GAS PIPELINE RATEMAKING AT THE FEDERAL ENERGY REGULATORY COMMISSION

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I. INTRODUCTION AND STATUTORY OVERVIEW

I have been asked to address the range of permissible methodologies that the Federal Energy Regulatory Commission ("FERC") might apply in setting tariff rates for an Alaska gas pipeline. Dan Ives has described the connection between the open season process and rate setting at FERC. I will describe generally the methodology and standards that the FERC utilizes to set gas pipeline rates. I have included explanatory material in an appendix to this testimony, particularly a summary of FERC decisions for about the past eight years showing the effect of differences in the cost of debt and equity and capital structure on the return allowed. I also will present some hypothetical calculations to illustrate different approaches to setting rates.

The Natural Gas Act requires that the rates charged by any interstate gas pipeline be "just and reasonable." Those precise words occur in the statutes that govern the rates of many regulated industries such as electric utilities, gas distribution companies, and oil pipelines. So how will just and reasonable rates be determined?

When TAPS started operations, there was a huge issue over what was the proper methodology to set its rates -- whether it should be the old Interstate Commerce Commission valuation methodology, a modern version of valuation or a standard form of utility ratemaking. I do not believe that there is any such issue for the gas line. Standard utility ratemaking, starting with the original cost of the utility property, has been the approach the FERC and, before that, the Federal Power Commission, have used to set gas pipeline rates for as long as anyone can remember. To my knowledge, original cost ratemaking is the common assumption of the competing proposals to build the gas pipeline. However, the devil is in the details and those details will have real dollar consequences on the rates of any Alaska gas pipeline.

It is worth emphasizing also that we are dealing with gas pipeline rates, not oil pipeline rates. FERC's rate setting jurisdiction is different for oil and gas pipelines. For oil pipelines, there is dual rate jurisdiction between the FERC and the Regulatory Commission of Alaska ("RCA"). FERC decides the rates that apply for interstate shipments of oil on TAPS; the RCA decides the rates that apply for intrastate shipments of oil on TAPS.

For gas pipelines that provide both interstate and intrastate service, that is not the case. For the Alaska gas pipeline, FERC will set the rate both for gas that travels to destinations outside Alaska and for gas that travels *on the main pipeline*

to destinations inside Alaska. In other words, Congress has given the FERC exclusive jurisdiction to set the rates for gas that travels on interstate pipelines even if a portion of that gas travels to destinations within the state where the gas is produced. *Cal. v. LoVaca Gathering Co.*, 379 U.S. 366 91965). If lateral pipelines are built from the main pipeline to destinations within Alaska (*e.g.*, a line from Fairbanks to Anchorage), whether the RCA or the FERC has jurisdiction over the rates of the lateral project depends on the ownership of the lateral and other factors.[1]

This difference in rate regulation flows from a difference in FERC's powers over interstate oil and gas pipelines. FERC comprehensively regulates interstate gas pipelines.[2] Gas pipeline regulation is the bread and butter of FERC practice and there are many FERC rules, procedures, and cases involving gas pipeline rates and facilities. Oil pipeline rates are not comprehensively regulated by the FERC. It does not control oil pipelines' entry or exit into business nor does it regulate their facilities.

[1] The Alaska provisions of the Energy Act of 2003, which has not been adopted by Congress, would require that the FERC consult with Alaska on the rates it sets for transportation to destinations within the State.

[2] Before interstate gas pipelines can begin construction, let alone operation, they must receive a certificate of public convenience and necessity from the FERC pursuant to the requirements of Section 7(c) of the Natural Gas Act. In contrast, interstate oil pipelines do not apply for a certificate of public convenience and necessity from the FERC. FERC regulates only the rates of oil pipelines and then only those rates that apply to interstate shipments. In the case of TAPS, this means that oil going to the refineries at Fairbanks is subject to a RCA-determined rate.

II. BASIC FERC RATEMAKING PRINCIPLES

There are three basic principles that frame ratemaking at the FERC.

1. The FERC has a wide range of discretion in ratemaking. The Supreme Court of the United States emphasized that point in the landmark case on ratemaking: *Hope Natural Gas*. As it said then, it is "not the theory but the impact of the rate order which counts," and "there is no single formula or combination of formulae" for determining "just and reasonable" rates. *FPC v. Hope Natural Gas Co.*, 320 U.S. 591, 602 (1944). In my more than 30 years of practice before the FERC, I have seen many significant changes in what the Commission considers the right way to set just and reasonable rates. FERC has exercised its discretion to adopt original cost ratemaking for *gas* pipelines, but has exercised the same discretion in a different way for oil pipelines. Depending upon the circumstances of the case, FERC applies one of three different methodologies to set an individual pipeline's rates.

2. The FERC's objective is to set rates that strike a balance between protecting consumers from excessive rates and rewarding investors for the risks they face in investing capital in a regulated pipeline. *Hope* teaches the rates must be set in a way that both "attracts capital" to the regulated enterprise and produces "comparable earnings" with those of other businesses of similar risk.

3. Rates are developed by carriers in the first instance but FERC has the final say. It is the regulated pipeline that initially determines and files the rate that it intends to charge. Of course, in doing so the pipeline is not free to simply ignore the rate setting precedent of the applicable agency. After the pipeline is given the first opportunity to file a rate, the agency then reviews and reacts to that rate. Thus, while the agency does not command that a regulated pipeline file a specific rate, it does review and often changes the rate that the pipeline proposes.

III. THE RATESETTING PROCESS

What is the process by which the rates for an interstate gas pipeline are set? Any person that proposes to build such a pipeline must first apply to the FERC for a certificate of public convenience and necessity. Such certificates are granted under Section 7(c) of the Natural Gas Act. As part of this process, an applicant will make a mini-rate case showing of what rates it expects to charge based upon the estimated costs of construction. In reviewing the applicant's Section 7 application, the FERC will accept, or suggest modifications to, the proposed rate. The FERC will also require the applicant to file final rates after pipeline construction is completed and before it begins operation. It is also FERC policy to require the applicant to justify its recourse rates within three years of the start of operations. *See, e.g., Colo. Interstate Gas Co.,* 105 FERC ¶ 61,095 at 61,493 (2003).

From time immemorial, as we have noted, the FERC has used depreciated original cost rate making or DOC, for gas pipelines, as we FERC practitioners like to say. To simplify, under DOC the cost of building the regulated asset (its original cost) is used in setting the first rate. Over time as the asset is depreciated and loses value that lower depreciated value (assuming no asset additions) is then used in setting rates. Under the DOC methodology, an asset's value can approach or equal zero.

In setting rates, a pipeline is allowed to recover prudent operating costs, depreciation, taxes, and a return on the capital invested. This results in the calculation of a cost of service or revenue requirement. While the FERC has always used a basic DOC methodology, it has changed its approach to determining the "return" allowed to equity investors under that methodology. Here we get into some messy details. The revenue requirement formula is set forth in Appendix A.

Rates are designed to allow a pipeline the opportunity to recover an amount equal to the revenue requirement including this calculated "return." Return is compensation due the investors in the project for the capital they invest in the pipeline and the risk they took on making that investment. Most of the creative energy in ratemaking proceedings is spent on determining the return component and the depreciation (or "useful life") component. I will not address depreciation today but it, too, is very important to the cost of tariffs.

To determine the return or, in laymen's terms, the "profit," the FERC determines an overall rate of return on the capital invested in the project (*e.g.*, 10.5%) and multiplies that percentage by the value of the asset devoted to the regulated service, minus accumulated depreciation and deferred taxes (called the "rate base"). This "rate base times rate of return" method produces the dollar amount of return that is permissible to include within rates.[3] An additional amount is then allowed for the regulated company to pay the income taxes associated with that return amount so that pipeline has the opportunity to earn *after* taxes the rate of return that the FERC has decided.

In developing what is the authorized "return," the FERC takes two large steps. One step is to determine the capital structure of the asset -- what percentage of the capital was borrowed and what percent did the investors invest from their own funds. The second step is to determine the cost of each class of assets -- debt or equity. After these two steps have been taken, they are brought together to determine the overall cost of capital.

Let's start with the capital structure. FERC has to decide how much of a proposed capital structure is debt and how much is equity. For debt, it looks to the dollar amount of the bonds (the amount of borrowed money) that will be issued or

[3] Technically speaking, the return includes an amount necessary to pay interest on the debt.

that have been issued to finance the project. For equity, it determines how much money has been or will be contributed by investors. Equity or "stock" comes in two categories: preferred stock and common equity. Preferred stock resembles a bond in some respects because preferred stockholders are promised a fixed dividend. Common equity resembles the shares of stock that are traded on the New York Stock Exchange.

This calculation of the relative amount of debt and equity determines the pipeline's "capital structure," or the "debt/equity" ratio. Different gas pipelines' financial structures, and their debt/equity ratios, as a result, vary widely and range from those that utilize mostly debt to those that utilize mostly equity. The relative amounts of debt and equity translate into differences in the amount of return that a pipeline is permitted to earn. I will return to this subject shortly and give examples.

Having found what share of the capital structure is debt and what is equity, the rate to use in the rate setting process for each of those components must then be computed. For debt and preferred stock, that is a simple and direct exercise. For debt, one looks to the interest rate on the pipeline's bonds. If bonds are issued at different times or for different maturities, the rates can vary considerably and a weighted average will be derived. Preferred stock also has an identifiable dividend rate.

The more difficult exercise is determining the rate of return for common equity, something on which experts often disagree. As you might expect, the experts for the pipeline typically argue that higher rates of return are justified because of high and/or unique risks that the particular pipeline faces. Experts for shippers on the pipeline, on the other hand, typically de-emphasize the pipeline's risks so as to lower the permissible rate of return and, hence, the permissible rates.

Arriving at the rate of return on common equity is the result of judgment and estimation, since one cannot objectively know what is the right rate of return. Since Opinion No. 414-A, 84 FERC ¶61,084 (1998), to make that estimate for gas pipelines, the FERC has settled upon what is called the discounted cash flow ("DCF") formula. In Appendix B, I have set forth by way of example the elements of the FERC's standard DCF formula, but it is not necessary to explore those for purposes of today's hearings. Using this formula, the FERC calculates what the expected rate of return for investors is for a representative group of publicly traded companies. This representative group of publicly traded companies is called a proxy group. The companies that are normally selected are other interstate gas pipelines.

The DCF method is utilized to produce a range of rates of returns on equity for the proxy group, as opposed to a single number. Appendix B shows the proxy group results from a recent case. Although it is often said that the median point of

the range is considered the appropriate rate of return on equity for an average-risk pipeline, the FERC has stated that it will not lower the pipeline's rate of return on equity if the lower risks are the product of efficiently operating the pipeline. It is interesting to note that few pipelines are accused of being the average pipeline in ratemaking cases. Rather, as I indicated a moment ago, a pipeline will argue that its risk is higher than average, thus entitling it to a higher rate of return on equity and, hence, return allowance. Shippers, of course, generally argue the opposite.

The limit of what a pipeline may receive in its return allowance is capped by the high end of the rate of return on equity range that the DCF methodology produces. Looking at a random selection of recent rate cases in the past few years at the FERC, the rate of return on equity has ranged from 12.38% to 14.00%.

In the case of the Alaska Natural Gas Transportation System ("ANGTS"), the FERC in the early 1980s decided that the appropriate rate of return for equity for the Alaska segment was at the very high end of what it was awarding to gas pipelines at the time – 17.5%. This assumed a 30% cost overrun of the projected cost. An overrun of more than 30% meant a lower than 17.5% rate of return; an overrun of less than 30% meant the pipeline could earn a rate of return higher than 17.5%. This was a time of high inflation and high interest rates and represented a high water mark in the permissible return on equity. In the TAPS cases, arguments were made that the pipeline faced special risks and deserved a very high return.

By setting forth this history, I do not mean to suggest the rightness or wrongness of the arguments made in the original TAPS rate case or for the ANGTS. I mean merely that it is safe to predict that there likely will be arguments in any upcoming Alaska gas pipeline rate case that Alaska projects continues to present special risk and that Alaska pipelines should receive unique treatment.

It is easy to see why differences in the equity rate of return have consequences but why do differences in the capital structure really matter? The short answer is that they can make a sizeable difference in how much return a pipeline earns. I will illustrate this in numbers, but this is a good time to discuss the different ways in which pipelines are financed.

IV. FINANCING A GAS PIPELINE AND THE RATE IMPLICATIONS

Gas pipelines are either project financed or financed based on the balance sheet of the owners of the pipeline. Project financing typically means that the lenders to the project will be paid back from the operations of the pipeline without an independent guarantee from the owners of the pipeline. To make an analogy, a real estate developer could go to a bank and say loan me the money to build an office building and I will pay back the loan out of the rents from the office space.

Project financed projects typically borrow large amounts of debt to build the project. Looking back at project financed gas pipelines authorized by the FERC in

recent years, one sees that such projects have borrowed 70 to 80% of their total cost of construction. Thus, the debt component of their "capital structure" would be 70 to 80%.

The practical consequence of having so much debt in the capital structure is to lower the overall tariff. The reason for this is the cost of debt is almost always less than the cost of equity. In recent cases, debt costs for pipelines averaged about 8%; equity returns are more typically in the 13 to 14 % range.

The alternative to project financing is so-called recourse (balance sheet) financing. In such cases, the owners of the project back the project by pledging their own financial strength. Here, the hypothetical real estate developer would say that he would provide the funds from his own assets or he would combine funds he has with borrowed money, and that he would promise to repay any borrowed money not only from the operations of the project but from his own assets if the project was not successful.

Looking at the cases of recent pipelines that were not project financed, one finds capital structures of about 50 or 60 percent. It is simple mathematics to see that a pipeline that earns 13 or 14% on one half or more of its capital structure will have a higher total return and, hence, a higher tariff than a pipeline that has a capital structure that is one quarter equity.

So a critical question to ask is how will an Alaska gas pipeline be financed? Will it be project financed with a capital structure that is mostly debt or will it be financed with heavy amounts of equity? And how will FERC react to whatever financing arrangement is utilized?

FERC has developed standards that it applies to decide whether a capital structure is reasonable or not. The FERC prefers to use the applicant's own capital structure if the applicant independently finances its project. FERC's preference is not unlimited. If the capital structure is outside the range of the representative sample of pipelines in the "proxy group," then the FERC will turn to that of the parent company. Even here, the FERC may decide that the capital structure is too heavily weighted to one extreme or another and impute a hypothetical capital structure. In a situation where an applicant does not independently finance its project but rather relies on its parent company to finance it, here too the FERC will turn to that parent company's capital structure, assuming it is not anomalous.

There is a set of straightforward principles that FERC uses in deciding capital structure issues:

1. The Commission prefers to use the pipeline's actual capital structure in developing the pipeline's rate of return. *Kentucky West Virginia Gas Company,* 2 FERC ¶ 61,139 at 61,325-28 (1978). In deciding whether a departure from this general preference is warranted in a particular case, the Commission first looks to the

issue of whether the pipeline is an independent financial entity. *Transcontinental Gas Pipeline Corp.*, 84 FERC ¶ 61,084 at 61,413 (1998).

2. In determining whether a pipeline is independent (*i.e.*, self-financing), the Commission looks to whether the pipeline has its own bond rating and whether it provides its own debt financing (not guaranteed by the parent). *Transcontinental Gas Pipeline Corp.*, 90 FERC ¶ 61,279 at 61,928 (2000). When the pipeline issues its own debt that is not guaranteed by the corporate parent and has its own bond rating, the Commission uses the pipeline's own capital structure, unless the pipeline's capital structure is not representative of the pipeline's risk profile or where use of the actual capital structure would create anomalous results. *Transco*, 84 FERC at 61,413. By anomalous results, the Commission means whether the actual capital structure is atypical when compared with the capital structures approved by the Commission for other pipelines, as well as those of the proxy companies. *Id.*

3. For pipeline subsidiaries without publicly traded stock, the manner in which the pipeline obtains its debt financing determines whether it does its own financing. *Panhandle Eastern Pipe Line Co.*, 74 FERC ¶ 61,109 at 61,359 (1996); *Panhandle Eastern Pipe Line Co.*, 71 FERC ¶ 61,228 at 61,828 (1995). The Commission previously has recognized that a subsidiary commonly has financial, operational, and managerial relationships with its corporate parent (*Williams*

Natural Gas Co., 77 FERC ¶ 61,277 at p. 62,192 (1996); *Panhandle Eastern Pipe Line Co.*, 74 FERC ¶ 61,109 at 61,360 (1996)); however, such ties typically have not caused the Commission to employ the parent's capital structure unless the subsidiary pipeline issues no long-term debt, issues long-term debt only to its parent, or issues long-term debt to outside investors only with the guarantee of its parent. *KansOk Partnership*, 71 FERC ¶ 61,340 at 62,338 (1995); *Transcontinental Gas Pipe Line Corp.*, 71 FERC ¶ 61,305 at 62,193 (1995); *Louisiana Intrastate Gas Corp.*, 52 FERC ¶ 61,297 at 62,188 (1990); *Midwestern Gas Transmission Co.*, 31 FERC ¶ 61,317 at 61,720-21 (1985); *Arkansas-Louisiana Gas Co.*, 31 FERC ¶ 61,318 at 61,726-27 (1985); *Kentucky West Virginia Gas Co*., 2 FERC ¶ 61,139 at 61,326 (1978).

4. If the pipeline does not provide its own financing, the Commission looks to another entity. The Commission's policy is to use the actual capital structure of the entity that does the financing for the regulated pipeline as long as it results in just and reasonable rates. *Michigan Gas Storage Co.*, 87 FERC ¶ 61,038 at 61,157-61 (1999); *Transcontinental Gas Pipe Line Corp.*, 84 FERC ¶ 61,084 at 61,415, *reh'g denied*, 85 FERC ¶ 61,323 (1998), *petition for review denied*, *North Carolina Utilities Commission v. FERC*, 203 F.3d 53 (D.C. Cir. 2000) (*per curiam*). This generally means the parent company.

5. If the parent's capital structure is used, because it finances the operation of the pipeline, the Commission will make adjustments in the pipeline's allowed rate of return on equity to adjust for risk differences, if any, between the parent and the regulated subsidiary. If, however, the financing entity's capital structure is anomalous relative to the capital structures of the publicly-traded proxy companies used in the DCF analysis and capital structures approved for other regulated pipelines, the Commission may employ a hypothetical capital structure. *Transcontinental Gas Pipe Line Corp.*, 90 FERC ¶ 61,279 at 61,928 (2000); *Michigan Gas Storage Co.*, 87 FERC ¶ 61,038 at 61,160 (1999); *Transco*, 84 FERC at 61,414-15 (1998). "Thus, if the actual capital structure has an equity ratio that is either too thick or too thin, the allowed return necessary to ensure that ratepayers do not pay unjust and unreasonable rates may appear anomalous to the market. In that event, the Commission will use a hypothetical capital structure based on the average capital structure of a selected group of comparable firms." *Transcontinental Gas Pipe Line Co.*, 60 FERC ¶ 61,246 at 61,823 (1992).

6. Once the rates of return for the proxy companies are determined, thereby establishing a range of reasonable returns, the Commission must determine where to set the pipeline's return in that range based upon how the pipeline's risk compares with that of other pipelines. The Commission begins its risk analysis with the assumption that pipelines generally fall within a broad range of average

risk, absent highly unusual circumstances that indicate and anomalously high or low risk as compared to other pipelines. *Transcontinental Gas Pipe Line Co.,* 90 FERC ¶ 61,279 at 61,936 (2000). As a result, the Commission has generally placed pipelines at the middle of the range, using the median of the proxy group returns to calculate the middle. *Enbridge Pipelines*, 100 FERC ¶ 61,260 at 61,965 (2002).

7. Generally, financial risk is a function of the amount of debt in an organization's capital structure. When there is less debt, there is less risk. *Transco*, 84 FERC at 61,427. In *Williams Natural Gas Co.,* 77 FERC ¶ 61,277 at 62,199 (1996), the Commission noted that the thickness of a company's equity ratio is a major factor affecting the rate of return and that a high equity ratio indicates a lower financial risk. The Commission relied on *Panhandle Eastern Pipe Line Co.,* 71 FERC ¶ 61,228 at 61,834 (1995), and found that a high equity ratio suggests that a pipeline's return should be lowered from the midpoint of the range created by a proxy group.

8. The Commission has determined that maintaining a high percentage of capacity under long-term contracts reduces a pipeline's business risk. *Transco*, 80 FERC at 61,675; *Williams*, 77 FERC at 62,199. In *Iroquois Gas Transmission System*, 84 FERC ¶ 61,085 at 61,453-56 (1998), the Commission discussed pipeline risk in the determination of an appropriate rate of return and upheld the

Presiding Judge's reduction of the rate of return in light of the pipeline's reduced level of business risk. The record showed that, as here, the pipeline was well established with a high percentage of its capacity subscribed under long-term contracts which insulated it from business risk. *Iroquois*, 84 FERC at 61,453.

I have attached a table that shows the results of the capital structure and cost of capital determinations in a large sample of FERC rate cases in the last eight year. These include pipelines that were project financed and pipelines that were balance sheet financed. The capital structures varied from more than 80 percent equity to 80 percent debt. One might observe that generally project financed projects were authorized to earn a lower rate of return than pipeline projects that were balance sheet financed. To be confident of this conclusion, one would have to analyze carefully the specifics of each case.

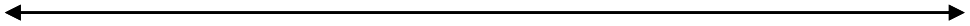
Thinking ahead to the Alaska gas pipeline poses some interesting issues. Based on the Stranded Gas Act applications, the project could be built by the North Slope producers. At least two of these companies are rich in equity and they are among the largest companies in the world -- Exxon's capital structure is about 90% equity; and BP's is about 77 % equity. Even Conoco-Phillips has about 66 percent equity. In theory, these companies have a choice whether to use balance sheet or project financing. If they relied on balance sheet financing, their capital structure would be more than 80% equity, and the resulting cost of capital would be

relatively higher. If, on the other hand, they chose to use project financing with a traditional 70 or 75 % debt structure, the cost of capital, all other things being equal, would be that be proportionately lower. Other things do enter the equation such as whether a federal loan guarantee is available and used, and the strength of the shipper contracts that the pipeline arranges.

Trans-Canada -- another Stranded Gas Act applicant -- has a balance sheet, on the other hand, that is not as rich in equity. Its equity is 37.8 percent of its capital. By itself, it appears to be a less likely candidate for a balance sheet financing and a more likely candidate for project financing. Again, the presence or absence of loan guarantees and strong shipper contracts is highly relevant.

I now want to give some example to illustrate the variations in ratemaking. Assume a gas pipeline costs $1 million. Let's take three cases: (1) a project financed pipeline; (2) a project independently financed by a pipeline that has a capital structure resembling that of a median lower 48 gas pipeline; and (3) a project that is financed by the parent company of a pipeline, where the parent company has a balance sheet with very little debt.

Higher % Debt — Higher % Equity



Lower Return — Higher Return

Lower Rates — Higher Rates

	Project Financed Pipeline (Non-recourse Financing)	**Pipeline Financed Project (Recourse Financing)**	**Equity-Rich Parent Company Financed Pipeline**
Capital Structure	25% Equity 75% Debt .25 x $1M=$250,000 Equity .75 x $1M=$750,000 Debt	50% Equity 50% Debt .50 x $1M=$500,000 Equity .50 x $1M=$500,000 Debt	80% Equity 20% Debt .80 x $1M=$800,000 Equity .20 x $1M=$200,000 Debt
Cost of Equity **Cost of Debt**	14% 8%	13% 8%	11% 8%
Weighted Average Cost of Capital (WACC)	Equity .25 x 14% = 3.5% Debt .75 x 8% = 6.0% WACC = 9.5%	Equity .5 x 13% = 6.5% Debt .5 x 8% = 4.0% WACC = 10.5%	Equity .80 x 11% = 8.8% Debt .20 x 8% = 1.6% WACC = 10.4%
Return = WACC x Rate Base	9.5% x $1M = $95,000	10.5% x $1M = $105,000	10.4% x $1M = $104,000
Return After Payment of Interest	$35,000	$65,000	$88,000

It is a relatively simple matter to study the chart and project the consequences of more or less highly leveraged capital structures. I have seen one estimate of a likely tariff that indicates that 10 percent more or less equity in the capital structure means a difference of 14 cents on the tariff. I have not made calculations of my own; I cite this for illustrative purposes only. I have refrained

from commenting on what the correct level of equity return is for an Alaska gas project because that is an issue that Alaska will need to take a position on, sooner or later.

Thank you for giving me the opportunity to speak to you on this important topic. I would be happy to answer any questions

APPENDIX A

Revenue Requirement = Cost of Service

$R = O + D + T + kB$

Where R = revenue requirement

O = operating expenses

D = depreciation allowance

T = taxes

k = a fair rate of return

B = rate base

APPENDIX B

RATE OF RETURN ON EQUITY: THE DISCOUNTED CASH FLOW METHOD

The formula for the Discounted Cash Flow Method is K = d/p + g, where

K = cost of equity (the expected return on equity investment);

d = current dividends per share;

p = current market price per share; and

g = anticipated growth rate (the expected annual growth in dividend or market price of stock).

1. Finding "d/p": Average Dividend Yields for the Proxy Group Companies

The "d/p" component of the formula calculates a dividend yield for each company in the proxy group:

Average Dividend Yields[4]

Company	Continuous Yield	Discrete Yield	Average Yield
Coastal	1.26	1.38	1.32
El Paso	4.78	5.10	4.93
Enron	2.30	2.57	2.43
Panhandle	3.58	3.88	3.73
Sonat	3.46	3.78	3.62
TWC	3.00	3.29	3.14

[4] Source: *Transcontinental Gas Pipe Line Corp.*, 84 F.E.R.C. ¶61,084, at 61,427-428 (1998).

2. Finding "g": Derivation of Growth Rates for the Proxy Group Companies

"G" represents the annual dividend growth rate derived by averaging the Institutional Brokerage Estimate System 5-year median estimate of earnings growth, given double weight, with a long-term forecast of the growth in U.S. Gross Domestic Product. While this formula uses both long and short-term growth projections, it gives short-term projections greater weight because the long-term projections "are inherently more difficult to make, and thus less reliable."[5] These calculations are performed for each proxy company in a group. Example weighting calculations are set forth below.

Unweighted IBES and GDP Growth Rates[6]

Company	IBES Growth Rates (%)	Average GDP Growth Rates (%)
Coastal	12.00	5.45
El Paso	8.00	5.45
Enron	15.00	5.45
Panhandle	10.00	5.45
Sonat	11.00	5.45
TWC	12.00	5.45

[5] *Transcontinental Gas Pipe Line Corp.*, 84 F.E.R.C. ¶61,084, at 61,423 (1998).

[6] Source: *Transcontinental Gas Pipe Line Corp.*, 84 F.E.R.C. ¶61,084, at 61,427-428 (1998).

Weighted Growth Rates (with 2/3 and 1/3 weights for the short and long-term growth components, respectively)

Company	Weighted IBES Growth Rates (%)	Weighted GDP Growth Rates (%)	Weighted Average Growth Rates (%)
Coastal	8.00	1.81	9.81
El Paso	5.34	1.81	7.15
Enron	10.00	1.81	11.81
Panhandle	6.67	1.81	8.48
Sonat	7.34	1.81	9.15
TWC	8.00	1.81	9.81

3. Finding "K": Derivation of the Rate of Return on Common Equity

Once the dividend yield and growth rates are determined (above), then finding the return on common Equity for each company becomes simple arithmetic. In the example provided, the FERC chose to use the median of the proxy group for the pipelines' allowed return on equity.

Transco's 12.49% (Median) Cost of Common Equity[7]

Company	Dividend Yield(%) +	Weighted Growth Rate(%) =	Common Equity Cost(%)
Coastal	1.32	9.81	11.13
El Paso	4.93	7.15	12.08
Enron	2.43	11.81	14.24
Panhandle	3.73	8.48	12.21
Sonat	3.62	9.15	12.77
TWC	3.14	9.81	12.95
		Median	12.49

[7] Source: *Transcontinental Gas Pipe Line Corp.*, 84 F.E.R.C. ¶61,084, at 61,427-428 (1998).

4. Finding The Overall Rate of Return

The overall rate of return considers both the capital structure of the pipeline and the cost of each type of capital. The cost of long-term debt is easily identifiable, and the cost of the common equity was determined above using the Discounted Cash Flow Method. These costs are then weighted according to the capital structure of the pipeline.

Transco's Overall Allowed Return of 10.81%[8]

Type of Capital	% of Total Capital	Cost of Capital	Weighted Cost of Capital
Long Term Debt	42.42	8.53	3.62
Common Equity	57.58	12.49	7.19
Total	100.00		10.81

[8] Source: *Transcontinental Gas Pipe Line Corp.*, 84 F.E.R.C. ¶61,084, at 61,427-428 (1998).

APPENDIX C

Pipeline	Project Financed?	Capital Structure (D/E)	ROE	Cost of Debt	WACC
***Shell Gas Pipeline Co.*, 74 FERC ¶ 61,219 (1996). ***	No	18/82	13.75%	7.65%	12.64%
Pine Needle LNG Co., LLC*, 75 FERC ¶ 61,121 (1996). *	No	50/50	12.75%	8.50%	10.63%
***Portland Natural Gas Transmission System*, 76 FERC ¶ 61,123 (1996).**	Yes	75/25	14.00%	7.69%	9.27%
***Maritimes & Northeast Pipeline, LLC*, 76 FERC ¶ 61,124 (1996). ***	Yes	75/25	14.00%	8.00%	9.50%
***Garden Banks Gas Pipeline, LLC*, 78 FERC ¶ 61,066 (1997). ***	No	21.5/78.5	13.25%	7.60%	12.04%
Ouachita River Gas Storage Co., LLC*, 78 FERC ¶ 61,181 (1997). *	Yes	75/25	13.00%	9.00%	10.00%
***Discovery Producers Services, LLC*, 78 FERC ¶ 61,194 (1997). ***	Yes	80/20	14.00%	8.30%	9.34%
***Nautilus Pipeline Co., LLC*, 78 FERC ¶ 61,325 (1997). ***	No	50/50	13.25%	7.50%	10.13%
***Dauphin Island Gathering System*, 79 FERC ¶ 61,391 (1997). ***	No	48.86/51.14	13.25%	8.30%	10.84%
***Destin Pipeline Co. LLC*, 79 FERC ¶ 61,395 (1997). ***	Yes	50/50	13.25%	8.00%	10.63%
***Alliance Pipeline LP*, 80 FERC ¶ 61,149 (1997).**	Yes	70/30	14.00%	7.50%	9.45%
***Chevron U.S.A. Inc., Venice Gathering Co.*, 81 FERC ¶ 61,183 (1997). ***	No	36.25/63.75	13.25%	6.89%	10.95%
Granite State Gas Transmission, Inc.*, 83 FERC ¶ 61,194 (1998). *	Yes	80/20	13.25%	8.25%	9.25%
***KN Wattenberg Transmission LLC*, 84 FERC ¶ 61,010 (1998).**	No	50/50	12.75%	7.99%	10.33%

***Vector Pipeline LP*, 85 FERC ¶ 61,083 (1998).**	Yes	70/30	14.00%	8.21%	9.95%
***Questar Southern Trails Pipeline Co.*, 89 FERC ¶ 61,050 (1999).**	Yes	70/30	14.00%	6.00%	8.40%
***USG Pipeline Co.*, 89 FERC ¶ 61,121 (1999).**	No	50/50	13.25%	8.00%	10.66%
Southern LNG Inc.*, 89 FERC ¶ 61,314 (1999). *	No	41/59	12.50%	7.80%	10.58%
***Buccaneer Gas Pipeline Co., LLC*, 91 FERC ¶ 61,117 (2000).**	Yes	75/25	14.00%	8.50%	9.89%
***Gulfstream Natural Gas System, LLC*, 91 FERC ¶ 61,119 (2000).**	Yes	70/30	14.00%	8.00%	9.80%
***Guardian Pipeline, LLC*, 91 FERC ¶ 61,285 (2000).**	Yes	70/30	14.00%	8.25%	9.98%
***Horizon Pipeline Co., LLC*, 92 FERC ¶ 61,205 (2000).**	Yes	60/40	13.20%	8.00%	10.08%
***North Baja Pipeline LLC*, 95 FERC ¶ 61,259 (2001).**	Yes	70/30	14.00%	8.50%	10.15%
***Petal Gas Storage LLC*, 97 FERC ¶ 61,097 (2001).**	No	50/50	12.60%	8.75%	10.66%
***Cross Bay Pipeline Co., LLC*, 97 FERC ¶ 61,165 (2001).**	Yes	75/25	14.00%	8.00%	9.50%
***Islander East Pipeline Co., LLC*, 97 FERC ¶ 61,363 (2001).**	Yes	70/30	14.00%	8.00%	9.80%
***Georgia Straight Crossing Pipeline*, 98 FERC ¶ 61,271 (2002).**	Yes	70/30	14.00%	8.00%	9.80%
***Southern Natural Gas Co., SCG Pipeline, Inc.*, 99 FERC ¶ 61,345 (2002).**	Yes	60/40	13.30%	7.00%	9.52%
***Iroquois Gas Transmission System, LP*, 100 FERC ¶ 61,275 (2002).**	Yes	75/25	12.38%	7.75%	8.91%
***Millennium Pipeline Co., LP*, 100 FERC ¶ 61,277 (2002).**	Yes	70/30	14.00%	7.50%	9.45%

***Missouri Interstate Gas, LLC*, 100 FERC ¶ 61,312 (2002).**	No	55/45	13.30%	7.33%	10.02%
***Greenbrier Pipeline Co., LLC*, 101 FERC ¶ 61,122 (2002).**	Yes	70/30	14.00%	8.00%	9.80%
Hackberry LNG Terminal, LLC*, 101 FERC ¶ 61,294 (2002). *	Yes	70/30	13.25%	8.00%	9.58%
***Energy West Development, Inc.*, 103 FERC ¶ 61,015 (2003).**	No	50/50	12.50%	7.50%	10.00%
AES Ocean Express, LLC*, 103 FERC ¶ 61,030 (2003). * *	Yes	70/30	14.00%	8.50%	10.15%
***Tractebel Calypso Pipeline, LLC*, 103 FERC ¶ 61,106 (2003). ***	Yes	70/30	14.00%	8.00%	9.80%
***Trans-Union Interstate Pipeline, LP*, 104 FERC ¶ 61,315 (2003).**	Yes	70/30	14.00%	9.00%	10.50%
***Colorado Interstate Gas Co.*, 105 FERC 61,095 (2003) .**	No	69/31	14.00%	9.00%	10.55%

** Denotes projects involving LNG and/or storage services.