annually.

Regulatory commissions develop the cost of debt capital and cost of equity capital for the INGPI company in each rate case. The cost of debt capital and the cost of equity capital is weighted by the respective percentages of the amount of debt and equity in the overall capital structure for the utility. The resulting **weighted average cost of capital** is multiplied by the authorized rate base to obtain the authorized net utility operating income for regulatory purposes, which is the targeted amount that the regulatory commissions intend for the utility to earn each year to pay its cost of capital. Net utility operating income is reported on the utility's income statement and it is the amount available to pay to debt and equity holders. Thus, net utility operating income is the level of income set by regulatory commissions to fully cover the cost of capital of a public utility.

A note of caution about the use of direct capitalization is given here. There are six accepted techniques which can be used correctly to derive the overall capitalization rate used in direct capitalization. They are as stated below.

Accepted techniques include 1) derivation from comparable sales, 2) derivation from effective gross income multipliers and net income ratios, 3) band of investment—mortgage and equity components, 4) band of investment—land and building components, 5) the debt coverage formula, and 6) yield capitalization techniques such as the general yield change formula, R_O = yield – change in income and value, and the Ellwood method.[30]

No generally accepted appraisal literature indicates that it is proper under any circumstances to use sales of stock as comparable sales for deriving an overall capitalization rate or even an equity capitalization rate. In fact, there is an abundance of caution in appraisal literature about the use of sales that are not comparable to the property being appraised (such as deriving earnings-price ratios from stock transactions). For example, the following quotation addresses this issue:

Fundamental Investment Difference between Investment Securities and Real Estate/Tangible Personal Property. Table 29-2 summarizes some of the intrinsic differences between capital market securities (whether debt or equity instruments) and real estate and tangible personal property (either individual assets or going concern assemblages of assets) as investment alternatives.

Table 29-2
Investment Differences between Securities and Real Estate/Personal Property

	Securities (Debt or Equity Instruments)		Real Estate/Personal Property (Individually or as a Mass Assemblage)
1.	Liquid, marketable investments	1.	Illiquid investments
2.	Noncontrolling interest in income production and distribution	2.	Controlling interest in income production and distribution
3.	Small, absolute dollar investment required	3.	Large, absolute dollar investment required
4.	Small percentage of overall wealth committed to this investment	4.	Large percentage of overall wealth committed to this investment
5.	Diversified portfolio of investments	5.	Nondiversified portfolio of investments
6.	Short-term investment time horizon	6.	Long-term investment time horizon
7.	Does not require re-investment to maintain investment base	7.	Requires "replenishment" investment to maintain investment base
8.	Investments expected to appreciate over time	8.	Investments expected to depreciate over time
9.	Income typically subject to only individual tax (from investor's perspective)	9.	Income typically subject to both corporate and individual tax (from investor's perspective)
10.	Portfolios can be created in limitless combinations of risky securities and risk-free securities	10.	Portfolio limited to the particular combination of real estate and personal property that operate the subject business

As the table indicates, there are fundamental investment risk and return differences between (1) marketable,

[30] *The Appraisal of Real Estate*, 11th ed., (Chicago: Appraisal Institute, 1996), p. 514.

minority interests in debt and equity securities and (2) nonmarketable, controlling interests in operating real estate and tangible personal property. Due to these differences, and for other reasons, it is unlikely that an economic model that correlates nondiversified risk and expected return for one type of investment will effectively serve the same function for such a different type of investment.[31]

Thus, it is clear from appraisal literature that it is absolutely wrong to use earnings-price ratios derived from stock sales as the equity capitalization rate or the equity yield rate in the appraisal of tangible assets or mass assemblages of assets as a going concern. Further, it is improper to use earnings-price ratios to match with the net utility operating income authorized by the FERC. The FERC does not utilize earnings-price ratios in the determination of the cost of equity for any company or in setting the authorized net operating amount. Finally, for the FERC to set the cost of equity capital based on earnings-price ratios would violate the mandates of the US Supreme court in their *Hope Natural Gas* and *Bluefield Water Works* decisions, which require the regulatory commissions to allow the regulated utilities to earn their cost of capital (commensurate with the return earned by companies of comparable risk).

Appraisal texts do not tell us that an appraiser may derive equity capitalization rates from the stock market, however the same appraisal texts emphatically state that appraisers can derive equity yield rates from stocks and bonds of commensurate risk in the market. The use of earnings-price ratios as a substitute for the equity capitalization rate in deriving equity value, is simply not permissible. Additionally, the majority of public utility companies are subsidiaries of publicly traded holding companies. The use of a parent company traded stock earnings-price ratio as comparison to an untraded subsidiary company would further exacerbate an incorrect equity value.

Yield Capitalization

Yield capitalization is a method of converting a series of income flows (called cash flows) or a singular representative level cash flow into present value by discounting the expected future benefits at an appropriate discount rate (synonymous with the property's **overall yield rate** or **cost of capital**).

> To perform yield capitalization, an appraiser 1) selects an appropriate holding period; 2) forecasts all future cash flows or cash flow patterns; 3) chooses an appropriate yield, or discount rate; and 4) converts future benefits into present value by discounting each annual future benefit or by developing an overall rate that reflects the income pattern, value change, and yield rate. The application of capitalization rates that reflect an appropriate yield rate, the use of present value

[31] Pratt, Reilly, & Schweihs, *Valuing A Business*, 3rd edition, (Chicago: Irwin Professional Publishing, 1996), 708.

factors, and discounted cash flow analysis are all yield capitalization procedures.[32]

Thus, the appraiser performs yield capitalization by either 1) discounting each individual cash flow to its present value for the duration of the income, or 2) capitalizing the appropriate income at an overall capitalization rate, which represents the income pattern, value change, and yield rate.

Upon projecting the amount, timing, and duration of the cash flows to the property being appraised, the appraiser must identify the pattern that the cash flow is expected to follow during the holding period. Those patterns are either variable, level, increasing, or decreasing annuities. For a level annuity where a property is expected to generate a level net utility operating income for a finite period of time and then be resold at the original purchase price, the property can be valued with capitalization in perpetuity by dividing the periodic income by the appropriate discount rate. In this model the discount rate and the overall capitalization rate are the same.[33]

When the net income consists of a fixed amount that represents the return of capital (depreciation expense) plus a declining amount representing the return on the capital remaining in the investment, classic straight-line capitalization can be used to value the property.[34] In this model, as with the level perpetuity, the discount rate and the overall capitalization rate are equal when properly applied to a utility's net cash flow.

If the cash flow pattern is expected to be in the form of a variable annuity each individual income flow will be discounted into an indication of present worth at the appropriate discount rate for the holding period. Further, the appraiser discounts any remaining value in the investment at the end of the holding period and adds the total present worth of the variable cash flows to the present worth of the future value at the end of the holding period. The total represents the present worth of the total property.

The application of the DCF model for a variable annuity can be accomplished using the following formula.

$$Value = \frac{I_1}{(1+r)^1} + \frac{I_2}{(1+r)^2} + \frac{I_3}{(1+r)^3} + \ldots + \frac{I_n}{(1+r)^n}$$

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[32] *The Appraisal of Real Estate*, 11th ed., (Chicago: Appraisal Institute, 1996), 529.

[33] *Ibid.*, 537.

[34] *Ibid.*, 540.

In this formula, ***I*** equals income or cash flow in periods 1 through n, and ***r*** equals the discount rate. Where income has the characteristics of a perpetuity or of a classic straight line capitalization model, the universal capitalization formula, *Value = Income ÷ Rate*, can be used. In this case the overall capitalization rate will equal the discount rate.

To derive *equity yield rates* from market information, yield capitalization permits some things that would not be proper when using direct capitalization. For example, generally accepted appraisal texts record how it is permissible to use stocks and bonds for determination of equity yield rates in alternative investments when appraising real estate.

> An investor may compare the expected equity yield on a real property investment with the yields on alternative investments with commensurate risk (e.g., stocks and bonds) and with a lender's yield on mortgages secured by similar real property.[35]

The Appraisal Institute goes on to state:

> To estimate equity yield rates, appraisers must do market research. This research can take many forms and may include one or more of the following analyses...Comparison with the equity yield rates achieved in alternative investments of comparable risk such as stocks and bonds...[36]

An important difference between yield capitalization and direct capitalization is that in yield capitalization when deriving the equity yield rate, i.e., the cost of capital, it is entirely appropriate to use sales of stock (the capital asset pricing model, DCF or Gordon growth model, or risk premium models) to derive the equity yield rate. However, when using direct capitalization, it is absolutely inappropriate to use sales of stock (earnings-price ratios) to derive equity capitalization rates. The reason is simple; equity cap rates are intended to be ratios between income and value while equity yield rates are not. Thus, it is critical that the sales used in deriving those ratios be virtually identical to the property being appraised. Stocks, quite simply, are not comparable to tangible assets as discussed in the quotation on page 64. Because stock sales used to derive equity yield rates are used to indicate relative risk between investments, it is entirely appropriate to use stock sales to derive equity yield rates.

Estimation of Income to Capitalize

The income level capitalized in the income approach is usually called ***cash flow***. In

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[35] *Ibid.*, 554.

[36] *Ibid.*, 555.

fact, as mentioned previously on page 9, Dr. William Kinnard, MAI explains that all of the annual "income" figures used in appraising income-producing properties are *cash flows* rather than accrual accounting incomes. Cash flow can be defined in a number of ways, however for appraisal purposes it generally consists of income necessary to satisfy the cost of capital plus depreciation expense. Commercial and general appraisers recognize this level of income as simply ***net operating income***. Utility appraisers know that the definition of "net utility operating income" for public utilities and commercial properties is different in one important aspect. For public utilities the level of income reported as "net utility operating income" is only that income available to pay the utility's cost of capital, while for commercial properties "net operating income" includes not only the level of income available for debt and equity, but also the income to recapture a portion of the wasting asset (*otherwise known as depreciation expense*).

In general commercial appraisals cash flow is typically defined as simply net operating income (as defined for general commercial appraisal purposes), which is the income available for debt and equity and the depreciation expense. For an illustration of this type of analysis, refer to *The Appraisal of Real Estate*, 11th edition, page 564.

For public utility appraisal, cash flow is often defined as net utility operating income (defined as the income available to pay the cost of capital) plus depreciation expense and the current portion of deferred income taxes. This definition of cash flow is sometimes referred to as ***gross cash flow*** because there is no deduction for capital expenditures to keep the utility operating, Thus this cash flow model will have a limited life duration. In other words, gross cash flows cannot continue indefinitely without significant new investment to keep the utility operations ongoing.

Another variation of this same general definition of cash flow for a public utility is called ***net cash flow***, which is the gross cash flow less capital expenditures. Some refer to this as gross revenue less all cash disbursements except interest expense. For the appraisal of public utilities where it is assumed that the amount of capital reinvestment is equal to the depreciation expense, *net cash flow* can be defined simply as utility net utility operating income. For the appraisal of a public utility as a going concern, net cash flow is usually the best level of income to work with. The purpose of this cost of capital study is to provide the cost of capital, which can be used to capitalize the net cash flow for the typical interstate natural gas pipeline company for the purpose of estimating market value.