Interstate Natural Gas Pipeline Industry

2008 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
FED	Federal Reserve
FERC	Federal Energy Regulatory Commission
GDP	Gross Domestic Product
GP	General Partner
GRI	Gas Research Institute
GSR	Gas Supply Realignment
GTI	Gas Technology Institute
INGAA	Interstate Natural Gas Association of America
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
LDC	Local Distribution Company
LNG	Liquified Natural Gas
M&A	Mergers and Acquisitions
MLP	Master Limited Partnership
NUOI	Net Utility Operating Income
OCS	Outer Continental Shelf
PFRB	Philadelphia Federal Reserve Bank
PUHCA	Public Utility Holding Company Act
RP	Risk Premium
SFV	Straight Fixed Variable
S&P	Standard & Poor's
VL	Value Line Investment Survey
WACC	Weighted Average Cost of Capital
YTM	Yield to Maturity

2008 Cost of Capital Study of the Interstate Natural Gas Pipeline Industry for the Interstate Natural Gas Pipeline Property Tax Forum January 1, 2008

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, 2008. This cost of capital 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 the cost of capital for the typical interstate natural gas pipeline company at January 1, 2008, and is not representative of any particular interstate pipeline company. 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 represented by the cost of capital herein and adjusting for the differences accordingly. For example, if one were interested in the typical cost of capital for a mid-cap or a low-cap pipeline, size adjustments of 0.92% and 1.65% respectively would need to be made to the capital asset pricing model.[1] Further, for companies which are considered below investment grade, additional adjustments must be made to reflect the enhanced risk associated with an investment in the operating assets of such companies.

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 by the authors, who reserve all rights to any reproduction. 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, 2008.

Executive Summary - Cost of Capital

Based on our analysis and investigation, we have calculated the rounded weighted

[1] *2008 Ibbotson Risk Premia Over time Report*, (Chicago: Morningstar, 2008), p. 5.

average cost of capital (WACC) for the INGPI to be **10.85%** as of January 1, 2008. 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, 2008 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 10.

Interstate Natural Gas Pipeline Property Tax Forum

The current members of the INGPPTF are listed below:

Boardwalk Pipeline Partners, LP
- Texas Gas Transmission, LLC
- Gulf South Pipeline Company, LP
- Gulf Crossing Pipeline Company, LLC

Centerpoint Energy
- Centerpoint Energy Gas Transmission
- Centerpoint Energy Mississippi River Transmission

Columbia Gas/Gulf Transmission Corporation
Dominion Transmission Corporation
El Paso Corp - Colorado Springs
- El Paso Natural Gas
- Mojave Pipeline
- Colorado Interstate Gas
- Cheyenne Plains Pipeline
- Wyoming Interstate Company

El Paso Corporation
- Tennessee Gas Pipeline
- Southern Natural Gas

Great Lakes Gas Transmission L.P.
Kern River Gas Transmission
Kinder Morgan, Inc.
- Natural Gas Pipeline Company of America
- KN Energy

MDU Resources Group, Inc.
National Fuel Gas Supply Corporation
Northern Border Pipeline Company
Northern Natural Gas Company
Oneok Partners, LP
- Guardian Pipeline Company
- Midwestern Gas Transmission Company
- Viking Gas Transmission Company

Questar Pipeline Company
Southern Star Central Gas Pipeline, Inc.
Southern Union Company
- Florida Gas
- Panhandle Eastern Pipeline
- Trunkline Gas Company
- Sea Robin Pipeline

Spectra Energy Corp
- Texas Eastern Transmission, LP
- Algonquin Gas Transmission, LLC
- Gulf Stream Natural Gas Transmission, LLC
- Maritimes and Northeast Pipeline, LLC
- East Tennessee Natural Gas, LLC

Spectra Energy - Canada
- West Coast Pipelines & Field Services
- West Coast Gas Services, Inc.
- Maritimes and Northeast Pipeline (Canada)
- Spectra Energy Empress L.P.
- Union Gas Limited
- St. Clair Pipelines (1996)
- Market Hub Partners

Spectra Energy Income Fund
Trans Canada Pipelines Limited
Trans Canada US Pipelines Central
ANR Pipeline
TransCanada Northwest Gas Transmission
TransCanada Portland Gas Transmission
Williams - Northwest Pipeline Corporation
Williams - Transcontinental Gas Pipeline Corporation

General Economic Trends - 2008

When economists made their forecasts for 2007, many failed to appreciate housing's impact on the economy. Contrary to the consensus, Keith Hembre, chief economist at the asset management firm FAF Advisors in Minneapolis, expected the housing slump to crimp economic growth all year and to spur the Federal Reserve to cut rates more than anticipated. The focus on housing helped make Hembre the most accurate economic forecaster, based on a 2007 economic forecast survey conducted by *BusinessWeek* in December 2006.[2]

As 2007 drew to a close, most experts polled expected growth, however meager, in 2008. As 2008 dawned the economic outlook seemed to be the number one topic for almost all investors. Hembre, in his 2008 economic forecast, was making an even sharper break from the consensus as one of only two economists — Richard Berner of Morgan Stanley is the other — who saw a shallow recession on the horizon. Hembre admitted forecasting two straight quarters of declining economic output was "going out on a limb" but he pointed to four factors that "tipped the balance." Tops among the warning signs was corporate profits. A third-quarter decline in profits and expectations of another fall in fourth quarter earnings pointed to an even weaker labor market in 2008. The ongoing stretch of more than a year with the Federal funds target rate exceeding the 10-year Treasury rate was also a "pattern that's typical of recession," said Hembre. The sharp drop-off in consumer confidence and the dramatic fall in home construction and prices rounded out Hembre's list of indicators pointing to more turbulence ahead.[3]

The Wall Street Journal's (WSJ) 54 economists surveyed saw increasing odds of a recession this year along with mounting inflationary pressures. This could result in an uncomfortable mix that could play a role in shaping the 2008 presidential campaign and

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[2] Mehring, James. "Hembre's Farsighted Forecasts," *BusinessWeek online*, December 20, 2007, 5:00 pm EST, http://www.businessweek.com/print/magazine/content/07_53/b4065048245085.htm.

[3] *Ibid*.

complicate life for the Federal Reserve, according to Phil Izzo.[4] On the political front, most of the economists expected a Democrat to be elected president in 2008, although they personally preferred a Republican. Some 56% disapproved of President Bush's handling of the economy, about the same as the 59% of the public who disapproved in a recent *WSJ*/NBC News Poll. Three of the 54 WSJ economists forecasted a recession in 2008. Setting off the alarm bells was December 2007's jump in the nation's unemployment rate to 5%. "Historically, this has invariably been associated with recession, typically starting immediately and almost always within three months," according to a research note of Goldman Sachs Group Inc.[5]

James Cooper reported at December 31, 2007, the 54 forecasters that BusinessWeek surveyed projected, on average, the economy would grow 2.1% from the fourth quarter of 2007. Only two of the forecasters expected a recession, although it might feel like one if there's sluggish growth over the next couple of quarters, as many predicted. Almost all forecasters thought the risk of a downturn had risen substantially in the last quarter of 2007. As a group, the forecasters said slow growth would lift the jobless rate which in turn would hold down inflation. As oil prices leveled off or declined, the yearly growth in consumer prices was projected to slide from 4.3% in November of 2007 to 2.4%, while core inflation, which excluded energy and food, would hold steady at a tame 2.2%.

Almost all "no recession" forecasts were predicated on further rate cuts by the Fed. The target rate was projected to drop from 4.25% to between 2.5% and 4%, with almost half of the analysts projecting it to fall below 4%. On balance, the analysts were cautiously optimistic, but with plenty of hedging amid all the uncertainties.[6] *WSJ* economists felt the slowdown projected for 2008 would increase the focus on the economy in the run-up to the November election and that the economy would have recovered to some extent by the time the next president took office. "Length of recession doesn't vary very much: about three quarters and that's it," said David Wyss of Standard & Poor's, who isn't predicting a recession.[7]

Of course economists and Wall Street have been pessimistic — and wrong — before. In 2007, for example, strong exports, thanks to the weak dollar, and an unexpected inventory buildup resulted in a surge of 4.9% growth in the third quarter, much higher than the forecasts.

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[4] Izzo, Phil. "Odds of Recession Seen Rising," *The Wall Street Journal*, Friday, January 11, 2008, http://online.wsj.com/article/SB119990867859778525.html.

[5] *Ibid.*

[6] Cooper, James C. "No Recession, But...," *BusinessWeek*, December 31, 2007 / January 7, 2008, 48.

[7] *Op. Cit.*, Izzo.

"The biggest surprise of 2007 was how resilient the economy was in the face of [skyrocketing] oil prices," said Robert MacIntosh, chief economist at Eaton Vance, a mutual-fund group in Boston. "Consumers have barely blinked."

Behind some of the dim forecasts for next year are some of the same factors that beset the United States economy in 2007: stress in the housing market and relatively high oil prices. These twin problems will, in 2008, finally get to the consumer reports Ron Scherer of the Christian Science Monitor.[8] The outlook for the national economy in 2008 continues to depend upon how well the consumer navigates through four major headwinds: the housing slump, rising energy costs, a tightening credit environment, and a weakening job market.[9]

All in all the economy is sliding uncomfortably close to the brink of recession. *Standard & Poor's* Stovall and Wyss projected economic growth to average near one percent through the second quarter of 2008. This percentage was well within the forecasting error of recession, despite the Fed's recent rate cuts. They reported the housing decline would have its biggest negative impact during this period, and orders data suggested slower capital spending. The slowdown in the economy would feel like a recession to most people. They reported that *Standard & Poor's* still expected the economy to escape recession. However, there would be little room for error. Any other problems — a new oil price surge, further turmoil in the financial markets, or a related decline in inflows of capital from outside the United States — would turn the already bumpy landing of the economy into a recession.[10]

In summary the pace of economic growth is likely to be slower in 2008 than it was in 2007. Inflation should moderate during 2008, but the recent run-up in oil prices could put upward pressure on inflation. The most glaring fundamental weakness in the economy will continue to be the housing industry and associated businesses. The bottom of the housing downturn may not be reached until the last half of 2008 or even later. Several factors make the current economic outlook uncertain, and most of these risks emanate from the connections between the housing sector and financial markets. The spillover should be expected to be limited to generally smaller increases in consumer and business spending than experienced in 2007, according the Fed. Despite such challenging prospects, the fundamentals of the United States' economy remain essentially sound, and, historically, the nation's economy has proved quite

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[8] Scherer, Ron. "U.S. Economic Forecast for 2008: Bleak," *The Christian Science Monitor*, December 28, 2007, http://csmonitor.com/2007/1228/p01s07-usec.htm.

[9] "What's to Come in the Year Ahead?" *Wachovia Annual Outlook*, December 17, 2007, 3.

[10] Stovall, Sam and David Wyss. "Trends & Projections," *Standard & Poor's*, December 2007, 3 & 7.

resilient to episodes of financial distress.

Natural Gas Pipeline Industry - 2008

Interstate pipelines have both utility and merchant energy characteristics. They are similar to monopoly utilities in that they require significant capital expenditures, involve a permitting process, and are subject to price controls. However, an interstate pipeline's service territory can be expanded through new permitting and construction, whereas that is not usually the case for LDCs. Pipelines are also subject to competition from other pipelines that are built close enough to contend for institutional customers.

Pipelines differ from LDCs in that their business generally relies on a limited number of large institutional customers (including wholesale marketers, exploration and production companies, LDCs, and large industrial companies). Such high customer concentration increases the risks associated with bad debt expense. When evaluating a pipeline company, the appraiser must investigate demand and supply growth along the pipeline's footprint, opportunities for pipeline expansion, applications for competitive pipeline developments, and the growth prospects and credit quality of shippers along the pipeline's system.[11]

The January 8, 2008, Energy Information Administration Short-Term Energy Outlook (STEO) of the projection of natural gas needs for 2008 reports that total natural gas consumption is estimated to have increased by 6 percent in 2007, driven largely by increases in the residential, commercial, and electric power sectors that occurred earlier in the year. The forecast of near-normal weather in 2008 and 2009 is projected to lower the annual increase in total consumption to 0.6 and 1 percent, respectively, for those two years. Total U.S. marketed natural gas production is estimated to have increased by 2.5 percent in 2007, with increases in onshore lower-48 production offsetting declines in the offshore Gulf of Mexico. In 2008, total marketed production is expected to increase by 1.6 percent primarily because of the start-up of new deepwater Gulf of Mexico supply infrastructure, which is expected to increase Gulf production by 7.9 percent for the year. In addition, lower-48 onshore production in 2008 is expected to rise by 0.5 percent.[12]

Value Line (VL) reported in December 2007 that the natural gas (diversified) industry's growth ought to continue in 2008, driven by the relatively high price of natural gas and strength in drilling programs. VL predicted natural gas quotations between $6 and $9 per million btu for

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[11] Muir, Christopher. "Natural Gas Distribution," *Standard & Poor's*, September 13, 2007, 29-30.

[12] "Short-Term Energy Outlook," Energy Information Administration, January 2008, 5.

2008, based on the midpoint of the range, dependent upon weather conditions.[13]

Continued development of the oil sands in Canada should reduce natural gas imports to the United States. As drilling in the oil sands proceeds, greater amounts of natural gas will probably be needed for these projects. Thus, growth in the amount of natural gas exported from Canada to the United States should be limited going forward. This should put a floor under natural gas prices in the coming years.[14]

Additionally, VL reported that the Natural Gas (Diversified) Industry's Timeliness rank had fallen from 56 to 65 (out of 98) since their review in September of 2007. Looking forward, Napoli anticipated continued volatility in the industry, given the reliance on natural gas prices, which, in turn, depend upon fickle weather patterns.

The long term energy outlook for natural gas to 2030 developed by the Energy Information Administration (EIA) reported that their early release version did not include consideration of HR 6, the Energy Independence and Security Act of 2007, that was signed into law on December 19, 2007. The EIA assumes those current policies affecting the energy sector remain unchanged throughout EIA's projection period. Policy changes — such as the adoption of policies to reduce greenhouse gas emissions — could change the projection in the report. While some current laws and regulations will change, and new ones will be created over the next 25 years, no one knows the specifics of what they will be or when they will be enacted.

Trends in energy supply and demand are affected by difficult-to-predict factors: energy prices, United States and worldwide economic growth, advances in technologies, and future public policy decisions in the United States and in other countries. The projection for United States economic growth, a key determinant of United States demand, has been lowered reflecting an updated projection of productivity improvement. Key energy market changes EIA analysts have identified include: higher oil and gas prices; higher delivered energy prices, reflecting both higher wellhead prices and transportation and distribution costs; slower projected growth in energy demand, especially gas; higher domestic oil production in the near term; and slower projected growth in gas imports.[15]

IBISWorld Inc. annually produces an IBISWorld Industry Risk Rating Report. On January 19, 2008, the "Pipeline Transportation of Natural Gas in the US: 48621" report was released. This industry group analyzed comprises establishments primarily engaged in the

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[13] Napoli, Michael F. "Natural Gas (Diversified) Industry," *Value Line Investment Survey*, December 14, 2007, 429.

[14] *Ibid*.

[15] "EIA Gas Projections to 2030 Identify Market Changes," *Oil & Gas Journal*, January 28, 2008, 28.

pipeline transportation of natural gas from processing plants to local distribution systems. The forecast period encompasses all of 2008. Three types of risk are recognized in their analysis. These are: risk arising from within the industry itself (structural risk), risks arising from the expected future performance of the industry (growth risk) and risk arising from forces external to the industry (external sensitivity risk). The results follow.[16]

Structural Risk Analysis — is forecast to be medium-high over the outlook period. The primary risk factor is that the industry is in the decline phase of its economic life cycle. Over recent years, the Natural Gas Pipeline Industry has remained flat despite overall economic growth. Despite new pipelines set to come on stream in the next few years, the industry is still expected to expand more slowly than the economy as a whole. A medium level of revenue volatility exists in the industry and this reflects modest fluctuations in price. There is a medium level of competition within the industry, as the fixed nature of natural gas pipelines limits competition between firms in the industry. The industry receives no government assistance and there are no specific tariffs.

Offsetting the high level of risk is the high level of barriers to industry entry which helps protect incumbent operators, thanks to the amount of capital required to fund construction of gas pipelines. Large initial contracts must also be secured in order to make the pipeline viable.

Growth Risk Analysis — is forecast to exhibit medium - high revenue risk in 2008. Natural gas pipelines are long-lived assets and their construction is based on long-term projections of gas demand and supply. The demand for natural gas in the United States is expected to expand over the outlook period and beyond. New gas pipelines will be installed and pipeline expansions undertaken. New supply sources and varying growth in gas demand in the different regions of the United States will also change the shape of gas grid. As gas demand and gas grid expands, players in the industry will need to improve ancillary facilities, such storage, and develop new methods of conducting business to facilitate the flow of natural gas from supply locations to markets and from one market to another.

IBISWorld forecasts that the performance of the Natural Gas Pipeline Industry is expected to remain flat during the outlook period. Although increases in gas consumption are anticipated, they will be relatively modest, reflecting the adverse impact of high gas prices early in the outlook period on demand.

Sensitivity Risk Analysis — for the year 2008 is forecasted to low. Furthermore, with additional gas capacity being installed, this is expected to have a positive impact on the industry as the level of gas demand plays a key role in determining the volume of gas transported by the industry. This is contributing to favorable sensitivity risk levels.

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[16] "IBISWorld Industry Risk Rating Report, Pipeline Transportation of Natural Gas in the US: 48621," IBISWorld, January 19, 2008, 3.

When the three risk analyses are combined, the overall "Risk Rating Analysis" in the Pipeline Transportation of Natural Gas Industry is expected to be medium - low in 2008. The low level of risk can be attributed to continual expansion of new natural gas systems in the in the industry. Industry risk in this industry has been fairly static moving within the medium - low and medium band. In 2004 risk was medium - low and then increased to a medium level in 2005. Risk remained unchanged from the previous year in 2006, and then it decreased to medium - low in 2007. The static movement in risk levels for the current performance period was due to increased natural gas consumption which contributed to an expansion in natural gas pipeline systems.[17]

A number of pure-play businesses are owned by master limited partnerships (MLPs). MLPs trade on exchanges just like common stocks, but the businesses avoid income taxation by paying out nearly all free cash flows to shareholders. These income-oriented investments generally trade based on their yield, distribution growth potential, and volatility of cash flows.

Because MLPs cannot utilize operating cash flows for growth oriented capital expenditures, they are dependent on the ability to continuously raise fresh debt and equity capital to fund new investment. The general partners (GPs) for MLPs often have performance participation awards that provide the GP with larger and larger interests in MLP distributions as the dividend is raised. An appraiser may need to evaluate an MLP's capacity to raise distributions in light of growth opportunities, access to capital markets, and GP performance participation award.[18] 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. The additional risk attributable to the natural gas pipeline industry should be reflected in the development of the cost of capital.

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[17] *Ibid*, 3-4.

[18] Shere, Craig. Industry Surveys: Natural Gas. *Standard & Poors*, May 13, 2004, 32.

Weighted Average Cost of Capital (WACC)

The return investors require on investments of comparable risk is what the cost of capital measures. Rational investors will not invest in a particular investment opportunity if the expected return on that opportunity is less than their cost of capital requirement. 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***.[19] 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.[20]] This rate of return is often referred to as the discount rate or the opportunity cost of capital.[21] 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.[22]

The estimated cost of capital in this report for the Interstate Natural Gas Pipeline Industry as of January 1, 2008 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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[19] 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.

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

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

[22] *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.

$$K = (D \times K_d) + (E \times K_e)$$

where

K = *Weighted Average Cost of Capital*
D = *Proportion of Debt in Capital Structure*
K_d = *Cost of Debt*
E = *Proportion of Equity in Capital Structure*
K_e = *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.[23]

Cost of Capital Study Results

The cost of capital for the Interstate Natural Gas Pipeline Industry as of January 1, 2008 is estimated to be 10.84% (rounded to **10.85%**) as the chart on the following page indicates. Following the chart are explanations of the derivation of each of the component parts of the cost of capital study.

[23] *SBBI (Stocks, Bonds, Bills and Inflation)*, 2007 Yearbook: Valuation Edition, (Chicago: Morningstar, Inc., 2007), 23.

Capital	Portion	Cost	Product
Debt	25.00%	6.54%	1.64%
Equity	75.00%	12.27%	9.20%
Totals	100.00%		10.84%

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 statements from Brigham and Gapenski and from Damodaran.

> 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.[24]
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> The weights assigned to equity and debt in calculating the weighted average cost of capital have to be based upon market value, not book value. The rationale rests on the fact that the cost of capital measures the cost of issuing securities, stocks as well as bonds, to finance projects, and that these securities are issued at market value, not at book value.[25]

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

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

[25] Damodaran, Aswath, *Investment Valuation*, (New York, NY: John Wiley & Sons, Inc., 1996), p. 64.

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.

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.[26]
>
> **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.[27]

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

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

[27] *Ibid*., 132.

> 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...[28]

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 (*Value Line*) and *Standard & Poor's Compustat* data base as of January 2008. The capital structure study involved the following companies we believe to be representative of the interstate natural gas transmission pipeline industry: 25 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; 20 companies from that group excluding the limited partnerships; 14 large companies from that group that have reported annual sales of at least $750 million; and twelve (12) companies heavily involved with 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 25% debt, essentially no preferred stock, and 75% 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.

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

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

is usually used for the debt weight. Ibbotson states, "Therefore, in most cases the market value of debt in the capital structure is assumed to be the book value of debt."[29] 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 six pages. As can be 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 25% debt (***D***) and 75% 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), the 20 companies from that group excluding the limited partnerships, and the Value Line Natural Gas Diversified Industry (Large[30]).

On the following pages are the capital structure data from *Value Line* and *Standard & Poor's Compustat.*

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[29] *SBBI (Stocks, Bonds, Bills and Inflation)*, *2006Yearbook: Valuation Edition*, (Chicago: Ibbotson Associates, 2006, 14.

[30] 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, 2008

Company Name	Ticker	LTD %	PS %	CS %
ATP Oil & Gas Corp	ATPG	47.91%	0.00%	52.09%
Cabot Oil & Gas 'A'	COG	5.44%	0.00%	94.56%
Callon Pete Co	CPE	52.78%	0.00%	47.22%
Chesapeake Energy	CHK	33.83%	6.09%	60.07%
Crosstex Energy LP	XTEX	46.08%	0.00%	53.92%
Delta Natural Gas	DGAS	41.39%	0.00%	58.61%
Devon Energy	DVN	12.30%	0.31%	87.38%
EOG Resources	EOG	4.87%	0.18%	94.95%
Eagle Rock Energy Partners Ltd	EROC	28.80%	0.00%	71.20%
El Paso Corp.	EP	49.00%	2.95%	48.05%
Energen Corp.	EGN	10.77%	0.00%	89.23%
Enterprise Products	EPD	32.52%	0.00%	67.48%
Equitable Resources	EQT	10.20%	0.00%	89.80%
Markwest Energy Partners LP	MWE	31.95%	0.00%	68.05%
National Fuel Gas	NFG	17.06%	0.00%	82.94%
Newfield Exploration	NFX	12.83%	0.00%	87.17%
ONEOK Inc.	OKE	47.53%	0.00%	52.47%
ONEOK Partners LP	OKS	32.83%	0.00%	67.17%
Penn Virginia Corp.	PVA	31.23%	0.00%	68.77%
Petroleum Development Corp.	PETD	16.09%	0.00%	83.91%
Quest Resource Corp	QRCP	62.59%	0.00%	37.41%
Questar Corp.	STR	9.29%	0.00%	90.71%
Rentech Inc.	RTK	17.10%	0.00%	82.90%
Southwestern Energy	SWN	6.77%	0.00%	93.23%
XTO Energy	XTO	18.89%	0.00%	81.11%
	Average	27.20%	0.38%	72.42%
	Median	28.80%	0.00%	71.20%

Source: *Value Line* CD Rom, January 2008.

Value Line Natural Gas Diversified Industry (w/o LPs)

Capital Structure (VL Data) - January 1, 2008

Company Name	Ticker	LTD %	PS %	CS %
ATP Oil & Gas Corp	ATPG	47.91%	0.00%	52.09%
Cabot Oil & Gas 'A'	COG	5.44%	0.00%	94.56%
Callon Pete Co	CPE	52.78%	0.00%	47.22%
Chesapeake Energy	CHK	33.83%	6.09%	60.07%
Delta Natural Gas	DGAS	41.39%	0.00%	58.61%
Devon Energy	DVN	12.30%	0.31%	87.38%
EOG Resources	EOG	4.87%	0.18%	94.95%
El Paso Corp.	EP	49.00%	2.95%	48.05%
Energen Corp.	EGN	10.77%	0.00%	89.23%
Equitable Resources	EQT	10.20%	0.00%	89.80%
National Fuel Gas	NFG	17.06%	0.00%	82.94%
Newfield Exploration	NFX	12.83%	0.00%	87.17%
ONEOK Inc.	OKE	47.53%	0.00%	52.47%
Penn Virginia Corp.	PVA	31.23%	0.00%	68.77%
Petroleum Development Corp.	PETD	16.09%	0.00%	83.91%
Quest Resource Corp	QRCP	62.59%	0.00%	37.41%
Questar Corp.	STR	9.29%	0.00%	90.71%
Rentech Inc.	RTK	17.10%	0.00%	82.90%
Southwestern Energy	SWN	6.77%	0.00%	93.23%
XTO Energy	XTO	18.89%	0.00%	81.11%
	Average	25.39%	0.48%	74.13%
	Median	17.08%	0.00%	82.92%

Source: *Value Line* CD Rom, January 2008.

Value Line Natural Gas Diversified Industry (Large)
Capital Structure (VL Data) - January 1, 2008

Company Name	Ticker	LTD %	PS %	CS %
Cabot Oil & Gas 'A'	COG	5.44%	0.00%	94.56%
Chesapeake Energy	CHK	33.83%	6.09%	60.07%
Devon Energy	DVN	12.30%	0.31%	87.38%
El Paso Corp.	EP	49.00%	2.95%	48.05%
Energen Corp.	EGN	10.77%	0.00%	89.23%
EOG Resources	EOG	4.87%	0.18%	94.95%
Equitable Resources	EQT	10.20%	0.00%	89.80%
National Fuel Gas	NFG	17.06%	0.00%	82.94%
Newfield Exploration	NFX	12.83%	0.00%	87.17%
ONEOK Inc.	OKE	47.53%	0.00%	52.47%
Penn Virginia Corp.	PVA	31.23%	0.00%	68.77%
Questar Corp.	STR	9.29%	0.00%	90.71%
Southwestern Energy	SWN	6.77%	0.00%	93.23%
XTO Energy	XTO	18.89%	0.00%	81.11%
	Average	19.29%	0.68%	80.03%
	Median	12.57%	0.00%	87.27%

Interstate Natural Gas Pipeline Forum (Pipelines)
Capital Structure (VL Data) - January 1, 2008

Company Name	Ticker	LTD %	PS %	CS %
Boardwalk Pipeline	BWP	33.21%	0.00%	66.79%
CenterPoint Energy	CNP	60.33%	0.00%	39.67%
El Paso Corp.	EP	49.00%	2.95%	48.05%
Kinder Morgan Energy	KMP	32.86%	0.00%	67.14%
MDU Resources	MDU	18.57%	0.24%	81.18%
National Fuel Gas	NFG	17.06%	0.00%	82.94%
ONEOK Partners LP	OKS	32.83%	0.00%	67.17%
Questar Corp.	STR	9.29%	0.00%	90.71%
Southern Union	SUG	40.94%	3.66%	55.39%
Spectra Energy	SE	34.31%	0.00%	65.69%
TransCanada Corp.	TRP			
Williams Cos.	WMB	25.53%	0.00%	74.47%
	Average	32.18%	0.62%	67.20%
	Median	32.86%	0.00%	67.14%

Source: *Value Line* CD Rom, January 2008.

Value Line Natural Gas Diversified Industry (All)

Capital Structure (S&P Data) - January 1, 2008

Company Name	Ticker	LTD %	PS %	CS %
ATP OIL & GAS CORP	ATPG	48.50%	0.00%	51.50%
CABOT OIL & GAS CORP	COG	7.00%	0.00%	93.00%
CALLON PETROLEUM CO/DE	CPE	53.27%	0.00%	46.73%
CHESAPEAKE ENERGY CORP	CHK	34.62%	6.24%	59.14%
CROSSTEX ENERGY LP	XTEX	59.28%	0.00%	40.72%
DELTA NATURAL GAS CO INC	DGAS	41.38%	0.00%	58.62%
DEVON ENERGY CORP	DVN	12.93%	0.00%	87.07%
EAGLE ROCK ENERGY PARTNRS LP	EROC	30.09%	0.00%	69.91%
EL PASO CORP	EP	49.24%	2.97%	47.79%
ENERGEN CORP	EGN	11.01%	0.00%	88.99%
ENTERPRISE PRODS PRTNER -LP	EPD	32.82%	0.00%	67.18%
EOG RESOURCES INC	EOG	5.12%	0.19%	94.70%
EQUITABLE RESOURCES INC	EQT	10.41%	0.00%	89.59%
MARKWEST ENERGY PARTNERS LP	MWE	32.35%	0.00%	67.65%
NATIONAL FUEL GAS CO	NFG	17.02%	0.00%	82.98%
NEWFIELD EXPLORATION CO	NFX	13.23%	0.00%	86.77%
ONEOK INC	OKE	47.55%	0.00%	52.45%
ONEOK PARTNERS -LP	OKS	33.94%	0.00%	66.06%
PENN VIRGINIA CORP	PVA	31.72%	0.00%	68.28%
PETROLEUM DEVELOPMENT CORP	PETD	16.33%	0.00%	83.67%
QUEST RESOURCE CORP	QRCP	63.47%	0.00%	36.53%
QUESTAR CORP	STR	9.49%	0.00%	90.51%
RENTECH INC	RTK	16.30%	0.00%	83.70%
SOUTHWESTERN ENERGY CO	SWN	7.15%	0.00%	92.85%
XTO ENERGY INC	XTO	19.74%	0.00%	80.26%
	Average	28.16%	0.38%	71.47%
	Median	30.09%	0.00%	69.91%

Source: *S&P Compustat*, January 2008.

Value Line Natural Gas Diversified Industry (w/o LPs)

Capital Structure (S&P Data) - January 1, 2008

Company Name	Ticker	LTD %	PS %	CS %
ATP OIL & GAS CORP	ATPG	48.50%	0.00%	51.50%
CABOT OIL & GAS CORP	COG	7.00%	0.00%	93.00%
CALLON PETROLEUM CO/DE	CPE	53.27%	0.00%	46.73%
CHESAPEAKE ENERGY CORP	CHK	34.62%	6.24%	59.14%
DELTA NATURAL GAS CO INC	DGAS	41.38%	0.00%	58.62%
DEVON ENERGY CORP	DVN	12.93%	0.00%	87.07%
EL PASO CORP	EP	49.24%	2.97%	47.79%
ENERGEN CORP	EGN	11.01%	0.00%	88.99%
EOG RESOURCES INC	EOG	5.12%	0.19%	94.70%
EQUITABLE RESOURCES INC	EQT	10.41%	0.00%	89.59%
NATIONAL FUEL GAS CO	NFG	17.02%	0.00%	82.98%
NEWFIELD EXPLORATION CO	NFX	13.23%	0.00%	86.77%
ONEOK INC	OKE	47.55%	0.00%	52.45%
PENN VIRGINIA CORP	PVA	31.72%	0.00%	68.28%
PETROLEUM DEVELOPMENT CORP	PETD	16.33%	0.00%	83.67%
QUEST RESOURCE CORP	QRCP	63.47%	0.00%	36.53%
QUESTAR CORP	STR	9.49%	0.00%	90.51%
RENTECH INC	RTK	16.30%	0.00%	83.70%
SOUTHWESTERN ENERGY CO	SWN	7.15%	0.00%	92.85%
XTO ENERGY INC	XTO	19.74%	0.00%	80.26%
	Average	25.77%	0.47%	73.76%
	Median	16.68%	0.00%	83.33%

Source: *S&P Compustat*, January 2008.

Value Line Natural Gas Diversified Industry (Large)
Capital Structure (S&P Data) - January 1, 2008

Company Name	Ticker	LTD %	PS %	CS %
CABOT OIL & GAS CORP	COG	7.00%	0.00%	93.00%
CHESAPEAKE ENERGY CORP	CHK	34.62%	6.24%	59.14%
DEVON ENERGY CORP	DVN	12.93%	0.00%	87.07%
EL PASO CORP	EP	49.24%	2.97%	47.79%
ENERGEN CORP	EGN	11.01%	0.00%	88.99%
EOG RESOURCES INC	EOG	5.12%	0.19%	94.70%
EQUITABLE RESOURCES INC	EQT	10.41%	0.00%	89.59%
NATIONAL FUEL GAS CO	NFG	17.02%	0.00%	82.98%
NEWFIELD EXPLORATION CO	NFX	13.23%	0.00%	86.77%
ONEOK INC	OKE	47.55%	0.00%	52.45%
PENN VIRGINIA CORP	PVA	31.72%	0.00%	68.28%
QUESTAR CORP	STR	9.49%	0.00%	90.51%
SOUTHWESTERN ENERGY CO	SWN	7.15%	0.00%	92.85%
XTO ENERGY INC	XTO	19.74%	0.00%	80.26%
	Average	19.73%	0.67%	79.60%
	Median	13.08%	0.00%	86.92%

Interstate Natural Gas Pipeline Forum (Pipelines)
Capital Structure (S&P Data) - January 1, 2008

Company Name	Ticker	LTD %	PS %	CS %
BOARDWALK PIPELINE PARTNERS	BWP	33.82%	0.00%	66.18%
CENTERPOINT ENERGY INC	CNP	59.82%	0.00%	40.18%
EL PASO CORP	EP	49.24%	2.97%	47.79%
KINDER MORGAN ENERGY -LP	KMP	33.30%	0.00%	66.70%
MDU RESOURCES GROUP INC	MDU	18.50%	0.24%	81.25%
NATIONAL FUEL GAS CO	NFG	17.02%	0.00%	82.98%
ONEOK PARTNERS -LP	OKS	33.94%	0.00%	66.06%
QUESTAR CORP	STR	9.49%	0.00%	90.51%
SOUTHERN UNION CO	SUG	40.65%	3.64%	55.71%
SPECTRA ENERGY CORP	SE	34.49%	0.00%	65.51%
TRANSCANADA CORP	TRP	37.24%	1.09%	61.67%
WILLIAMS COS INC	WMB	25.92%	0.00%	74.08%
	Average	32.79%	0.66%	66.55%
	Median	33.88%	0.00%	66.12%

Source: *S&P Compustat*, January 2008.

Cost of Debt

The expected return on debt, or the cost of debt capital (K_d), 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. The YTM (yield to maturity) is the rate of return the existing bondholders expect to receive, and it is also a good estimate of K_d (cost of debt), the rate of return that new bondholders would require.[31] 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.[32]

From information in *Mergent Bond Record* (January 2008), we found the Moody's bond rating to be approximately **Baa2** and the *Standard & Poor's* long-term senior debt rating to be **BBB** for the typical interstate natural gas pipeline. The yield for utility, corporate, and industrial bonds rated Baa was **6.51%, 6.65%**, and **6.78%** respectively as of December 31, 2007. Further, we took note of the yield to maturity for the *Value Line* Natural Gas Diversified Industry (All) group. Within this group we found the average and median yields to maturity for all the bonds with 20 or more years till maturity to be **6.57%** and **6.45%** respectively at December 31, 2007. Additionally, we found the average yield to maturity for all bonds issued by this group, regardless of rating or maturity, to be **6.25%**. From this information we determined the appropriate cost of debt capital to be **6.50%**. 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*.

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[31] Brigham, Eugene F. & Michael C. Ehrhardt, *Financial Management: Theory and Practice*, 10th ed. (Thomson Learning, Inc.: Stamford, CT, 2002), p. 423.

[32] *Stocks, Bonds, Bills and Inflation: 2007 Yearbook, Valuation Edition* (Chicago: Morningstar, Inc., 2007), p. 33.

Value Line Natural Gas Diversified Industry (All)

S&P and Mergent Long-Term Debt Ratings - January 1, 2008

Company Name	Ticker	S&P Rating	Numerical Rating	Mergent Rating	Numerical Rating
ATP Oil & Gas Corp	ATPG				
Cabot Oil & Gas 'A'	COG				
Callon Pete Co	CPE			B2	17
Chesapeake Energy	CHK	BB	14	Ba3	15
Crosstex Energy LP	XTEX				
Delta Natural Gas	DGAS	AAA	3		
Devon Energy	DVN	BBB	11	Baa1	10
EOG Resources	EOG	A-	9	A3	9
Eagle Rock Energy Partners Ltd	EROC				
El Paso Corp.	EP	BB-	15	Ba3	15
Energen Corp.	EGN	A-	9	Baa3	12
Enterprise Products	EPD	BBB-	12	Baa3	12
Equitable Resources	EQT	A	8	Baa1	10
Markwest Energy Partners LP	MWE	B	17	B2	17
National Fuel Gas	NFG	BBB+	10	Baa1	10
Newfield Exploration	NFX	BB-	15	Ba3	15
ONEOK Inc.	OKE	BBB	11	Baa2	11
ONEOK Partners LP	OKS	BBB	11	Baa2	11
Penn Virginia Corp.	PVA				
Petroleum Development Corp.	PETD				
Quest Resource Corp	QRCP				
Questar Corp.	STR	A-	9	A2	8
Rentech Inc.	RTK				
Southwestern Energy	SWN	BBB	11	Ba3	15
XTO Energy	XTO	BBB	11	Baa2	11
	Average	BBB	11	Baa3	12
	Median	BBB	11	Baa3	12

Source: *Mergent* Database, Jan. 2008.

Value Line Natural Gas Diversified Industry (w/o LPs)

S&P and Mergent Long-Term Debt Ratings - January 1, 2008

Company Name	Ticker	S&P Rating	Numerical Rating	Mergent Rating	Numerical Rating
ATP Oil & Gas Corp	ATPG				
Cabot Oil & Gas 'A'	COG				
Callon Pete Co	CPE			B2	17
Chesapeake Energy	CHK	BB	14	Ba3	15
Delta Natural Gas	DGAS	AAA	3		
Devon Energy	DVN	BBB	11	Baa1	10
EOG Resources	EOG	A-	9	A3	9
El Paso Corp.	EP	BB-	15	Ba3	15
Energen Corp.	EGN	A-	9	Baa3	12
Equitable Resources	EQT	A	8	Baa1	10
National Fuel Gas	NFG	BBB+	10	Baa1	10
Newfield Exploration	NFX	BB-	15	Ba3	15
ONEOK Inc.	OKE	BBB	11	Baa2	11
Penn Virginia Corp.	PVA				
Petroleum Development Corp.	PETD				
Quest Resource Corp	QRCP				
Questar Corp.	STR	A-	9	A2	8
Rentech Inc.	RTK				
Southwestern Energy	SWN	BBB	11	Ba3	15
XTO Energy	XTO	BBB	11	Baa2	11
	Average	BBB-	10	Baa3	12
	Median	BBB	11	Baa2	11

Value Line Natural Gas Diversified Industry (Large)

S&P and Mergent Long-Term Debt Ratings - January 1, 2008

Company Name	Ticker	S&P Rating	Numerical Rating	Mergent Rating	Numerical Rating
Cabot Oil & Gas 'A'	COG				
Chesapeake Energy	CHK	BB	14	Ba3	15
Devon Energy	DVN	BBB	11	Baa1	10
El Paso Corp.	EP	BB-	15	Ba3	15
Energen Corp.	EGN	A-	9	Baa3	12
EOG Resources	EOG	A-	9	A3	9
Equitable Resources	EQT	A	8	Baa1	10
National Fuel Gas	NFG	BBB+	10	Baa1	10
Newfield Exploration	NFX	BB-	15	Ba3	15
ONEOK Inc.	OKE	BBB	11	Baa2	11
Penn Virginia Corp.	PVA				
Questar Corp.	STR	A-	9	A2	8
Southwestern Energy	SWN	BBB	11	Ba3	15
XTO Energy	XTO	BBB	11	Baa2	11
	Average	BBB	11	Baa3	12
	Median	BBB	11	Baa2	11

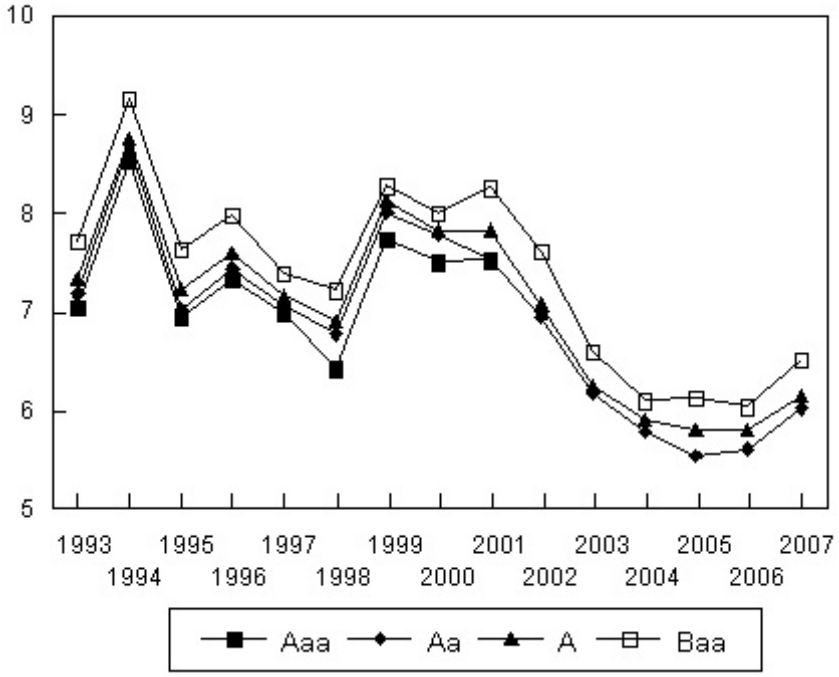
Source: Mergent Database, Jan. 2008.

Interstate Natural Gas Pipeline Forum (Pipelines)
S&P and Mergent Long-Term Debt Ratings - January 1, 2008

Company Name	Ticker	S&P Rating	Numerical Rating	Mergent Rating	Numerical Rating
Boardwalk Pipeline	BWP	BBB	11	Baa2	11
CenterPoint Energy	CNP	BBB-	12	Ba1	13
El Paso Corp.	EP	BB-	15	Ba3	15
Kinder Morgan Energy	KMP	BBB	11	Baa2	11
MDU Resources	MDU	A-	9	A2	8
National Fuel Gas	NFG	BBB+	10	Baa1	10
ONEOK Inc.	OKE	BBB	11	Baa2	11
Questar Corp.	STR	A-	9	A2	8
Southern Union	SUG	BBB	11	Baa3	12
Spectra Energy	SE				
TransCanada Corp.	TRP	A-	9	A2	8
Williams Cos.	WMB	BB+	13	Baa3	12
	Average	BBB	11	Baa2	11
	Median	BBB	11	Baa2	11

Source: *Mergent* Database, Jan. 2008.

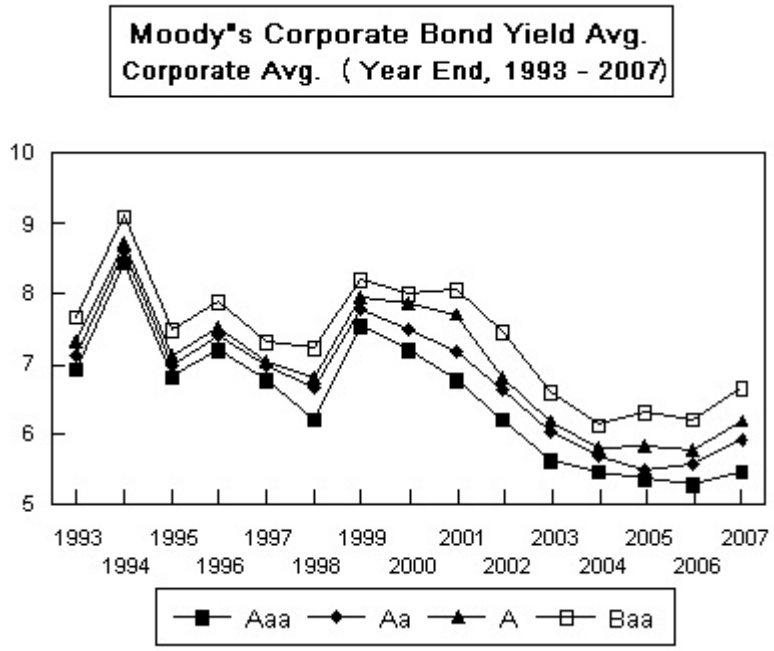
Mergent Utility Bond Yields
Public Utility Yields (1993 - 2007)
Year End Data



1993-2007 Public Utility Bond Yields - Year End Data				
Year End Date	Aaa	Aa	A	Baa
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
2003	—	6.18	6.27	6.61
2004	—	5.78	5.92	6.10
2005	—	5.55	5.80	6.14
2006	—	5.62	5.81	6.05
2007	---	6.03	6.16	6.51

Source: *Mergent's Bond Record*, January 1994 - 2008

Mergent Corporate Bond Yields



1993 - 2007 Moody's Corporate Bond Yields Corporate Averages - Year End Data				
Year End Date	Aaa	Aa	A	Baa
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
2003	5.65	6.02	6.19	6.60
2004	5.47	5.69	5.82	6.15
2005	5.38	5.51	5.84	6.33
2006	5.29	5.58	5.78	6.22
2007	5.49	5.91	6.19	6.65

Source: *Mergent's Bond Record*, January 1994 - 2008

Cost of Equity

We have estimated the cost of equity capital by employing several methods. The market cost of equity is generally 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 Gordon growth model sometimes referred to as the discounted cash flow method (or DCF method), 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 before flotation costs of **11.75%**. 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, 2008

Company Groups	*Value Line* Data		S&P (IBES) Data	
	Average	Median	Average	Median
Value Line Natural Gas (Diversified) - All	10.44	7.86	14.34	12.99
Value Line Natural Gas (Diversified) - All w/o LPs	9.80	7.80	11.51	12.18
Value Line Natural Gas (Diversified) - Large	9.80	7.80	11.51	12.18
Interstate Natural Gas Pipeline Forum (Pipes)	14.28	11.47	11.89	12.03
S&P Screened Comparables Group	10.21	11.97	12.09	12.39
Averages	10.91	9.38	12.27	12.35

The discounted cash flow method for above industry groups were calculated as follows:

Using *Value Line* data and *Value Line* earnings growth estimates and S&P's *Compustat* data with *Institutional Brokers Estimate System* (IBES) earnings growth.

Risk Premium Indicators - January 1, 2008

General Risk Premium Indicators

Indicators	Rates		Indicator
	Rf	Rp	
20-Year Treasury Bonds (ex post)	4.50	7.10	11.60
20-Year Treasury Bonds (ex ante)	4.50	9.51	14.01

Risk Premium Indicators by Groups

Indicators	Risk Premium	
	Average	Median
Natural Gas Diversified Industry (All)	12.67	12.55
Natural Gas Diversified Industry (Large)	12.65	12.55
Interstate Nat. Gas Pipeline Forum Group (Pipes)	12.55	12.66
Screened Comparables Group	12.28	12.52
Average	12.54	12.57

Risk Premium Formula: Ke = Rf + Rp

Base Rate: Yield to maturity on each company's long-term bonds, *Mergent Bond Record*, January, 2008.

Risk Premium: *SBBI*, Morningstar, 2008 Corporate Bond RP of 6.1%.

Capital Asset Pricing Model (CAPM) - January 1, 2008

Item	Rates			CAPM
	Rf	Rp	Beta	Indicator
CAPM Indicator *				
Long-Term Gov't Bonds (ex post)	4.50	7.10	0.95	11.25
Long-Term Gov't Bonds (ex ante)	4.50	9.51	0.95	13.53

CAPM Formula: Ke = Rf + B(Rp)

* CAPM Indicator is based upon a *Value Line* beta of 0.95. Morningstar, *2008 SBBI* & *Risk Premia over Time Report*;, & Federal Reserve data December 31, 2007.

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 Compustat* 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 9,900 companies for companies with risk equal to the risk of the typical interstate natural gas pipeline. As a measure of financial risk the average Standard and Poor's rating on the long-term debt of companies comprising the large natural gas pipeline industry was **BBB**. Our first screening process was to find all companies having a S&P senior debt rating of BBB to BBB+ (the mid-rated triple B debt to the highest level triple B 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. (Several of these companies have double B rated debt.) 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. 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 1.00

presently. Thus we excluded all companies with S&P adjusted betas less than 0.80 and greater than 1.20. 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, 2008
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
Cabot Oil & Gas Corp	COG			1.12	20.09	0.46
Chesapeake Energy Corp	CHK	BB	14	1.06	15.83	0.36
Devon Energy Corp	DVN	BBB	11	0.97	18.28	0.32
El Paso Corp	EP	BB	14	1.33	8.56	0.14
Energen Corp	EGN	BBB+	10	0.78	64.29	0.49
EOG Resources Inc	EOG	A-	9	0.85	23.79	0.45
Equitable Resources Inc	EQT	A-	9	0.83	15.55	0.38
National Fuel Gas Co	NFG	BBB+	10	0.80	13.77	0.54
Newfield Exploration Co	NFX	BB+	13	0.85	10.54	0.29
ONEOK Inc	OKE	BBB	11	1.14	15.39	1.16
Penn Virginia Corp	PVA			1.28	12.55	0.52
Questar Corp	STR			0.76	17.87	0.60
Southwestern Energy Co	SWN	BB+	13	1.18	12.21	0.36
XTO Energy Inc	XTO	BBB	11	1.00	23.76	0.40
	Average	BBB	11	1.00	19.46	0.46

Source: *S&P Compustat*, January 2008.

Surviving the screening process are eleven (11) 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:

ALLETE
Central Tel Inc.
Corning, Inc.
Devon Energy
DPL, Inc.
Molson Coors Brewing
Newmont Mining
Rayonier, Inc.
Republic Services
Waste Management
XTO Energy

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 four (4) other groups of companies, the Value Line natural gas (diversified) group

(all companies), the Value Line natural gas (diversified) group (all companies excluding the limited partnerships), the Value Line natural gas (diversified) group (large companies – with over $750 million in annual sales), and the interstate natural gas pipeline forum group (traded) that are heavily involved with pipelines. We used financial data from two independent sources, *Standard and Poor's Compustat* database, and the *Value Line Investment Survey*. The two independent sources of data gave us two sets of growth estimates for the five 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 Compustat* 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.[33] 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 **11.25%** as of January 1, 2008. The result of all of the DCF analysis and research can be found below.

Summary of DCF Method Indicators

Company Groups	*Value Line* Data		S&P (IBES) Data	
	Average	Median	Average	Median
Value Line Natural Gas (Diversified) - All	10.44	7.86	14.34	12.99
Value Line Natural Gas (Diversified) - All w/o LPs	9.80	7.80	11.51	12.18
Value Line Natural Gas (Diversified) - Large	9.80	7.80	11.51	12.18
Interstate Natural Gas Pipeline Forum (Pipes)	14.28	11.47	11.89	12.03
S&P Screened Comparables Group	10.21	11.97	12.09	12.39
Averages	10.91	9.38	12.27	12.35

The discounted cash flow method for above industry groups were calculated as follows:
Using *Value Line* data and *Value Line* earnings growth estimates and S&P's *Compustat* data with *Institutional Brokers Estimate System* (IBES) earnings growth.

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

Value Line Natural Gas Diversified Industry (All)
DCF Indicator (VL Data) - January 1, 2008

Company Name	Ticker	% Cur Yld	EPS Gth	DCF
ATP Oil & Gas Corp	ATPG		35.00	
Cabot Oil & Gas 'A'	COG	0.30	7.50	7.80
Callon Pete Co	CPE		10.00	
Chesapeake Energy	CHK	0.76	4.50	5.26
Crosstex Energy LP	XTEX			
Delta Natural Gas	DGAS		3.00	
Devon Energy	DVN	0.62	6.00	6.62
EOG Resources	EOG	0.43	6.50	6.93
Eagle Rock Energy Partners Ltd	EROC			
El Paso Corp.	EP	0.92	28.00	28.92
Energen Corp.	EGN	0.73	5.50	6.23
Enterprise Products	EPD	6.52	11.00	17.52
Equitable Resources	EQT	1.78	11.50	13.28
Markwest Energy Partners LP	MWE			
National Fuel Gas	NFG	2.64	4.50	7.14
Newfield Exploration	NFX		1.00	
ONEOK Inc.	OKE	3.28	5.50	8.78
ONEOK Partners LP	OKS			
Penn Virginia Corp.	PVA			
Petroleum Development Corp.	PETD			
Quest Resource Corp	QRCP			
Questar Corp.	STR	0.91	8.00	8.91
Rentech Inc.	RTK			
Southwestern Energy	SWN		25.50	
XTO Energy	XTO	0.91	7.00	7.91
	Average	1.65	10.59	10.44
	Median	0.91	7.00	7.86

Source: *Value Line* CD Rom, January 2008.

Value Line Natural Gas Diversified Industry (w/o LPs)

DCF Indicator (VL Data) - January 1, 2008

Company Name	Ticker	% Cur Yld	EPS Gth	DCF
ATP Oil & Gas Corp	ATPG		35.00	
Cabot Oil & Gas 'A'	COG	0.30	7.50	7.80
Callon Pete Co	CPE		10.00	
Chesapeake Energy	CHK	0.76	4.50	5.26
Delta Natural Gas	DGAS		3.00	
Devon Energy	DVN	0.62	6.00	6.62
EOG Resources	EOG	0.43	6.50	6.93
El Paso Corp.	EP	0.92	28.00	28.92
Energen Corp.	EGN	0.73	5.50	6.23
Equitable Resources	EQT	1.78	11.50	13.28
National Fuel Gas	NFG	2.64	4.50	7.14
Newfield Exploration	NFX		1.00	
ONEOK Inc.	OKE	3.28	5.50	8.78
Penn Virginia Corp.	PVA			
Petroleum Development Corp.	PETD			
Quest Resource Corp	QRCP			
Questar Corp.	STR	0.91	8.00	8.91
Rentech Inc.	RTK			
Southwestern Energy	SWN		25.50	
XTO Energy	XTO	0.91	7.00	7.91
	Average	1.21	10.56	9.80
	Median	0.91	6.75	7.80

Source: *Value Line* CD Rom, January 2008.

Value Line Natural Gas Diversified Industry (Large)
DCF Indicator (VL Data) - January 1, 2008

Company Name	Ticker	% Cur Yld	EPS Gth	DCF
Cabot Oil & Gas 'A'	COG	0.30	7.50	7.80
Chesapeake Energy	CHK	0.76	4.50	5.26
Devon Energy	DVN	0.62	6.00	6.62
El Paso Corp.	EP	0.92	28.00	28.92
Energen Corp.	EGN	0.73	5.50	6.23
EOG Resources	EOG	0.43	6.50	6.93
Equitable Resources	EQT	1.78	11.50	13.28
National Fuel Gas	NFG	2.64	4.50	7.14
Newfield Exploration	NFX		1.00	
ONEOK Inc.	OKE	3.28	5.50	8.78
Penn Virginia Corp.	PVA			
Questar Corp.	STR	0.91	8.00	8.91
Southwestern Energy	SWN		25.50	
XTO Energy	XTO	0.91	7.00	7.91
	Average	1.21	9.31	9.80
	Median	0.91	6.50	7.80

Interstate Natural Gas Pipeline Forum (Pipelines)
DCF Indicator (VL Data) - January 1, 2008

Company Name	Ticker	% Cur Yld	EPS Gth	DCF
Boardwalk Pipeline	BWP	6.27		
CenterPoint Energy	CNP	4.33	9.50	13.83
El Paso Corp.	EP	0.92	28.00	28.92
Kinder Morgan Energy	KMP	6.47	5.00	11.47
MDU Resources	MDU	2.11	5.00	7.11
National Fuel Gas	NFG	2.64	4.50	7.14
ONEOK Partners LP	OKS			
Questar Corp.	STR	0.91	8.00	8.91
Southern Union	SUG	2.03	7.50	9.53
Spectra Energy	SE	3.58		
TransCanada Corp.	TRP	3.36	13.00	16.36
Williams Cos.	WMB	1.25	24.00	25.25
	Average	3.08	11.61	14.28
	Median	2.64	8.00	11.47

Source: *Value Line* CD Rom, January 2008.

Value Line Natural Gas Diversified Industry (All)
DCF Indicator (S&P Data) - January 1, 2008

Company Name	Ticker	Current Yield	EPS Growth	DCF
ATP OIL & GAS CORP	ATPG		53.50	
CABOT OIL & GAS CORP	COG	0.34	12.73	13.07
CALLON PETROLEUM CO/DE	CPE		10.00	
CHESAPEAKE ENERGY CORP	CHK	0.82	19.00	19.82
CROSSTEX ENERGY LP	XTEX	8.14	7.00	15.14
DELTA NATURAL GAS CO INC	DGAS			
DEVON ENERGY CORP	DVN	0.66	5.00	5.66
EAGLE ROCK ENERGY PARTNRS LP	EROC	10.41	29.50	39.91
EL PASO CORP	EP	1.03	11.00	12.03
ENERGEN CORP	EGN	0.77	7.00	7.77
ENTERPRISE PRODS PRTNER -LP	EPD	6.76	10.00	16.76
EOG RESOURCES INC	EOG	0.44	8.52	8.96
EQUITABLE RESOURCES INC	EQT	1.83	10.50	12.33
MARKWEST ENERGY PARTNERS LP	MWE	7.39	13.45	20.84
NATIONAL FUEL GAS CO	NFG	2.79	5.00	7.79
NEWFIELD EXPLORATION CO	NFX		8.65	
ONEOK INC	OKE	3.51	9.00	12.51
ONEOK PARTNERS -LP	OKS	6.99	6.00	12.99
PENN VIRGINIA CORP	PVA	0.59	15.00	15.59
PETROLEUM DEVELOPMENT CORP	PETD		15.00	
QUEST RESOURCE CORP	QRCP			
QUESTAR CORP	STR	0.98	8.50	9.48
RENTECH INC	RTK			
SOUTHWESTERN ENERGY CO	SWN		21.46	
XTO ENERGY INC	XTO	1.05	12.00	13.05
	Average	3.21	13.54	14.34
	Median	1.05	10.25	12.99

Source: *S&P Compustat*, January 2008.

Value Line Natural Gas Diversified Industry (w/o LPs)

DCF Indicator (S&P Data) - January 1, 2008

Company Name	Ticker	Current Yield	EPS Growth	DCF
ATP OIL & GAS CORP	ATPG		53.50	
CABOT OIL & GAS CORP	COG	0.34	12.73	13.07
CALLON PETROLEUM CO/DE	CPE		10.00	
CHESAPEAKE ENERGY CORP	CHK	0.82	19.00	19.82
DELTA NATURAL GAS CO INC	DGAS			
DEVON ENERGY CORP	DVN	0.66	5.00	5.66
EL PASO CORP	EP	1.03	11.00	12.03
ENERGEN CORP	EGN	0.77	7.00	7.77
EOG RESOURCES INC	EOG	0.44	8.52	8.96
EQUITABLE RESOURCES INC	EQT	1.83	10.50	12.33
NATIONAL FUEL GAS CO	NFG	2.79	5.00	7.79
NEWFIELD EXPLORATION CO	NFX		8.65	
ONEOK INC	OKE	3.51	9.00	12.51
PENN VIRGINIA CORP	PVA	0.59	15.00	15.59
PETROLEUM DEVELOPMENT CORP	PETD		15.00	
QUEST RESOURCE CORP	QRCP			
QUESTAR CORP	STR	0.98	8.50	9.48
RENTECH INC	RTK			
SOUTHWESTERN ENERGY CO	SWN		21.46	
XTO ENERGY INC	XTO	1.05	12.00	13.05
	Average	1.23	13.64	11.51
	Median	0.90	10.50	12.18

Source: *S&P Compustat*, January 2008.

Value Line Natural Gas Diversified Industry (Large)
DCF Indicator (S&P Data) - January 1, 2008

Company Name	Ticker	Current Yield	EPS Growth	DCF
CABOT OIL & GAS CORP	COG	0.34	12.73	13.07
CHESAPEAKE ENERGY CORP	CHK	0.82	19.00	19.82
DEVON ENERGY CORP	DVN	0.66	5.00	5.66
EL PASO CORP	EP	1.03	11.00	12.03
ENERGEN CORP	EGN	0.77	7.00	7.77
EOG RESOURCES INC	EOG	0.44	8.52	8.96
EQUITABLE RESOURCES INC	EQT	1.83	10.50	12.33
NATIONAL FUEL GAS CO	NFG	2.79	5.00	7.79
NEWFIELD EXPLORATION CO	NFX		8.65	
ONEOK INC	OKE	3.51	9.00	12.51
PENN VIRGINIA CORP	PVA	0.59	15.00	15.59
QUESTAR CORP	STR	0.98	8.50	9.48
SOUTHWESTERN ENERGY CO	SWN		21.46	
XTO ENERGY INC	XTO	1.05	12.00	13.05
	Average	1.23	10.95	11.51
	Median	0.90	9.75	12.18

Interstate Natural Gas Pipeline Forum (Pipelines)
DCF Indicator (S&P Data) - January 1, 2008

Company Name	Ticker	Current Yield	EPS Growth	DCF
BOARDWALK PIPELINE PARTNERS	BWP	6.19	7.00	13.19
CENTERPOINT ENERGY INC	CNP	4.37	10.00	14.37
EL PASO CORP	EP	1.03	11.00	12.03
KINDER MORGAN ENERGY -LP	KMP	7.04	8.00	15.04
MDU RESOURCES GROUP INC	MDU	2.26	7.70	9.96
NATIONAL FUEL GAS CO	NFG	2.79	5.00	7.79
ONEOK PARTNERS -LP	OKS	6.99	6.00	12.99
QUESTAR CORP	STR	0.98	8.50	9.48
SOUTHERN UNION CO	SUG	2.20	7.80	10.00
SPECTRA ENERGY CORP	SE	3.61	6.00	9.61
TRANSCANADA CORP	TRP			
WILLIAMS COS INC	WMB	1.29	15.00	16.29
	Average	3.52	8.36	11.89
	Median	2.79	7.80	12.03

Source: *S&P Compustat*, January 2008.

Pipeline Screened Comparables Group
DCF Indicator (VL Data) - January 1, 2008

Company Name	Ticker	% Cur Yld	EPS Gth	DCF
ALLETE	ALE	4.22	8.00	12.22
CenturyTel Inc.	CTL	0.64	1.00	1.64
Corning Inc.	GLW	0.83	16.00	16.83
Devon Energy	DVN	0.62	6.00	6.62
DPL Inc.	DPL	3.68	10.50	14.18
Molson Coors Brewing	TAP	1.22		
Newmont Mining	NEM	0.83	1.50	2.33
Rayonier Inc.	RYN	4.21	7.50	11.71
Republic Services	RSG	2.12	12.50	14.62
Waste Management	WMI	3.00	11.00	14.00
XTO Energy	XTO	0.91	7.00	7.91
	Average	2.03	8.10	10.21
	Median	1.22	7.75	11.97

Source: *Value Line* CD Rom, January 2008.

Pipeline Screened Comparables Group
DCF Indicator (S&P Data) - January 1, 2008

Company Name	Ticker	Current Yield	EPS Growth	DCF
ALLETE INC	ALE	4.35	5.00	9.35
CENTURYTEL INC	CTL	0.65	3.34	3.99
CORNING INC	GLW	0.99	18.50	19.49
DEVON ENERGY CORP	DVN	0.66	5.00	5.66
DPL INC	DPL	3.77	7.50	11.27
MOLSON COORS BREWING CO	TAP	1.40	13.00	14.40
NEWMONT MINING CORP	NEM	0.97	19.00	19.97
RAYONIER INC	RYN	4.48	5.70	10.18
REPUBLIC SERVICES INC	RSG	2.39	10.00	12.39
WASTE MANAGEMENT INC	WMI	3.23	10.00	13.23
XTO ENERGY INC	XTO	1.05	12.00	13.05
	Average	2.18	9.91	12.09
	Median	1.40	10.00	12.39

Source: *S&P Compustat*, January 2008.

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 ex post risk premiums were derived from the *2008 Valuation Edition* of *Stocks, Bonds, Bills and Inflation* (SBBI), published by Morningstar. Our ex ante risk premium was derived from the market-weighted expected cost of capital for the S&P 500 less the current 20-year Treasury bond rate. The SBBI risk premium was cross-checked for reasonableness by information from *Value Line*.[34] Our relevant current 'safe rates' for the

[34] In an effort to check the long-term risk premium of 7.1% from SBBI published by Morningstar, Inc., we performed our own calculations to confirm or deny the reasonableness of this figure. The SBBI risk premium figure is supported by our own calculations of risk premium by using the CAPM formula in Figure A. From *Value Line* we know the market average return on all the stocks in their database is 12.84% and that the 5-year beta is 1.09 for the full database (see statistics for full database, *Value Line* CD ROM, January 2008). Further, we know the long-term treasury bond rate is 4.50% at January 1, 2008. Therefore, we can substitute all the known elements into the CAPM formula and solve for RP as shown in Figure B. The result of this calculation is a risk premium indicator of 7.65%, which more than supports the SBBI long-term government bond risk premium of 7.1%.

$$K_e = R_f + \beta(R_p)$$

Figure A

Solve for R_p

$$R_p = \frac{K_e - R_f}{\beta}$$

$$R_p = \frac{0.1284 - 0.0450}{1.09}$$

$$R_p = 0.0765$$

Figure B

general indicators were derived from the sources footnoted below.[35] The 'safe rates' (or base 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 in *Mergent Bond Record* database (January, 2008). The average yield to maturity for each company's bonds was added to the SBBI corporate bond risk premium of 6.1% 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 Morningstar, indicates a cost of equity capital of 11.60% (ex post) and 14.01% (ex ante).

The range for all calculations of averages of risk premiums using the indicators by specific company groups are between 12.28% and 12.67%. This measurement involved the use of the average long-term yields to maturity for company bonds with at least 20 years to maturity plus the corporate bond risk premium of 6.1%. A reasonable view of these results would indicate a risk premium correlated indicator for the specific companies to be approximately 12.50%.

For the general indicators discussed on the previous page the ex post and ex ante indicators using the long-term government bonds are deemed appropriate because a purchase of an interstate natural gas pipeline company is considered a long-term commitment of capital, and thus the long-term bond risk premium should be indicative of the cost of long-term equity capital for the typical company. These indicators together would support a cost of equity of 12.50%.

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, 2008 is **12.50%**. 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 Indicators - January 1, 2008

General Risk Premium Indicators

Indicators	Rates		Indicator
	Rf	Rp	
20-Year Treasury Bonds (ex post indicator)	4.50	7.10	11.60
20-Year Treasury Bonds (ex ante indicator)	4.50	9.51	14.01

[35] Morningstar, *2008 SBBI & 2008 Ibbotson Risk Premia Over time Report* and The Federal Reserve, Dec. 31, 2007.

Risk Premium Indicators by Groups

Indicators	Risk Premium	
	Average	Median
Natural Gas Diversified Industry (All)	12.67	12.55
Natural Gas Diversified Industry (Large)	12.65	12.55
Interstate Nat. Gas Pipeline Forum Group	12.55	12.66
Screened Comparables Group	12.28	12.52
Average	12.54	12.57

Risk Premium Formula: Ke = Rf + Rp

Base Rate: Yield to maturity on each company's long-term bonds, *Mergent Bond Record*, Jan. 2008. Risk Premium: SBBI, Morningstar, 2008 Corporate Bond RP of 6.1%.

Summary Statistics of Annual Returns: Basic Series (in percent)
2008 Ibbotson SBBI Valuation Yearbook: Table 2-1, page 28
From 1926 to 2007

Series	Geometric Mean	Arithmetic Mean	Standard Deviation
Large Company Stocks			
Total Returns[1]	10.4	12.3	20.0
Income	4.2	4.2	1.6
Capital Appreciation	6.0	7.8	19.3
Ibbotson Small Company Stocks			
Total Returns	12.5	17.1	32.6
Mid-Cap Stocks [2, 5]			
Total Returns	11.3	14.0	24.4
Income	4.0	4.0	1.7
Capital Appreciation	7.1	9.8	23.7
Low-Cap Stocks [3, 5]			
Total Returns	11.7	15.5	29.0
Income	3.7	3.7	2.0
Capital Appreciation	7.9	11.6	28.4
Micro-Cap Stocks [4, 5]			
Total Returns	12.5	18.5	38.8
Income	2.6	2.6	1.8
Capital Appreciation	9.9	15.8	38.3
Long-Term Corporate Bonds			
Total Returns	5.9	6.2	8.4
Long-Term Government Bonds			
Total Returns	5.4	5.8	9.2
Income	5.2	5.2	2.7
Capital Appreciation	0.1	0.4	8.0
Intermediate-Term Government Bonds			
Total Returns	5.3	5.5	5.7
Income	4.7	4.7	2.9
Capital Appreciation	0.5	0.5	4.4
Treasury Bills			
Total Returns	3.7	3.8	3.1
Inflation	3.0	3.1	4.2

[1] Total return is equal to the sum of three component returns: income return, capital appreciation return, and reinvestment return.

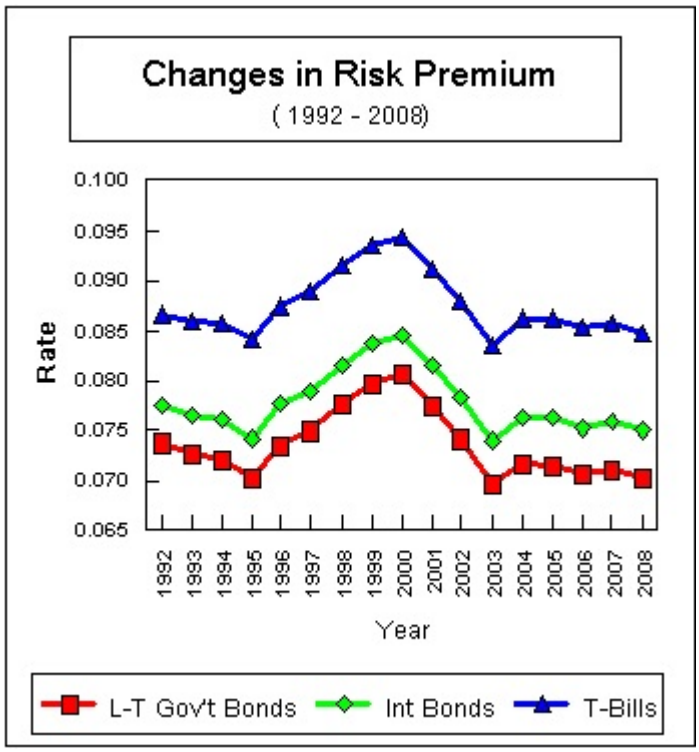
[2] Mid-Cap stocks are represented here by CRSP NYSE/AMEX/NASDAQ deciles 3-5.

[3] Low-Cap stocks are represented here by CRSP NYSE/AMEX/NASDAQ deciles 6-8.

[4] Micro-Cap stocks are represented here by CRSP NYSE/AMEX/NASDAQ deciles 9-10.

[5] Source of underlying returns and breakpoints for NYSE/AMEX/NASDAQ deciles: ©200801 CRSP®, Center for Research in Security Prices, Graduate School of Business, The University of Chicago used with permission. All rights reserved. www.crsp.chicagogsb.edu.

Changes in Risk Premium & Summary Calculations



RISK PREMIUM CALCULATION FOR COST OF EQUITY

L-T Govt Bonds	
Risk Premium*	7.1%
Applicable Rate**	4.5%
Indicated Cost of Equity	11.6%

Intermediate Gov't Bonds	
Risk Premium*	7.6%
Applicable Rate**	3.5%
Indicated Cost of Equity	11.1%

T-Bills	
Risk Premium*	8.5%
Applicable Rate**	2.8%
Indicated Cost of Equity	11.3%

Avg. Risk Prem Ind.	11.3%

Source: *Morningstar, 2008 SBBI December Market Report; **Fed Res. T&A (12/31/07)

RISK PREMIUM			
Year	L-T Gov't	Intermediate	T-Bills
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
2004	0.0719	0.0763	0.0862
2005	0.0716	0.0762	0.0863
2006	0.0707	0.0754	0.0855
2007	0.0712	0.0758	0.0858
2008	0.0704	0.0750	0.0848

Value Line Natural Gas Diversified Industry (All)

Yield to Maturity for Long-Term Debt - January 1, 2008

Company Name	Ticker	Mergent Rating	Numerical Rating	YTM* 20+ Bonds	Risk Prem. Indicator
ATP Oil & Gas Corp	ATPG				
Cabot Oil & Gas 'A'	COG				
Callon Pete Co	CPE	B2	17		
Chesapeake Energy	CHK	Ba3	15		
Crosstex Energy LP	XTEX				
Delta Natural Gas	DGAS				
Devon Energy	DVN	Baa1	10	5.99	12.09
EOG Resources	EOG	A3	9	6.37	12.47
Eagle Rock Energy Partners Ltd	EROC				
El Paso Corp.	EP	Ba3	15	7.69	13.79
Energen Corp.	EGN	Baa3	12	6.67	12.77
Enterprise Products	EPD	Baa3	12	6.97	13.07
Equitable Resources	EQT	Baa1	10		
Markwest Energy Partners LP	MWE	B2	17		
National Fuel Gas	NFG	Baa1	10		
Newfield Exploration	NFX	Ba3	15		
ONEOK Inc.	OKE	Baa2	11	6.52	12.62
ONEOK Partners LP	OKS	Baa2	11	6.31	12.41
Penn Virginia Corp.	PVA				
Petroleum Development Corp.	PETD				
Quest Resource Corp	QRCP				
Questar Corp.	STR	A2	8		
Rentech Inc.	RTK				
Southwestern Energy	SWN	Ba3	15		
XTO Energy	XTO	Baa2	11	6.03	12.13
	Average	Baa3	12	6.57	12.67
	Median	Baa3	12	6.45	12.55

* Yield to Maturity for bonds with 20+ years to maturity. Source: Mergent Database, Jan. 2008.

Value Line Natural Gas Diversified Industry (Large)

Yield to Maturity for Long-Term Debt - January 1, 2008

Company Name	Ticker	Mergent Rating	Numerical Rating	YTM* 20+ Bonds	Risk Prem. Indicator
Cabot Oil & Gas 'A'	COG				
Chesapeake Energy	CHK	Ba3	15		
Devon Energy	DVN	Baa1	10	5.99	12.09
El Paso Corp.	EP	Ba3	15	7.69	13.79
Energen Corp.	EGN	Baa3	12	6.67	12.77
EOG Resources	EOG	A3	9	6.37	12.47
Equitable Resources	EQT	Baa1	10		
National Fuel Gas	NFG	Baa1	10		
Newfield Exploration	NFX	Ba3	15		
ONEOK Inc.	OKE	Baa2	11	6.52	12.62
Penn Virginia Corp.	PVA				
Questar Corp.	STR	A2	8		
Southwestern Energy	SWN	Ba3	15		
XTO Energy	XTO	Baa2	11	6.03	12.13
	Average	Baa3	12	6.55	12.65
	Median	Baa2	11	6.45	12.55

Interstate Natural Gas Pipeline Forum (Pipelines)

Yield to Maturity for Long-Term Debt - January 1, 2008

Company Name	Ticker	Mergent Rating	Numerical Rating	YTM* 20+ Bonds	Risk Prem. Indicator
Boardwalk Pipeline	BWP	Baa2	11		
CenterPoint Energy	CNP	Ba1	13	5.73	11.83
El Paso Corp.	EP	Ba3	15	7.69	13.79
Kinder Morgan Energy	KMP	Baa2	11	6.60	12.70
MDU Resources	MDU	A2	8	4.85	10.95
National Fuel Gas	NFG	Baa1	10		
ONEOK Inc.	OKE	Baa2	11	6.52	12.62
Questar Corp.	STR	A2	8		
Southern Union	SUG	Baa3	12	7.13	13.23
Spectra Energy	SE				
TransCanada Corp.	TRP	A2	8	6.12	12.22
Williams Cos.	WMB	Baa3	12	6.96	13.06
	Average	Baa2	11	6.45	12.55
	Median	Baa2	11	6.56	12.66

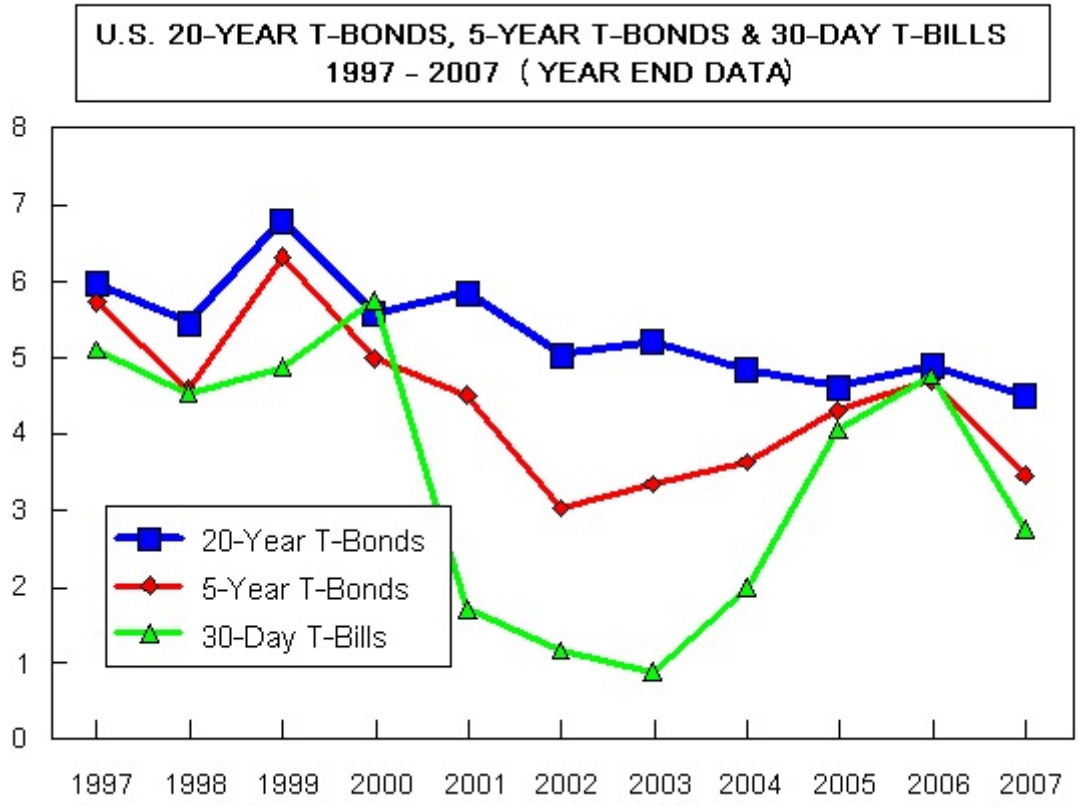
* Yield to Maturity for bonds with 20+ years to maturity. Source: Mergent Database, Jan. 2008.

Pipeline Screened Comparables Group

Yield to Maturity for Long-Term Debt - January 1, 2008

Company Name	Ticker	Mergent Rating	Numerical Rating	YTM* 20+ Bonds	Risk Prem. Indicator
ALLETE	ALE				
CenturyTel Inc.	CTL	Baa2	11	6.87	12.97
Corning Inc.	GLW	Baa1	10	6.54	12.64
Devon Energy	DVN	Baa1	10	5.99	12.09
DPL Inc.	DPL	A2	8	4.91	11.01
Molson Coors Brewing	TAP	Baa2	11		
Newmont Mining	NEM				
Rayonier Inc.	RYN				
Republic Services	RSG	Baa1	10	6.47	12.57
Waste Management	WMI	Baa3	12	6.42	12.52
XTO Energy	XTO	Baa2	11	6.03	12.13
	Average	Baa1	10	6.18	12.28
	Median	Baa2	11	6.42	12.52

* Yield to Maturity for bonds with 20+ years to maturity. Source: Mergent Database, Jan. 2008.



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
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
2003	5.21	3.36	0.88
2004	4.84	3.64	1.99
2005	4.62	4.30	4.05
2006	4.91	4.70	4.75
2007	4.50	3.45	2.76

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 Morningstar 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 Morningstar, which includes data from 1926 through 2007. The indicated cost of equity by this method was 11.25% at January 1, 2008. Our *ex ante* CAPM calculations were based upon the expected risk premium of 9.51% derived from the market-weighted average of the cost of equity capital less the current long-term Treasury bond rate. The indicated cost of equity by this method was 13.53% at January 1, 2008.

Our 'safe rates' for the CAPM calculations were derived as described in the risk premium method discussed earlier. Our beta estimate of 0.95 was based on observing the average and median betas from each of the groups. The average and median betas are shown in Figure 5. The calculated forward-looking (*ex ante*) CAPM indicator was found by deriving an expected risk premium from the S&P 500 companies. The *ex ante* CAPM 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

Group of Companies	Avg.	Med.
Value Line Betas		
VL Nat Gas (all)	0.96	0.93
VL Nat Gas (w/o LPs)	1.03	0.98
VL Nat Gas (large)	1.03	0.95
Nat Gas PL Forum (pipes)	0.98	0.90

Figure 5 - Value Line Betas

fundamental principle underlying the income approach, which is the principle of anticipation. Further, this ex ante method is discussed in the *Cost of Capital* as follows:

> "The ex ante risk premium is a forward looking premium. The Gordon Growth Model is applied to determine the resulting risk premium. The premium is determined by first estimating the cost of equity for the proxy market. The proxy market is a market large enough to remove the effects of non-diversification. Typically, the S&P 500 or the NYSE is used as this proxy...
>
> The first step in deriving the ex ante risk premium is to use a single-stage discounted cash flow analysis (otherwise known as the Gordon Growth Model) to calculate the cost of equity for the market proxy, (i.e., the S&P 500). The cost of equity is calculated by using the most recent I/B/E/S consensus long-term growth rates for each firm in the S&P 500 and adding it to the dividend growth yield. I/B/E/S is a service that polls analysts about their growth estimates for individual stocks. The dividend yield for the S&P 500 should be an estimate for Year 1's dividend (D_1). D_1 can be estimated by multiplying the S&P 500's current weighted average dividend yield (DY) by 1 plus its weighted average long-term earnings growth rate. By adding the weighted average long-term growth rate to the dividend yield at the end of Year 1, the cost of equity is estimated. If for example, the long-term growth rate is equal to 10% and the current dividend yield is 4%, then the cost of equity is (4% x 1.1) + 10%, or 14.40 %. This can also be described in the following formula:

$$K_{e500} = DY \times (1 + g) + g$$

Where:	DY	=	dividend yield
	G	=	long-term growth
	K_{e500}	=	cost of equity for the S&P 500

> The second step is to calculate the risk premium of the S&P 500 (RP_{500}). For the CAPM, the ex ante risk premium is calculated by subtracting the risk-free rate (R_f), from the cost of equity for the S&P 500. For the build up method, the ex ante risk premium is calculated by subtracting the weighted average bond yield for the S&P 500 from the cost of equity for the S&P 500."[36]

$$RP_{500} = K_{e500} - R_f$$

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[36] Pratt, Shannon P. *Cost of Capital, Estimation and Applications*, (NY: John Wiley & Sons, Inc. 1998) p. 178.

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 14.01%. We then subtracted the current long-term Treasury bond rate of 4.50% to obtain the expected equity risk premium of 9.51%. The 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 Morningstar and the pipeline industry beta of 0.95, indicates a cost of equity capital of 11.25%. 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 13.53%.

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 **11.75%** as of January 1, 2008. This conclusion gives weight and consideration to both indicators. A summary of the CAPM indicators and the supporting data begins below and on the following page.

Summary of CAPM Indicators - January 1, 2008

Item	Rates			CAPM Indicator
	Rf	Rp	Beta	
CAPM Indicator *				
Long-Term Gov't Bonds (ex post)	4.50	7.10	0.95	11.25
Long-Term Gov't Bonds (ex ante)	4.50	9.51	0.95	13.53

CAPM Formula: Ke = Rf + B(Rp)

* CAPM Indicator is based upon a *Value Line* beta of 0.95. Morningstar, *2008 SBBI* & *Risk Premia over Time Report*;, & Federal Reserve data December 31, 2007.

Correlation of the ex post and ex ante CAPM indicators using long-term government bonds as the 'safe rate' indicates a cost of equity of 11.75% for the Interstate Natural Gas Pipelines as of January 1, 2008.

Beginning on the following page are the *Value Line* betas for the various companies in the Natural Gas Diversified Industry (all), Natural Gas Diversified Industry (all without limited partnerships), the Natural Gas Diversified Industry (large), and the Interstate Natural Gas Pipeline Forum (Pipeline) groups. Shown after the betas for the various groups are the calculations for the ex ante CAPM with supporting data from *Standard & Poor's Compustat*.

Value Line Natural Gas Diversified Ind. (All)

Beta (Value Line) - January 1, 2008

Company Name	Ticker	Beta
ATP Oil & Gas Corp	ATPG	1.05
Cabot Oil & Gas 'A'	COG	1.10
Callon Pete Co	CPE	1.15
Chesapeake Energy	CHK	1.05
Crosstex Energy LP	XTEX	0.85
Delta Natural Gas	DGAS	0.55
Devon Energy	DVN	0.95
EOG Resources	EOG	0.95
Eagle Rock Energy Partners Ltd	EROC	
El Paso Corp.	EP	1.80
Energen Corp.	EGN	0.90
Enterprise Products	EPD	0.55
Equitable Resources	EQT	0.85
Markwest Energy Partners LP	MWE	0.55
National Fuel Gas	NFG	0.85
Newfield Exploration	NFX	1.00
ONEOK Inc.	OKE	0.90
ONEOK Partners LP	OKS	0.65
Penn Virginia Corp.	PVA	1.00
Petroleum Development Corp.	PETD	1.25
Quest Resource Corp	QRCP	0.70
Questar Corp.	STR	0.90
Rentech Inc.	RTK	1.45
Southwestern Energy	SWN	1.25
XTO Energy	XTO	0.90
	Average	0.96
	Median	0.93

Source: *Value Line* CD Rom, January 2008.

VL Nat Gas Diversified Industry (w/o LPs)

Beta (Value Line) - January 1, 2008

Company Name	Ticker	Beta
ATP Oil & Gas Corp	ATPG	1.05
Cabot Oil & Gas 'A'	COG	1.10
Callon Pete Co	CPE	1.15
Chesapeake Energy	CHK	1.05
Delta Natural Gas	DGAS	0.55
Devon Energy	DVN	0.95
EOG Resources	EOG	0.95
El Paso Corp.	EP	1.80
Energen Corp.	EGN	0.90
Equitable Resources	EQT	0.85
National Fuel Gas	NFG	0.85
Newfield Exploration	NFX	1.00
ONEOK Inc.	OKE	0.90
Penn Virginia Corp.	PVA	1.00
Petroleum Development Corp.	PETD	1.25
Quest Resource Corp	QRCP	0.70
Questar Corp.	STR	0.90
Rentech Inc.	RTK	1.45
Southwestern Energy	SWN	1.25
XTO Energy	XTO	0.90
	Average	1.03
	Median	0.98

Source: *Value Line* CD Rom, January 2008.

VL Natural Gas Diversified Ind. (Large)

Beta (Value Line) - January 1, 2008

Company Name	Ticker	Beta
Cabot Oil & Gas 'A'	COG	1.10
Chesapeake Energy	CHK	1.05
Devon Energy	DVN	0.95
El Paso Corp.	EP	1.80
Energen Corp.	EGN	0.90
EOG Resources	EOG	0.95
Equitable Resources	EQT	0.85
National Fuel Gas	NFG	0.85
Newfield Exploration	NFX	1.00
ONEOK Inc.	OKE	0.90
Penn Virginia Corp.	PVA	1.00
Questar Corp.	STR	0.90
Southwestern Energy	SWN	1.25
XTO Energy	XTO	0.90
	Average	1.03
	Median	0.95

Interstate Nat. Gas PL Forum (Pipelines)

Beta (Value Line) - January 1, 2008

Company Name	Ticker	Beta
Boardwalk Pipeline	BWP	
CenterPoint Energy	CNP	0.95
El Paso Corp.	EP	1.80
Kinder Morgan Energy	KMP	0.65
MDU Resources	MDU	0.90
National Fuel Gas	NFG	0.85
ONEOK Partners LP	OKS	0.65
Questar Corp.	STR	0.90
Southern Union	SUG	1.00
Spectra Energy	SE	
TransCanada Corp.	TRP	0.70
Williams Cos.	WMB	1.35
	Average	0.98
	Median	0.90

Source: *Value Line* CD Rom, January 2008.

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)	14.01		**LT Gov't.**		**Cost of Equity by**	
Current Yield on L-T Gov't. Bonds	4.50		**Bond Yield**		**CAPM**	
Expected Equity Risk Premium	9.51					
Beta	0.95					
Adjusted Risk Premium	9.03	+	4.50	=	13.53	*Ex Ante*

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 the following pages.)

Source: *Standard & Poor's Compustat* (January 2008)

Standard & Poor's Compustat & I/B/E/S (S&P 500) - Jan. 1, 2008						
Company Name	Expected Dividend	Recent Price	Yield %	Growth Rate %	Equity Cost %	Market Value
3M CO	2.13	84.32	2.53	11.00	13.53	60,139.47
ABBOTT LABORATORIES	1.46	56.15	2.60	12.11	14.71	86,767.08
ABERCROMBIE & FITCH -CL A	0.80	79.97	1.01	15.00	16.01	6,889.66
ACE LTD	1.21	61.78	1.96	12.24	14.20	20,361.76
AETNA INC	0.05	57.73	0.08	15.00	15.08	28,888.09
AFLAC INC	0.94	62.63	1.51	15.00	16.51	30,551.85
AIR PRODUCTS & CHEMICALS INC	1.68	98.63	1.70	10.50	12.20	21,167.67
ALCOA INC	0.74	36.55	2.03	9.20	11.23	30,999.81
ALLEGHENY ENERGY INC	0.19	63.61	0.30	26.70	27.00	10,574.34
ALLEGHENY TECHNOLOGIES INC	0.85	86.40	0.98	18.00	18.98	8,835.26
ALLERGAN INC	0.24	64.24	0.37	18.00	18.37	19,719.82
ALLSTATE CORP	1.64	52.23	3.14	8.00	11.14	29,808.50
ALTERA CORP	0.18	19.32	0.95	15.00	15.95	6,488.95
ALTRIA GROUP INC	3.21	75.58	4.25	7.00	11.25	159,195.67
AMBAC FINANCIAL GP	0.95	25.77	3.68	13.00	16.68	2,616.94
AMEREN CORP	2.65	54.21	4.88	4.25	9.13	11,276.17
AMERICAN CAPITAL STRATEGIES	4.30	32.96	13.05	7.50	20.55	6,187.52
AMERICAN ELECTRIC POWER	1.74	46.56	3.73	6.00	9.73	18,624.28
AMERICAN EXPRESS CO	0.67	52.02	1.29	12.02	13.31	60,833.54
AMERICAN INTERNATIONAL GRP	0.90	58.30	1.55	13.00	14.55	147,862.67
AMERIPRISE FINANCIAL INC	0.67	55.11	1.21	11.50	12.71	12,779.84
AMERISOURCEBERGEN CORP	0.34	44.87	0.76	14.00	14.76	7,536.41
ANADARKO PETROLEUM CORP	0.39	65.69	0.59	7.66	8.26	30,635.06
ANALOG DEVICES	0.85	31.70	2.67	17.50	20.17	9,616.32
ANHEUSER-BUSCH COS INC	1.43	52.34	2.73	8.33	11.06	38,409.03
AON CORP	0.65	47.69	1.36	8.23	9.59	13,913.94
APACHE CORP	0.66	107.54	0.61	9.62	10.23	35,772.86
APPLERA CORP-APPLIED BIOSYS	0.19	33.92	0.56	12.00	12.56	5,704.80
APPLIED MATERIALS INC	0.28	17.76	1.56	15.50	17.06	24,557.69
ARCHER-DANIELS-MIDLAND CO	0.51	46.43	1.09	10.00	11.09	29,849.43
ASHLAND INC	1.21	47.43	2.55	10.00	12.55	2,982.83
ASSURANT INC	0.53	66.90	0.79	10.50	11.29	7,888.11
AT&T INC	1.57	41.56	3.78	10.70	14.48	252,051.39
AUTOMATIC DATA PROCESSING	1.33	44.53	3.00	15.00	18.00	23,431.20
AVALONBAY COMMUNITIES INC	3.43	94.14	3.65	1.00	4.65	7,413.71
AVERY DENNISON CORP	1.81	53.14	3.41	10.50	13.91	5,658.40
AVON PRODUCTS	0.83	39.53	2.09	11.76	13.85	16,960.86
BAKER HUGHES INC	0.60	81.10	0.74	15.00	15.74	25,804.88
BALL CORP	0.46	45.00	1.02	14.50	15.52	4,522.46
BANK OF AMERICA CORP	2.71	41.26	6.58	6.00	12.58	183,125.00
BANK OF NY MELLON CORP	1.07	48.76	2.19	11.00	13.19	55,522.13
BARD (C.R.) INC	0.68	94.80	0.72	14.00	14.72	9,659.84
BAXTER INTERNATIONAL INC	0.99	58.05	1.70	13.50	15.20	36,807.94
BB&T CORP	2.02	30.67	6.60	10.00	16.60	16,851.85
BEAR STEARNS COMPANIES INC	1.42	88.25	1.61	11.00	12.61	10,189.43
BECTON DICKINSON & CO	1.29	83.58	1.54	13.00	14.54	20,404.30
BEMIS CO INC	0.91	27.38	3.31	8.00	11.31	2,752.18
BEST BUY CO INC	0.60	52.65	1.14	15.00	16.14	21,995.96
BJ SERVICES CO	0.22	24.26	0.92	11.50	12.42	7,106.55
BLACK & DECKER CORP	1.82	69.65	2.62	8.50	11.12	4,355.63

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Company Name	Expected Dividend	Recent Price	Yield %	Growth Rate %	Equity Cost %	Market Value
BLOCK H & R INC	0.64	18.57	3.44	12.00	15.44	6,035.88
BOEING CO	1.61	87.46	1.84	15.10	16.94	67,787.01
BRISTOL-MYERS SQUIBB CO	1.26	26.52	4.75	12.50	17.25	52,470.11
BROWN-FORMAN -CL B	1.50	74.11	2.03	10.53	12.55	9,188.51
BRUNSWICK CORP	0.66	17.05	3.87	10.00	13.87	1,499.31
BURLINGTON NORTHERN S F	1.45	83.23	1.74	13.34	15.08	29,183.02
C H ROBINSON WORLDWIDE INC	1.01	54.12	1.87	15.00	16.87	9,183.68
CA INC	0.18	24.95	0.72	12.00	12.72	12,864.44
CAMPBELL SOUP CO	0.94	35.73	2.64	7.15	9.79	13,706.06
CAPITAL ONE FINANCIAL CORP	0.12	47.26	0.25	11.00	11.25	19,778.88
CARDINAL HEALTH INC	0.55	57.75	0.95	14.50	15.45	20,880.26
CARNIVAL CORP/PLC (USA)	1.84	44.49	4.14	15.00	19.14	27,761.67
CATERPILLAR INC	1.64	72.56	2.26	13.89	16.15	46,145.26
CBS CORP	1.08	27.25	3.98	8.40	12.38	18,637.63
CENTERPOINT ENERGY INC	0.75	17.13	4.37	10.00	14.37	5,503.08
CENTURYTEL INC	0.27	41.46	0.65	3.34	3.99	4,576.48
CHESAPEAKE ENERGY CORP	0.32	39.20	0.82	19.00	19.82	20,005.96
CHEVRON CORP	2.50	93.33	2.68	7.79	10.47	197,060.88
CHUBB CORP	1.27	54.58	2.33	9.41	11.74	20,946.82
CIGNA CORP	0.04	53.73	0.08	12.00	12.08	14,999.43
CINTAS CORP	0.44	33.62	1.30	12.00	13.30	5,166.62
CIRCUIT CITY STORES INC	0.18	4.20	4.27	12.00	16.27	707.95
CIT GROUP INC	1.09	24.03	4.53	8.78	13.31	4,556.78
CITIGROUP INC	2.37	29.44	8.03	9.50	17.53	146,644.58
CITIZENS COMMUNICATIONS CO	1.02	12.73	8.03	2.20	10.23	4,172.58
CLEAR CHANNEL COMMUN	0.81	34.52	2.34	7.60	9.94	17,188.20
CLOROX CO/DE	1.76	65.17	2.70	10.00	12.70	9,026.37
CME GROUP INC	4.21	686.00	0.61	22.50	23.11	36,524.01
CMS ENERGY CORP	0.21	17.38	1.21	5.00	6.21	3,912.08
COCA-COLA CO	1.49	61.37	2.43	9.47	11.89	141,824.66
COCA-COLA ENTERPRISES INC	0.26	26.03	1.00	8.00	9.00	12,626.22
COLGATE-PALMOLIVE CO	1.60	77.96	2.05	11.00	13.05	39,741.05
COMERICA INC	2.69	43.53	6.18	5.00	11.18	6,573.81
COMMERCE BANCORP INC/NJ	0.58	38.14	1.51	11.00	12.51	7,430.82
CONAGRA FOODS INC	0.83	23.79	3.47	8.75	12.22	11,591.80
CONOCOPHILLIPS	1.80	88.30	2.04	9.90	11.94	141,240.89
CONSOL ENERGY INC	0.44	71.52	0.62	10.00	10.62	12,977.02
CONSOLIDATED EDISON INC	2.41	48.85	4.93	3.80	8.72	13,263.56
CONSTELLATION ENERGY GRP INC	1.97	102.53	1.92	13.00	14.92	18,522.46
COOPER INDUSTRIES LTD	0.96	52.88	1.82	14.50	16.32	9,522.15
CORNING INC	0.24	23.99	0.99	18.50	19.49	37,804.26
COSTCO WHOLESALE CORP	0.66	69.76	0.94	13.64	14.58	30,328.65
COUNTRYWIDE FINANCIAL CORP	0.67	8.94	7.52	12.00	19.52	5,173.58
COVIDIEN LTD	0.66	44.29	1.49	3.00	4.49	22,051.55
CSX CORP	0.69	43.98	1.57	15.00	16.57	18,490.29
CUMMINS INC	1.20	63.69	1.89	20.36	22.26	13,007.92
CVS CAREMARK CORP	0.28	39.75	0.70	16.20	16.90	58,706.42
D R HORTON INC	0.67	13.17	5.10	12.00	17.10	4,147.97
DANAHER CORP	0.14	87.74	0.15	13.00	13.15	27,766.20
DARDEN RESTAURANTS INC	0.80	27.71	2.89	11.40	14.29	3,931.88

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DEERE & CO	1.09	93.12	1.18	9.50	10.68	40,791.59
DEVELOPERS DIVERSIFIED RLTY	2.75	38.29	7.17	4.00	11.17	4,704.31
DEVON ENERGY CORP	0.59	88.91	0.66	5.00	5.66	39,561.39
DILLARDS INC -CL A	0.17	18.78	0.90	5.50	6.40	1,336.29
DISCOVER FINANCIAL SVCS INC	0.26	15.08	1.75	10.00	11.75	7,203.54
DISNEY (WALT) CO	0.40	32.28	1.23	13.90	15.13	61,444.50
DOMINION RESOURCES INC	1.71	47.45	3.60	8.00	11.60	27,305.01
DONNELLEY (R R) & SONS CO	1.15	37.74	3.05	10.50	13.55	8,099.00
DOVER CORP	0.91	46.09	1.98	14.00	15.98	9,158.82
DOW CHEMICAL	1.87	39.42	4.75	11.53	16.28	37,228.17
DTE ENERGY CO	2.23	43.96	5.06	5.00	10.06	7,196.87
DU PONT (E I) DE NEMOURS	1.77	44.09	4.01	7.76	11.77	39,639.03
DUKE ENERGY CORP	0.92	20.17	4.58	5.00	9.58	25,434.77
EASTMAN CHEMICAL CO	1.87	61.09	3.07	6.50	9.57	4,950.00
EASTMAN KODAK CO	0.52	21.87	2.39	4.50	6.89	6,298.06
EATON CORP	1.93	96.95	2.00	12.48	14.48	14,135.31
ECOLAB INC	0.60	51.21	1.16	14.50	15.66	12,598.58
EDISON INTERNATIONAL	1.31	53.37	2.45	7.00	9.45	17,388.53
EL PASO CORP	0.18	17.24	1.03	11.00	12.03	12,076.38
ELECTRONIC DATA SYSTEMS	0.23	20.73	1.10	14.50	15.60	10,615.67
EMBARQ CORP	2.58	49.53	5.20	3.00	8.20	7,568.63
EMERSON ELECTRIC CO	1.37	56.66	2.41	14.00	16.41	44,698.11
ENSCO INTERNATIONAL INC	0.12	59.62	0.20	18.00	18.20	8,637.09
ENTERGY CORP	3.24	119.52	2.71	8.00	10.71	23,231.82
EOG RESOURCES INC	0.39	89.25	0.44	8.52	8.96	21,954.70
EQUIFAX INC	0.18	36.36	0.49	12.00	12.49	4,793.67
EW SCRIPPS -CL A	0.61	45.01	1.36	8.98	10.34	5,685.80
EXELON CORP	1.90	81.64	2.33	8.00	10.33	53,879.87
EXPEDITORS INTL WASH INC	0.34	44.68	0.75	20.00	20.75	9,521.75
EXXON MOBIL CORP	1.51	93.69	1.61	7.54	9.15	511,887.13
FAMILY DOLLAR STORES	0.52	19.23	2.68	12.00	14.68	2,702.33
FANNIE MAE	2.23	39.98	5.58	11.60	17.18	39,107.16
FEDERAL HOME LOAN MORT CORP	1.12	34.07	3.29	12.00	15.29	22,538.67
FEDERATED INVESTORS INC	0.93	41.16	2.26	10.50	12.76	4,186.84
FEDEX CORP	0.45	89.17	0.51	13.50	14.01	27,594.99
FIDELITY NATIONAL INFO SVCS	0.23	41.59	0.55	15.00	15.55	8,067.00
FIFTH THIRD BANCORP	1.90	25.13	7.56	8.00	15.56	13,385.52
FIRST HORIZON NATIONAL CORP	1.93	18.15	10.66	7.50	18.16	2,293.94
FIRSTENERGY CORP	2.20	72.34	3.04	10.00	13.04	22,051.76
FLUOR CORP	0.92	145.72	0.63	15.00	15.63	12,885.29
FORTUNE BRANDS INC	1.85	72.36	2.55	10.00	12.55	11,129.98
FPL GROUP INC	1.80	67.78	2.66	10.00	12.66	27,591.75
FRANKLIN RESOURCES INC	0.90	114.43	0.78	12.00	12.78	27,549.59
FREEPORT-MCMORAN COP&GOLD	4.15	102.44	4.05	50.75	54.80	39,124.09
GANNETT CO	1.64	39.00	4.19	2.22	6.42	9,053.54
GAP INC	0.36	21.28	1.68	12.00	13.68	15,985.62
GENERAL DYNAMICS CORP	1.30	88.99	1.46	12.00	13.46	35,806.73
GENERAL ELECTRIC CO	1.38	37.07	3.71	11.00	14.71	374,637.16
GENERAL MILLS INC	1.69	57.00	2.97	8.40	11.37	19,195.55
GENERAL MOTORS CORP	1.06	24.89	4.28	6.50	10.78	14,087.59

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GENUINE PARTS CO	1.59	46.30	3.44	9.00	12.44	7,773.77
GENWORTH FINANCIAL INC	0.44	25.45	1.73	10.00	11.73	11,163.46
GOLDMAN SACHS GROUP INC	1.60	215.05	0.74	14.00	14.74	85,520.01
GOODRICH CORP	1.05	70.61	1.49	16.66	18.15	8,820.53
GRAINGER (W W) INC	1.57	87.52	1.79	12.00	13.79	6,935.44
HALLIBURTON CO	0.41	37.91	1.07	13.08	14.15	33,404.51
HARLEY-DAVIDSON INC	1.33	46.71	2.84	10.50	13.34	11,278.69
HARMAN INTERNATIONAL INDS	0.06	73.71	0.08	20.00	20.08	4,457.61
HARRAHS ENTERTAINMENT INC	1.90	88.75	2.14	18.80	20.94	16,647.55
HARTFORD FINANCIAL SERVICES	2.35	87.19	2.70	11.00	13.70	27,364.15
HASBRO INC	0.70	25.58	2.75	10.00	12.75	3,762.10
HEINZ (H J) CO	1.63	46.68	3.50	7.40	10.90	14,793.73
HERCULES INC	0.22	19.35	1.14	10.00	11.14	2,237.48
HERSHEY CO	1.29	39.40	3.26	8.00	11.26	6,549.82
HESS CORP	0.45	100.86	0.45	12.47	12.92	32,219.63
HEWLETT-PACKARD CO	0.37	50.48	0.73	14.50	15.23	129,928.91
HOME DEPOT INC	1.01	26.94	3.74	12.00	15.74	45,464.40
HONEYWELL INTERNATIONAL INC	1.11	61.57	1.81	11.50	13.31	45,978.63
HUDSON CITY BANCORP INC	0.39	15.02	2.63	16.00	18.63	7,816.78
HUNTINGTON BANCSHARES	1.11	14.76	7.54	5.00	12.54	5,400.65
ILLINOIS TOOL WORKS	1.25	53.54	2.34	12.00	14.34	29,123.35
IMS HEALTH INC	0.13	23.04	0.58	11.50	12.08	4,469.58
INGERSOLL-RAND CO LTD	0.79	46.47	1.71	10.21	11.92	12,664.89
INTEGRYS ENERGY GROUP INC	2.80	51.69	5.41	6.00	11.41	3,942.09
INTEL CORP	0.52	26.66	1.94	15.00	16.94	155,881.02
INTL BUSINESS MACHINES CORP	1.76	108.10	1.63	10.00	11.63	148,956.94
INTL GAME TECHNOLOGY	0.64	43.93	1.45	13.50	14.95	13,855.52
INTL PAPER CO	1.05	32.38	3.24	5.00	8.24	13,863.11
ITT CORP	0.63	66.04	0.96	13.00	13.96	11,973.71
JABIL CIRCUIT INC	0.34	15.27	2.20	20.00	22.20	3,199.48
JANUS CAPITAL GROUP INC	0.05	32.85	0.14	18.00	18.14	5,599.84
JOHNSON & JOHNSON	1.80	66.70	2.70	8.50	11.20	190,878.72
JOHNSON CONTROLS INC	0.59	36.04	1.64	14.00	15.64	21,430.00
JONES APPAREL GROUP INC	0.62	15.99	3.85	10.00	13.85	1,363.31
JPMORGAN CHASE & CO	1.67	43.65	3.83	10.00	13.83	146,622.27
KB HOME	1.11	21.60	5.14	11.00	16.14	1,934.58
KELLOGG CO	1.35	52.43	2.58	9.00	11.58	20,652.60
KEYCORP	1.55	23.45	6.60	6.00	12.60	9,116.63
KIMBERLY-CLARK CORP	2.28	69.34	3.29	7.49	10.78	29,338.66
KLA-TENCOR CORP	0.71	48.16	1.47	18.09	19.57	8,772.20
KRAFT FOODS INC	1.16	32.63	3.55	7.39	10.94	50,484.97
KROGER CO	0.33	26.71	1.25	10.89	12.13	18,043.30
L-3 COMMUNICATIONS HLDGS INC	1.16	105.94	1.09	15.72	16.81	13,324.07
LAUDER ESTEE COS INC -CL A	0.61	43.61	1.41	11.73	13.13	4,961.99
LEGG MASON INC	1.07	73.15	1.46	11.55	13.01	9,673.28
LEGGETT & PLATT INC	1.07	17.44	6.14	7.00	13.14	2,966.72
LEHMAN BROTHERS HOLDINGS INC	0.67	65.44	1.03	12.00	13.03	34,807.54
LENNAR CORP	0.72	17.89	4.02	12.50	16.52	2,825.71
LILLY (ELI) & CO	1.83	53.39	3.43	7.88	11.31	60,560.97
LIMITED BRANDS INC	0.68	18.93	3.58	13.00	16.58	6,685.02

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LINCOLN NATIONAL CORP	1.75	58.22	3.01	10.95	13.96	15,674.40
LINEAR TECHNOLOGY CORP	0.83	31.83	2.60	15.00	17.60	7,113.34
LIZ CLAIBORNE INC	0.25	20.35	1.22	10.00	11.22	2,024.48
LOCKHEED MARTIN CORP	1.85	105.26	1.76	10.00	11.76	43,488.06
LOWE'S COMPANIES INC	0.37	22.62	1.63	15.00	16.63	33,084.08
M & T BANK CORP	3.02	81.57	3.71	8.00	11.71	8,960.22
MACY'S INC	0.58	25.87	2.24	11.34	13.57	11,201.40
MANITOWOC CO	0.10	48.83	0.20	23.00	23.20	6,339.45
MARATHON OIL CORP	1.07	60.86	1.76	11.62	13.38	43,227.64
MARRIOTT INTL INC	0.35	34.18	1.01	15.00	16.01	12,570.14
MARSH & MCLENNAN COS	0.83	26.47	3.12	8.75	11.87	13,768.37
MARSHALL & ILSLEY CORP	1.36	26.48	5.15	10.00	15.15	7,072.81
MASCO CORP	1.03	21.61	4.77	12.00	16.77	7,969.77
MATTEL INC	0.82	19.04	4.32	9.75	14.07	6,984.73
MBIA INC	1.53	18.63	8.21	12.50	20.71	2,336.09
MCCORMICK & COMPANY INC	0.96	37.91	2.53	9.00	11.53	4,843.41
MCDONALD'S CORP	1.64	58.91	2.78	9.00	11.78	69,676.27
MCGRAW-HILL COMPANIES	0.91	43.81	2.09	11.50	13.59	14,413.49
MCKESSON CORP	0.28	65.51	0.42	15.00	15.42	18,957.74
MEADWESTVACO CORP	1.02	31.30	3.26	11.00	14.26	5,782.52
MEDTRONIC INC	0.57	50.27	1.13	13.63	14.76	56,838.23
MERCK & CO	1.68	58.11	2.88	10.27	13.16	126,480.30
MEREDITH CORP	0.83	54.98	1.50	11.75	13.25	2,636.53
MERRILL LYNCH & CO INC	1.57	53.68	2.92	12.00	14.92	45,812.39
METLIFE INC	0.81	61.62	1.32	10.00	11.32	45,635.53
MGIC INVESTMENT CORP/WI	0.11	22.43	0.49	10.40	10.89	1,834.62
MICROCHIP TECHNOLOGY INC	1.43	31.42	4.54	15.00	19.54	6,731.45
MICROSOFT CORP	0.49	35.60	1.38	12.00	13.38	333,053.63
MOLEX INC	0.52	27.30	1.90	15.00	16.90	4,867.15
MOLSON COORS BREWING CO	0.72	51.62	1.40	13.00	14.40	7,653.17
MONSANTO CO	0.92	111.69	0.82	31.60	32.42	61,073.32
MOODY'S CORP	0.36	35.70	1.01	12.50	13.51	9,224.88
MORGAN STANLEY	1.21	53.11	2.28	12.00	14.28	56,119.86
MOTOROLA INC	0.22	16.04	1.37	10.00	11.37	36,640.51
MURPHY OIL CORP	0.85	84.84	1.01	13.86	14.87	16,056.65
NATIONAL CITY CORP	1.78	16.46	10.81	8.50	19.31	10,433.11
NATIONAL SEMICONDUCTOR CORP	0.27	22.64	1.21	14.40	15.61	5,977.12
NEW YORK TIMES CO -CL A	0.97	17.53	5.52	5.20	10.72	2,521.27
NEWELL RUBBERMAID INC	0.92	25.88	3.57	10.00	13.57	7,228.28
NEWMONT MINING CORP	0.48	48.83	0.97	19.00	19.97	21,054.37
NEWS CORP	0.14	20.49	0.68	15.70	16.38	64,801.58
NICOR INC	1.93	42.35	4.57	4.00	8.57	1,911.04
NIKE INC -CL B	1.04	64.24	1.63	13.50	15.13	25,132.68
NISOURCE INC	0.95	18.89	5.02	3.00	8.02	5,179.11
NOBLE CORP	0.19	56.51	0.34	20.00	20.34	15,203.17
NOBLE ENERGY INC	0.53	79.52	0.67	10.39	11.05	13,633.70
NORDSTROM INC	0.60	36.73	1.65	12.00	13.65	8,524.48
NORFOLK SOUTHERN CORP	1.19	50.44	2.37	14.71	17.08	19,532.38
NORTHERN TRUST CORP	1.25	76.58	1.64	12.00	13.64	16,843.16
NORTHROP GRUMMAN CORP	1.63	78.64	2.07	10.00	12.07	26,608.79

Standard & Poor's Compustat & I/B/E/S (S&P 500) - Jan. 1, 2008						
Company Name	Expected Dividend	Recent Price	Yield %	Growth Rate %	Equity Cost %	Market Value
NUCOR CORP	3.22	59.22	5.44	7.00	12.44	17,053.46
NYSE EURONEXT	1.18	87.77	1.34	17.50	18.84	23,259.05
OCCIDENTAL PETROLEUM CORP	1.10	76.99	1.43	10.00	11.43	63,793.61
OFFICEMAX INC	0.67	20.66	3.25	12.00	15.25	1,557.70
OMNICOM GROUP	0.67	47.53	1.41	12.00	13.41	15,537.56
PACCAR INC	1.93	54.48	3.54	12.00	15.54	20,066.46
PALL CORP	0.53	40.32	1.32	11.00	12.32	4,943.15
PARKER-HANNIFIN CORP	0.93	75.31	1.24	11.20	12.44	12,668.80
PAYCHEX INC	1.38	36.22	3.81	15.00	18.81	13,172.24
PEABODY ENERGY CORP	0.27	61.64	0.44	13.39	13.83	16,385.88
PENNEY (J C) CO	0.91	43.99	2.07	14.00	16.07	9,753.29
PEPCO HOLDINGS INC	1.18	29.33	4.01	13.00	17.01	5,683.22
PEPSI BOTTLING GROUP INC	0.62	39.46	1.56	10.00	11.56	8,826.69
PEPSICO INC	1.67	75.90	2.19	11.00	13.19	122,176.38
PERKINELMER INC	0.32	26.02	1.24	15.00	16.24	3,084.31
PFIZER INC	1.23	22.73	5.41	6.00	11.41	155,241.47
PG&E CORP	1.57	43.09	3.64	8.87	12.51	15,256.10
PINNACLE WEST CAPITAL CORP	2.23	42.41	5.25	6.00	11.25	4,257.33
PITNEY BOWES INC	1.45	38.04	3.82	10.00	13.82	8,250.42
PLUM CREEK TIMBER CO INC	1.76	46.04	3.83	5.00	8.83	7,931.59
PNC FINANCIAL SVCS GROUP INC	2.75	65.65	4.18	9.00	13.18	22,948.88
POLO RALPH LAUREN CP -CL A	0.23	61.79	0.38	16.00	16.38	3,599.14
PPG INDUSTRIES INC	2.32	70.23	3.30	11.50	14.80	11,499.74
PPL CORP	1.38	52.09	2.66	13.50	16.16	19,387.69
PRAXAIR INC	1.35	88.71	1.52	12.49	14.01	28,024.46
PRECISION CASTPARTS CORP	0.14	138.70	0.10	20.00	20.10	19,158.08
PRICE (T. ROWE) GROUP	1.09	60.88	1.79	13.50	15.29	16,075.61
PRINCIPAL FINANCIAL GRP INC	1.01	68.84	1.46	12.00	13.46	18,008.27
PROCTER & GAMBLE CO	1.57	73.42	2.14	12.00	14.14	228,016.02
PROGRESS ENERGY INC	2.56	48.43	5.29	4.98	10.27	12,553.15
PROGRESSIVE CORP-OHIO	0.04	19.16	0.20	8.10	8.30	13,109.27
PRUDENTIAL FINANCIAL INC	1.31	93.04	1.41	14.00	15.41	42,054.08
PUBLIC SERVICE ENTRP GRP INC	2.76	98.24	2.81	18.00	20.81	24,983.71
PULTE HOMES INC	0.18	10.54	1.75	15.00	16.75	2,698.55
QUALCOMM INC	0.69	39.35	1.74	22.50	24.24	64,395.76
QUEST DIAGNOSTICS INC	0.46	52.90	0.86	14.00	14.86	10,241.65
QUESTAR CORP	0.53	54.10	0.98	8.50	9.48	9,345.50
RADIOSHACK CORP	0.27	16.86	1.61	8.25	9.86	2,210.13
RANGE RESOURCES CORP	0.18	51.36	0.36	15.00	15.36	7,662.60
RAYTHEON CO	1.16	60.70	1.92	14.03	15.95	26,058.94
REGIONS FINANCIAL CORP	1.63	23.65	6.88	7.00	13.88	16,439.00
REYNOLDS AMERICAN INC	3.60	65.96	5.46	6.00	11.46	19,458.13
ROBERT HALF INTL INC	0.47	27.04	1.75	18.00	19.75	4,355.12
ROCKWELL AUTOMATION	1.33	68.96	1.93	14.50	16.43	10,292.56
ROCKWELL COLLINS INC	0.74	71.97	1.03	15.48	16.50	11,741.26
ROHM AND HAAS CO	1.63	53.07	3.07	10.00	13.07	10,391.11
ROWAN COS INC	0.45	39.46	1.15	13.50	14.65	4,391.31
RYDER SYSTEM INC	0.92	47.01	1.97	10.00	11.97	2,727.90
SAFECO CORP	1.76	55.68	3.16	10.00	13.16	5,264.54
SAFEWAY INC	0.31	34.21	0.89	10.78	11.68	15,134.50

Standard & Poor's Compustat & I/B/E/S (S&P 500) - Jan. 1, 2008						
Company Name	Expected Dividend	Recent Price	Yield %	Growth Rate %	Equity Cost %	Market Value
SARA LEE CORP	0.45	16.06	2.80	7.21	10.01	11,630.52
SCHERING-PLOUGH	0.32	26.64	1.19	21.90	23.09	43,149.39
SCHLUMBERGER LTD	0.83	98.37	0.84	18.00	18.84	117,637.44
SCHWAB (CHARLES) CORP	0.24	25.55	0.94	20.00	20.94	29,547.09
SEALED AIR CORP	0.45	23.14	1.94	12.00	13.94	3,737.64
SEMPRA ENERGY	1.33	61.88	2.14	7.00	9.14	16,176.11
SHERWIN-WILLIAMS CO	1.41	58.04	2.43	12.00	14.43	7,290.69
SIGMA-ALDRICH CORP	0.51	54.60	0.93	10.00	10.93	7,099.20
SIMON PROPERTY GROUP INC	3.80	86.86	4.37	13.00	17.37	19,369.26
SMITH INTERNATIONAL INC	0.49	73.85	0.66	22.54	23.20	14,793.34
SNAP-ON INC	1.34	48.24	2.79	12.00	14.79	2,779.20
SOUTHERN CO	1.69	38.75	4.36	5.00	9.36	29,429.81
SOUTHWEST AIRLINES	0.02	12.20	0.17	14.15	14.32	8,955.26
SOVEREIGN BANCORP INC	0.35	11.40	3.03	8.00	11.03	5,478.41
SPECTRA ENERGY CORP	0.93	25.82	3.61	6.00	9.61	16,325.93
SPRINT NEXTEL CORP	0.11	13.13	0.84	9.93	10.77	36,360.53
STANLEY WORKS	1.38	48.48	2.84	11.00	13.84	3,878.40
STAPLES INC	0.33	23.07	1.45	15.00	16.45	16,312.87
STARWOOD HOTELS&RESORTS	4.14	44.03	9.40	15.00	24.40	8,768.31
STATE STREET CORP	1.04	81.20	1.28	13.00	14.28	31,359.93
STRYKER CORP	0.39	74.72	0.52	18.00	18.52	30,671.37
SUNOCO INC	1.31	72.44	1.80	18.70	20.50	8,517.64
SUNTRUST BANKS INC	3.15	62.49	5.05	8.00	13.05	21,756.14
SUPERVALU INC	0.74	37.52	1.97	8.93	10.90	7,931.92
SYSCO CORP	0.86	31.21	2.75	13.00	15.75	18,980.67
TARGET CORP	0.64	50.00	1.28	14.30	15.58	41,542.25
TECO ENERGY INC	0.80	17.21	4.67	3.00	7.67	3,625.77
TESORO CORP	0.47	47.70	0.98	17.07	18.05	6,534.04
TEXAS INSTRUMENTS INC	0.46	33.40	1.38	15.00	16.38	46,700.11
TEXTRON INC	1.05	71.30	1.48	14.50	15.98	17,771.53
TIFFANY & CO	0.68	46.03	1.47	12.50	13.97	6,243.60
TIME WARNER INC	0.29	16.51	1.76	16.50	18.26	59,676.98
TITANIUM METALS CORP	0.09	26.45	0.36	26.00	26.36	4,289.95
TJX COMPANIES INC	0.40	28.73	1.40	12.00	13.40	12,555.53
TORCHMARK CORP	0.57	60.53	0.94	9.00	9.94	5,579.59
TOTAL SYSTEM SERVICES INC	0.31	28.00	1.12	12.00	13.12	5,541.51
TRANE INC	0.72	46.71	1.54	12.50	14.04	9,034.60
TRAVELERS COS INC	1.27	53.80	2.36	9.24	11.60	34,698.31
TYCO ELECTRONICS LTD	0.63	37.13	1.69	12.00	13.69	18,350.43
TYCO INTERNATIONAL LTD	0.76	39.65	1.92	27.00	28.92	19,619.46
TYSON FOODS INC -CL A	0.17	15.33	1.14	9.00	10.14	4,377.86
U S BANCORP	1.84	31.74	5.81	8.50	14.31	54,804.25
UNION PACIFIC CORP	2.02	125.62	1.61	15.00	16.61	32,990.83
UNITED PARCEL SERVICE INC	1.88	70.72	2.66	12.00	14.66	48,687.82
UNITED STATES STEEL CORP	0.85	120.91	0.71	6.57	7.28	14,281.65
UNITED TECHNOLOGIES CORP	1.44	76.54	1.88	12.62	14.50	75,660.40
UNITEDHEALTH GROUP INC	0.03	58.20	0.06	15.00	15.06	75,203.83
UNUM GROUP	0.33	23.79	1.37	9.00	10.37	8,584.15
UST INC	2.57	54.80	4.69	7.00	11.69	8,584.42
VALERO ENERGY CORP	0.56	70.03	0.80	16.90	17.70	38,547.03

Standard & Poor's Compustat & I/B/E/S (S&P 500) - Jan. 1, 2008						
Company Name	Expected Dividend	Recent Price	Yield %	Growth Rate %	Equity Cost %	Market Value
VERIZON COMMUNICATIONS INC	1.82	43.69	4.17	6.00	10.17	126,278.38
VF CORP	2.55	68.66	3.72	10.00	13.72	7,555.76
VORNADO REALTY TRUST	3.64	87.95	4.13	1.00	5.13	13,391.62
VULCAN MATERIALS CO	2.04	79.09	2.58	11.00	13.58	8,557.22
WACHOVIA CORP	2.79	38.03	7.33	8.85	16.18	75,212.27
WAL-MART STORES INC	0.99	47.53	2.09	13.00	15.09	190,348.58
WALGREEN CO	0.44	38.08	1.14	14.50	15.64	37,751.75
WASHINGTON MUTUAL INC	2.46	13.61	18.10	10.00	28.10	11,741.66
WASHINGTON POST -CL B	8.79	791.43	1.11	7.20	8.31	6,501.60
WASTE MANAGEMENT INC	1.06	32.67	3.23	10.00	13.23	16,607.66
WELLS FARGO & CO	1.36	30.19	4.52	10.00	14.52	102,124.59
WENDY'S INTERNATIONAL INC	0.56	25.84	2.17	12.06	14.23	2,258.26
WESTERN UNION CO	0.04	24.28	0.18	12.00	12.18	18,232.27
WEYERHAEUSER CO	2.57	73.74	3.48	7.00	10.48	15,450.96
WHIRLPOOL CORP	2.01	81.63	2.47	17.00	19.47	6,309.51
WHOLE FOODS MARKET INC	0.86	40.80	2.12	20.00	22.12	5,685.60
WILLIAMS COS INC	0.46	35.78	1.29	15.00	16.29	21,236.40
WINDSTREAM CORP	1.05	13.02	8.06	5.00	13.06	6,211.97
WRIGLEY (WM) JR CO	1.28	58.55	2.19	10.30	12.49	16,170.29
WYETH	1.17	44.19	2.65	4.50	7.15	59,176.60
WYNDHAM WORLDWIDE CORP	0.18	23.56	0.76	12.50	13.26	4,191.87
XCEL ENERGY INC	0.98	22.57	4.32	6.00	10.32	9,477.82
XEROX CORP	0.19	16.19	1.17	11.00	12.17	14,966.46
XILINX INC	0.55	21.87	2.52	14.75	17.27	6,473.10
XL CAPITAL LTD	1.69	50.31	3.36	11.22	14.58	8,972.94
XTO ENERGY INC	0.54	51.36	1.05	12.00	13.05	24,835.13
YUM BRANDS INC	0.67	38.27	1.76	12.00	13.76	19,464.43
ZIONS BANCORPORATION	1.87	46.69	4.02	9.00	13.02	4,994.90
			Market Weighted Average =		**14.01**	

Flotation Cost Adjustment

Flotation costs are the costs associated with financing the investment – 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. In the appraisal process it is appropriate to include the interest rate and any other charges necessary to obtain the financing for the investment. In other words, the cost of financing an investment includes not only the interest rate but also flotation costs (the cost of issuing securities – both debt and equity). *The Appraisal of Real Estate* states the following regarding the cost of financing:

> The cost of financing includes the interest rate and any points, discounts, equity participations, or other charges that the lender requires to increase the effective yield on the loan.[37]

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.

> In general, the adjustment for flotation costs is a refinement of the basic unadjusted cost. In other words, usually the adjusted and unadjusted costs will not be very different. However, this doesn't imply that you shouldn't make the adjustment. The information needed to make the adjustment is readily available, and the adjustment itself doesn't require much effort or computer processing time. To paraphrase the film maker, Spike Lee, you should do the right thing *(especially if the right thing is relatively easy to do*).[38]

> Flotation costs occur when new issues of stock or debt are sold to the public. The firm usually incurs several kinds of flotation or transaction costs, which reduces the actual proceeds received by the firm. Some of these are direct out-of-pocket outlays, such as fees paid to underwriters, legal expenses, and prospectus preparation costs. Because of this reduction in proceeds, the firm's required returns on these proceeds equate to a higher return to compensated for the additional costs. Flotation costs can be accounted for either by amortizing the cost, thus reducing the cash flow to discount, or by incorporating the cost

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[37] *The Appraisal of Real Estate*, 12th ed., (Chicago: Appraisal Institute, 2001) p. 142.

[38] Ehrhardt, Michael C., *The Search for Value: Measuring the Company's Cost of Capital*, (Harvard Business School Press: Boston, MA, 1994), p. 134.

into the cost of capital. Because flotation costs are not typically applied to operating cash flow, one must incorporate them into the cost of capital.[39]

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....<u>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</u>.[40]

> Companies generally hire an investment banker to assist them when they issue common stock, preferred stock, or bonds. In return for a fee, the investment banker helps the company with the terms, price, and sale of the issue. The banker's fees are often referred to as **flotation costs**. The total cost of capital should include not only the required return paid to investors but also the flotation fees paid to the investment banker for marketing the issue.[41] [This identical quote is also found in *Fundamentals of Financial Management*, 9th ed. (Dryden Press) by Eugene F. Brigham and Joel F. Houston, Chapter 10.]

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

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[39] Pratt, Shannon P., *Cost of Capital, Estimation and Applications*, (NY: John Wiley & Sons, Inc. 1998) p. 176.

[40] Roger A. Morin, PhD, *Regulatory Finance: Utilities' Cost of Capital*, (Arlington, VA: Public Utilities Reports, Inc., 1994), p. 170-171. (emphasis added)

[41] Brigham, Eugene F. and Michael C. Ehrhardt, *Financial Management: Theory and Practice*, 10th ed. (Thomson Learning, Inc.: Stamford, CT, 2002), p. 452.

> adjustment is for flotation costs (amounts that must be paid to underwriters by the issuer to attract and retain capital).[42]

All of these studies reach the conclusion that a flotation cost adjustment must be made when estimating the cost of capital. Alternatively, some finance textbooks suggest that it is better to adjust the net present value of the assets downward.

> ***Issue costs***. If accepting the project forces the firm to issue securities, then the present value of issue costs should be subtracted from base-case NPV.[43]

In either case (whether the cost of capital is adjusted upward or the net present value of the assets is adjusted downward) the end result is exactly the same – the market value of the assets subject to appraisal is lower as a result of flotation costs.

Even if one accounted for flotation costs as a negative cash flow [as Brealey, Myers and Marcus suggest – see *Fundamentals of Corporate Finance* (2004) 4th ed. Pg. 335-336] rather than an adjustment to the WACC, we should get exactly the same correct valuation. The following will illustrate that it makes no difference mathematically whether we (1) account for flotation costs in the WACC or (2) account for flotation costs as a negative cash flow. Please note the example that follows where we compare the appraisal by either adjusting the WACC for flotation costs or simply deducting the flotation costs from the expected cash flow to get the net cash flow. In both cases $950 is available to purchase assets because $50 was the flotation cost from issuing $1,000 worth of securities. Note that market value in both cases is exactly the same — $950. Clearly it makes no difference whether one adjusts the WACC or does all the necessary math to find the net present value after treating flotation costs as a negative cash flow at the beginning of the first year.

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[42] *Stocks, Bonds, Bills and Inflation: 2005 Yearbook, Valuation Edition* (Chicago: Ibbotson & Associates, Inc., 2005), p. 35

[43] Brealey, Richard & Stewart C. Myers, *Principles of Corporate Finance*, 7th ed. (New York: McGraw-Hill, 2002), p. 552.

Flotation Cost Measurement

WACC Adjustment Method		
Securities Issued	$1,000	
Cost of Capital	10%	
Required Return	$100	
Flotation Cost =	5.00%	
Flotation Cost =	50	
Assets Purchased	**950**	
Cost of Capital	10.00%	
1 - FC =	0.95	
Adj'd. Cost of Cap.	10.5263%	
Market Value:		
Required Return	100	
	--------- =	$950
Adj'd Cost of Cap.	10.5263%	

Cash Flow Adjustment Method			
Securities Issued		$1,000	
Flotation Cost =		$50	
Assets Purchased		$950	
Disc. Rate = Unadjusted WACC =			10.00%
First Year's Cash Flow:			
		Pres. Value Factor	**NCF**
Beg. of Year	($50)	1.10	($55)
		First Year's Income =	100
		First Year's Net Cash Flow =	45

End of Year	NCF	Pres. Value Factor (divisor)	Pres. Value
1	45	1.10	40.91
2	100	1.21	82.64
3	100	1.33	75.13
4	100	1.46	68.30
5	100	1.61	62.09
6	100	1.77	56.45
7	100	1.95	51.32
8	100	2.14	46.65
9	100	2.36	42.41
10	100	2.59	38.55
skip to			
339	100	107,676,335,910,201.00	0.00
340	100	118,443,969,501,221.00	0.00
341	100	130,288,366,451,343.00	0.00
342	100	143,317,203,096,477.00	0.00
343	100	157,648,923,406,125.00	0.00
344	100	173,413,815,746,737.00	0.00
345	100	190,755,197,321,411.00	0.00
346	100	209,830,717,053,552.00	0.00
347	100	230,813,788,758,908.00	0.00
348	100	253,895,167,634,798.00	0.00
349	100	279,284,684,398,278.00	0.00
350	100	307,213,152,838,106.00	0.00
			$950.00

As one can see from the above mathematical example the same $950 value results in either case. Actually, it is wrong to presuppose that one knows how much flotation cost to deduct in a valuation problem because in order to know exactly how much flotation cost will be, one has

to already know what the value in order to know how much debt and equity will have to be issued. Thus, the appraiser must be biased or clairvoyant or both. **In solving a valuation problem, the WACC adjustment method is best**. If one already knew how much debt and equity securities would have to be issued, one would have to already know the purchase price and thus the valuation. It's a 'Catch 22.' If one already knew the value, why do an appraisal at all?

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%.

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 1.00% and the average issuance cost of common equity to be 4.28%. We selected 1.00% and 4.25% 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 - 2007)

Company	Type of Utility	Issue Date	Amount Offered ($000)	Price to Public ($/100)	Net Proceeds	Issue 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%
AGL Capital Corp.	Gas	07-Jan-03	225,000	99.927	99.277	0.65%
Atmos Energy Corp	Gas	13-Jan-03	250,000	99.915	99.250	0.67%
Sepra Energy	Gas	01-Feb-03	400,000	99.658	99.008	0.66%
Michigan Consolidated Gas Co	Gas	12-Feb-03	200,000	99.637	98.762	0.89%

Debt Issuance Cost

Natural Gas/Transmission Utilities (1997 - 2007)

Company	Issue Utility	Offered Date	Amount Public ($000)	Price to Net ($/100)	Issue Proceeds	Cost
Northwest Natural Gas	Gas	25-Feb-03	10,000	100.000	99.250	0.76%
Nisource Finance Corp	Gas	01-Mar-03	345,000	100.000	99.354	0.65%
Keyspan Corporation	Gas	01-Apr-03	150,000	99.763	98.888	0.88%
AGL Capital Corp.	Gas	15-Apr-03	225,000	99.927	99.277	0.65%
Cincinnati Gas & Electric Co.	Gas	12-Jun-03	200,000	99.764	98.889	0.88%
Cincinnati Gas & Electric Co.	Gas	12-Jun-03	200,000	99.396	98.521	0.89%
Baltimore Gas & Electric Co.	Gas	17-Jun-03	200,000	99.295	98.420	0.89%
Nisource Finance Corp	Gas	16-Jul-03	500,000	99.862	99.212	0.66%
Vectren Coproation	Gas	24-Jul-03	100,000	99.746	99.096	0.66%
Vectren Coproation	Gas	24-Jul-03	100,000	99.177	98.477	0.71%
UGI Utilities	Gas	14-Aug-03	20,000	100.000	99.250	0.76%
UGI Utilities	Gas	14-Aug-03	25,000	100.000	99.370	0.63%
Energy East Corporation	Gas	08-Sep-03	200,000	99.830	98.950	0.89%
Madison Gas & Electric Co	Gas	09-Sep-03	20,000	100.000	99.250	0.76%
Energen Corporation	Gas	30-Oct-03	50,000	99.557	98.907	0.66%
Northwest Natural Gas	Gas	21-Nov-03	40,000	100.000	99.250	0.76%
Piedmont Natural Gas Co Inc	Gas	16-Dec-03	100,000	99.859	98.984	0.88%
Piedmont Natural Gas Co Inc	Gas	16-Dec-03	100,000	100.000	99.350	0.65%
AGL Resources	Gas	14-Dec-04	200,000	99.870	99.220	0.66%
Aquila	Gas	18-Aug-04	300,000	25.000	25.000	0.00%
Atmos Energy	Gas	18-Oct-04	500,000	99.993	99.343	0.65%
Atmos Energy	Gas	18-Oct-04	200,000	99.392	98.517	0.89%
Laclede Gas Co.	Gas	21-Apr-04	50,000	99.585	98.835	0.76%
Laclede Gas Co.	Gas	21-Apr-04	100,000	99.434	98.559	0.89%
Michigan Consolidated Gas	Gas	27-Sep-04	120,000	99.594	98.844	0.76%
Consolidated Natural Gas Co	Gas	15-Nov-04	400,000	99.686	99.036	0.66%
Alabama Gas Corp	Gas	11-Jan-05	40,000	100.000	96.860	3.24%
Alabama Gas Corp	Gas	11-Jan-05	40,000	100.000	99.350	0.65%
Alabama Gas Corp	Gas	14-Nov-05	80,000	100.000	99.400	0.60%
Cascade Natural Gas	Gas	20-Jan-05	30,000	100.000	96.850	3.25%
Cascade Natural Gas	Gas	29-Aug-05	15,000	100.000	99.300	0.70%
Northwest Natural Gas Co.	Gas	02-Jun-05	40,000	100.000	99.375	0.63%
Northwest Natural Gas Co.	Gas	21-Jun-05	10,000	100.000	99.250	0.76%
Vectren Utility Holdings, Inc	Gas	16-Nov-05	75,000	99.799	99.149	0.66%
Vectren Utility Holdings, Inc	Gas	16-Nov-05	75,000	99.779	98.904	0.88%
Laclede Gas Co.	Gas	06-Jun-06	55,000	99.852	98.977	0.88%
Piedmont Natural Gas Co., Inc	Gas	15-Jun-06	200,000	100.000	96.850	3.15%
AGI Capital Resources	Gas	27-Jun-06	175,000	99.856	99.206	0.65%
Southern Union Co.	Gas	18-Oct-06	600,000	99.644	98.344	1.30%
Northwest Natural Gas Co.	Gas	15-Dec-06	25,000	100.000	99.375	0.63%
Alabama Gas Corp	Gas	10-Jan-07	45,000	100.000	99.125	0.88%
Atmos Energy Corp	Gas	11-Jun-07	250,000	99.729	99.079	0.66%
UGI Utility Inc	Gas	19-Jun-07	200,000	99.375		
					Average	1.00%
					Selected	1.00%

Source: *Public Utility Finance Tracker*, February 1999 - 2008.

Common Stock Issuance Cost

Natural Gas/Transmission Utilities (1990 - 2007)

Company	Type of Utility	Issue Date	Number of Shares (000)	Price to Public	Net Proceeds	Issue Cost
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 Enterpr.	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%
Agl Resources, Inc	Gas	11-Feb-03	5,600	22.00	21.21	3.70%
Atmos Energy Corp.	Gas	18-Jun-03	4,000	25.31	24.25	4.38%
Sempra Energy	Gas	23-Oct-03	15,000	28.00	27.15	3.12%
Southern Union Co.	Gas	10-Jun-03	3,000	16.15	16.15	0.00%

Common Stock Issuance Cost
Natural Gas/Transmission Utilities (1990 - 2007)

Company	Type of Utility	Issue Date	Number of Shares (000)	Price to Public	Net Proceeds	Issue Cost
Southern Union Co.	Gas	05-Jun-03	9,500	16.00	15.38	4.06%
Southern Union Co.	Gas	15-Jun-03	2,500	50.00	48.17	3.80%
Vectren Corporation	Gas	07-Aug-03	6,500	22.81	22.00	3.70%
AGL Resources	Gas	19-Nov-04	9,600	31.010	30.038	3.23%
Ameren	Gas	30-Jun-04	10,000	42.000	40.700	3.19%
Aquila(M)	Gas	18-Aug-04	40,000	2.550	2.451	4.04%
Atmos Energy Co.	Gas	21-Oct-04	14,000	24.750	23.760	4.17%
Northwest Natural Gas Co.	Gas	30-Mar-04	1,200	31.000	29.844	3.87%
Piedmont Natural Gas Co. Inc	Gas	20-Jan-04	4,250	42.500	41.010	3.63%
Southern Union Co.	Gas	26-Jul-04	11,000	18.750	18.003	4.15%
The Laclede Group Inc	Gas	06-May-04	1,500	26.800	25.862	3.63%
UGI Corp.	Gas	18-Mar-04	7,500	32.100	30.696	4.58%
Semco Energy	Gas	09-Aug-05	27,176	6.320	6.067	4.17%
Southern Union Co.	Gas	07-Feb-05	342,999	23.000	22.300	3.14%
Chesapeake Utility Corp	Gas	15-Nov-06	600	30.100	28.975	3.88%
Vectron Corp	Gas	22-Feb-07	4,600	28.33	27.34	3.62%
					Average	4.28%
					Selected	4.25%

Source: *Public Utility Finance Tracker*, February 1999 - 2008.

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	25.00%	6.50%	1.63%	1.00%	99.38%	6.54%	1.64%
Equity	75.00%	11.75%	8.81%	4.25%	95.75%	12.27%	9.20%
Totals	100.00%		10.44%				10.84%

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 6.50% 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 1.64%. The divisor for the equity cost is 1 minus the equity flotation costs (100% - 4.25% = 95.75%). Next we divide cost of equity of 11.75% 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 9.20%. The sum of the two products is 10.84% (rounded to **10.85%**) and is the cost of capital for the typical interstate natural gas pipeline after accounting for flotation costs.

Other Issues Regarding the Cost of Capital

Geometric Mean vs. Arithmetic Mean

Occasionally appraisers make the mistake of using the geometric mean rather than the arithmetic mean in measuring the equity risk premium. The geometric mean is backward-looking, measuring the change in wealth over more than one period. On the other hand, the arithmetic mean better represents a typical performance over single periods and serves as the correct rate for forecasting, discounting, and estimating the cost of capital. Dr. Roger Ibbotson has written regarding this issue as follows:

> The equity risk premium data presented in this book are arithmetic average risk premia as opposed to geometric average risk premia. The arithmetic average equity risk premium can be demonstrated to be most appropriate when discounting future cash flows. For use as the expected equity risk premium in either the CAPM or the building block approach, the arithmetic mean or the simple difference of the arithmetic means of stock market returns and riskless

> rates is the relevant number. This is because both the CAPM and the building block approach are additive models, in which the cost of capital is the sum of its parts. The geometric average is more appropriate for reporting past performance, since it represents the compound average return.[44]

Additionally, Dr. Roger Morin addressed the issue of the arithmetic versus geometric means in estimating the cost of capital.

> In statistical parlance, the arithmetic average is the unbiased measure of the expected value of repeated observations of a random variable, not the geometric mean. This appendix formally illustrates that only arithmetic averages can be used as estimates of cost of capital, and that the geometric mean is not an appropriate measure of cost of capital.[45]

Brealey, Myers and Allen also addressed this issue:

> If the cost of capital is estimated from historical returns or risk premiums, use arithmetic averages, not compound annual rates of return (geometric averages).[46]

Income Return

The income return is the appropriate return for use in calculating the equity risk premium. This issue is discussed in SBBI as follows:

> Another point to keep in mind when calculating the equity risk premium is that the income return on the appropriate-horizon Treasury security, rather than the total return, is used in the calculation. The total return is comprised of three return components: the income return, the capital appreciation return, and the reinvestment return. The income return is defined as the portion of the total return that results from a periodic cash flow or, in this case, the bond coupon payment. The capital appreciation return results from the price change of a bond over a specific period. Bond prices generally change in reaction to unexpected fluctuations in yields. Reinvestment return is the return on a given month's investment income when reinvested into the same asset class in the subsequent months of the year. The income return is thus used in the estimation of the

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[44] *Stocks, Bonds, Bills and Inflation: 2007 Valuation Edition Yearbook,* (Chicago: Morningstar, Inc., 2007), p. 77.

[45] Morin, Roger A., *New Regulatory Finance* (Vienna, VA: Public Utilities Reports, Inc., 2006), p. 133.

[46] Richard A. Brealey, Stewart C. Myers, and Paul Allen, Principles of Corporate Finance, 8th ed., (Irwin McGraw-Hill, 2006), pp. 156-157.

equity risk premium because it represents the truly riskless portion of the return.[47]

Unlike the yield on a bond, the expected equity risk premium is unobservable in the market and must be estimated, typically by using historical data.[48] It can be calculated by subtracting the long-term average of the income return on the riskless asset from the long-term average stock market return (measured over the same period as for the riskless asset). The maturity (or duration) of the riskless asset from which r_f is taken must be the same as that used to estimate ERP. When calculating the equity risk premium, some analysts subtract a long-term Treasury bond's total return-rather than its income return-from the total return on the overall stock market. The income return is the better measure of return to be subtracted from the stock market total return for two reasons:

1. It is the completely riskless portion of the issues' returns (Treasury securities are subject to price risk).

2. Bond yields have risen historically, causing capital losses in fixed-income securities (including U.S. Treasury issues). These capital losses caused bonds' total returns to be lower than the returns that investors expected. In other words, had the investor held the bond to maturity, the investor would have realized the yield on the bond as the total return; but in a constant maturity portfolio such as those used to measure bond returns in this book, bonds are sold before maturity (at a capital loss if the market yield has risen since the time of purchase). There is no evidence that investors expect bond capital losses to be repeated in the future (otherwise bond prices would be adjusted accordingly), so that historical total returns are biased downward as indicators of future expectations. Historical income returns, in contrast, are unbiased estimators of the returns that investors expected.[49]

Equity Risk Premium Puzzle

In 1985, Mehra and Prescott published a paper that discussed the equity risk premium from a utility theory perspective. The point that Mehra and Prescott make is that under existing economic theory, economists cannot justify the magnitude of the equity risk premium.

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[47] *Stocks, Bonds, Bills and Inflation: 2007 Yearbook, Valuation Edition* (Chicago: Morningstar, Inc., 2007), p. 75-76.

[48] It should be noted that from a valuation specialist's point of view, the stock market returns presented in this book are after corporate taxes but before personal taxes, and should be applied to cash flows calculated on the same basis.

[49] *Stocks, Bonds, Bills and Inflation: 1999 Yearbook*, (Chicago: Ibbotson Associates, Inc., 1999), pp. 154-155.

The utility theory model employed was incapable of obtaining values consistent with those observed in the market.

This is an interesting point and may be worthy of further study, but it does not do anything to prove that the equity risk premium is too high. It may, on the other hand, indicate that theoretical economic models require further refinement to adequately explain market behavior.[50]

There is no historical data to suggest a systematic decline in the market risk premium in estimating the cost of equity.

> Are there any historical data to suggest a systematic decline in the market risk premium? Exhibit 10.5 plots five-year rolling averages of the market equity risk premium from 1930 to 1995. The volatility of the market risk premium has decreased, but what about the average market risk 'premium? A regression of the rolling five-year market risk premium versus time indicates that there is no statistically significant change in the risk premium between 1926 and 1995. The slope of the regression is not significantly different from zero.[51]

Survivorship Bias

Some have suggested that a negative adjustment should be made to the cost of equity for survivorship bias. They argue that the United States has been the most successful stock market of the twentieth century and therefore equity costs do not consider the low returns that failing companies might indicate. If that is the case, is it possible that the equity risk premium statistics based only on U.S. data may overstate the returns of equities as a whole because they only focus on one successful market? According to Dr. Roger Ibbotson this is not the case.

> While the survivorship bias evidence may be compelling on a worldwide basis, one can question its relevance to a purely U.S. analysis. If the entity being valued is a U.S. company, then the relevant data set should be the performance of equities in the U.S. market.[52]

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[50] *Stocks, Bonds, Bills and Inflation: 2007 Yearbook, Valuation Edition* (Chicago: Morningstar, Inc., 2007), p. 89.

[51] Copeland, Tom, Tim Koller & Jack Murrin, *Valuation: Measuring and Managing the Value of Companies*, 3rd ed. (New York: John Wiley & Sons, 2000), 217.

[52] *Stocks, Bonds, Bills and Inflation: 2003 Yearbook, Valuation Edition* (Chicago: Ibbotson & Associates, Inc., 2003), p. 82.

Other studies have reached similar conclusions – that survivorship bias is of no significance in measuring the cost of equity in U. S. equity markets.

> The U.S. equity premium plays an important role in many areas of finance research and practice. Therefore, the concerns raised by Brown, Goetzmann, and Ross (BGR) that the equity premium might contain serious survival bias should be studied with great care: If proven true, this hypothesis would have widespread impact.
>
> Based on a general survival model developed in this paper, we show that the fundamental difficulty facing the survival argument is that to have high survival bias, the probability of market survival over the long run has to be extremely small, which seems to be inconsistent with existing historical evidence. Therefore, we argue that contrary to what BGR suggest, the survival bias in the U.S. equity premium is unlikely to be significant and the resultant concerns about the survival problem in the current literature are probably overstated.[53]

Thus, we believe that there is no significant survivorship bias affecting our estimate of the cost of capital for the Interstate Natural Gas Pipeline industry at January 1, 2008, and no adjustment is necessary.

[53] Li, Haitao, and Yuewu Xu, "Survival Bias and the Equity Premium Puzzle," *The Journal of Finance*, Vol. LVII, Issue 5, October 2002, p. 1991. (emphasis added)

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*. 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.[54]

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, minority interests in debt and equity securities and (2) nonmarketable, controlling interests in operating real estate

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

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.[55]

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 or study period; 2) forecasts all future cash flows or cash flow patterns; 3) chooses an appropriate yield rate; and 4) converts future benefits (including the reversion) 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 using one of the various yield formulas. The application of capitalization rates that reflect an appropriate yield rate, the use of present value

[55] 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.[56]

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.[57]

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.[58] 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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[56] *The Appraisal of Real Estate*, 12th ed., (Chicago: Appraisal Institute, 2001), 549.

[57] *Ibid*., 560.

[58] *Ibid*., 560.

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.[59]

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...[60]

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 80. 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 fact, as mentioned previously on page 10, Dr. William Kinnard, MAI explains that all of the

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[59] *Ibid*., 118-119.

[60] *Ibid*., 119.

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*, 12th edition, page 572.

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.