Economic and Legal Rationale for Regulation

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Q. Why are the prices charged to customers by utilities such as Southern Union

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regulated?

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A. A primary purpose of price regulation is to restrain the exercise of monopoly

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power. Monopoly power represents the ability to charge excessive or unduly

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discriminatory prices. Monopoly power may arise from the presence of economies of

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scale and/or from the granting of a monopoly franchise.

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For services that operate efficiently and have the ability to achieve economies of

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scale, a monopoly is the most efficient form of market organization. Utility companies

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can supply service at lower costs if the duplication of facilities by competitors is avoided.

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This allows the use of larger and more efficient equipment and results in lower per unit

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costs. For instance, it may cost more to have two or more competing companies

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maintaining duplicate natural gas distribution systems and providing competing residential

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services to one household. This situation could result in price wars and lead to

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unsatisfactory and perhaps irregular service. For these reasons, exclusive rights may be

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granted to a single utility to provide service to a given territory. This also creates a more

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stable environment for operating the utility company. Utility regulation acts as a

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substitute for the economic control of market competition and allows the consumer to

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receive adequate utility service at a reasonable price.

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1   Natural gas distribution utility companies such as Southern Union provide natural

2   gas distribution services essentially under a monopoly franchise. Therefore, it is clear that

3   Southern Union has monopoly power.

4   Another purpose of price regulation is to provide the utility company with an

5   opportunity to earn a fair return on its capital, particularly on investments made as a result

6   of a monopoly franchise.

7   Q. Please describe your understanding of the legal basis you must use when

8   determining a fair and reasonable return for a public utility.

9   A. Several landmark decisions by the U.S. Supreme Court provide the legal

10   framework for regulation and for what constitutes a fair and reasonable rate of return for

11   a public utility. Listed below are some of the cases:

12   1. Munn v. People of Illinois Case (1877),

13   2. Bluefield Water Works and Improvement Company Case (1923),

14   3. Natural Gas Pipeline Company of America Case (1942), and

15   4. Hope Natural Gas Company Case (1944).

16   In the case of Munn v. People of Illinois, 94 U.S. 113 (1877), the Court found

17   that:

18   . . . when private property is "affected with a public interest, it ceases to
19   be *juris privati* only" . . . . Property does become clothed with a public
20   interest when used in a manner to make it of public consequence, and

affect the community at large. When, therefore, one devotes his property to a use in which the public has an interest, he, in effect, grants to the public an interest in that use, and must submit to be controlled by the public for the common good, to the extent of the interest he has thus created. Id at 126.

The Munn decision is important because it states the basis for regulation of both utility and non-utility industries.

In the case of Bluefield Water Works and Improvement Company v. Public Service Commission of the State of West Virginia, 262 U.S. 679 (1923), the Supreme Court ruled that a fair return would be:

1. A return "generally being made at the same time" in that "general part of the country";

2. A return achieved by other companies with "corresponding risks and uncertainties"; and

3. A return "sufficient to assure confidence in the financial soundness of the utility".

The Court specifically stated:

A public utility is entitled to such rates as will permit it to earn a return on the value of the property which it employs for the convenience of the public equal to that generally being made at the same time and in the same general part of the country on investments in other business undertakings which are attended by corresponding risks and uncertainties; but it has no constitutional right to profits such as are realized or anticipated in highly profitable enterprises or speculative ventures. The return should be reasonably sufficient to assure confidence in the financial soundness of the utility and should be adequate, under efficient and economical management, to maintain and support its credit and enable it to raise the

money necessary for the proper discharge of its public duties. A rate of return may be reasonable at one time and become too high or too low by changes affecting opportunities for investment, the money market and business conditions generally. _Id_ at 692-3.

In _Federal Power Commission et al. v. Natural Gas Pipeline Company of America et al._, 315 U.S. 575 (1942), the Court decided that:

The Constitution does not bind rate-making bodies to the service of any single formula or combination of formulas. If the Commission's order, as applied to the facts before it and viewed in its entirety, produces no arbitrary result, our inquiry is at an end. _Id_ at 586.

The U.S. Supreme Court also discussed the reasonableness of a return for a utility in the case of _Federal Power Commission et al. v. Hope Natural Gas Company_, 320 U.S. 591 (1944). The Court stated that:

The rate-making process . . . , i.e., the fixing of "just and reasonable" rates, involves a balancing of the investor and the consumer interests. Thus we stated . . . that "regulation does not insure that the business shall produce net revenues" . . . it is important that there be enough revenue not only for operating expenses but also for the capital costs of the business. These include service on the debt and dividends on the stock. . . . By that standard the return to the equity owner should be commensurate with returns on investments in other enterprises having corresponding risks. That return, moreover, should be sufficient to assure confidence in the financial integrity of the enterprise, so as to maintain its credit and to attract capital. _Id_ at 603.

The _Hope Case_ restates the concept of comparable returns to include those achieved by any other enterprises that have "corresponding risks". The Supreme Court also noted in this case that regulation does not guarantee profits to a utility company.

1   A more recent case heard by the Supreme Court of Pennsylvania extends the

2   Hope Case decision beyond balancing the interests of the investors and the consumers.

3   The Supreme Court of Pennsylvania stated that:

> 4   We do not believe, however, ... that the end result of a rate-making
> 5   body's adjudication *must* be the setting of rates at a level that will, in any
> 6   given case, guarantee the continued financial integrity of the utility
> 7   concerned . . . . In cases where the balancing of consumer interests
> 8   against the interests of investors causes rates to be set at a "just and
> 9   reasonable" level which is insufficient to ensure the continued financial
> 10   integrity of the utility, it may simply be said that the utility has
> 11   encountered one of the risks that imperil any business enterprise, namely
> 12   the risk of financial failure. Pennsylvania Electric Company, et al. v.
> 13   Pennsylvania Public Utility Commission, 502 A.2d 130, 133-34 (1985),
> 14   cert. denied, 476 U.S. 1137 (1986).

16   The Pennsylvania Electric Company Case is included in my testimony to illustrate a point

17   which is simply this: captive ratepayers of public utilities should not be forced to bear the

18   brunt of wrongful management which results in unnecessarily higher costs. It should be

19   noted that I do not believe that utility companies should be casually subjected to risk of

20   financial failure in a rate case proceeding. However, in a case of extremely poor

21   management, I do not believe it would always be appropriate for a regulatory agency to

22   provide sufficient funds to continue operations no matter what the costs are to the

23   ratepayers.

24   Through these and other court decisions, it has generally been recognized that

25   public utilities can operate more efficiently when they operate as monopolies. It has also

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1 been recognized that regulation is required to offset the lack of competition and maintain

2 prices at a reasonable level. It is the regulatory agency's duty to determine a fair rate of

3 return and the appropriate revenue requirement for the utility, while maintaining

4 reasonable prices for the public consumer.

5   The courts today still believe that a fair return on common equity should be similar

6 to the return for a business with similar risks, but not as high as a highly profitable or

7 speculative venture requires. The authorized return should provide a fair and reasonable

8 return to the investors of the company, while ensuring that excessive earnings do not

9 result from the utility's monopolistic powers. However, this fair and reasonable rate does

10 not necessarily guarantee revenues or the continued financial integrity of the utility.

11   It should be noted that the courts have determined that a reasonable return may

12 vary over time as economic and business conditions change. Therefore, the past, present

13 and projected economic and business conditions must be analyzed in order to calculate

14 a fair and reasonable rate of return.

15

16 **Historical Economic Conditions**

17   Q. Please discuss the relevant historical economic conditions in which Southern

18 Union has operated.

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1   A.   One of the most commonly accepted indicators of economic conditions is the

2   Discount Rate set by the Federal Reserve Board (Federal Reserve). The Federal Reserve

3   tries to achieve its monetary policy objectives by controlling the Discount Rate (the

4   interest rate charged by the Federal Reserve for loans of reserves to depository

5   institutions) and the Fed Funds Rate (the overnight lending rate between commercial

6   banks). At the end of 1982, the U.S. economy was in the early stages of recovery from

7   the longest post-World War II recession. This economic expansion began when the

8   Federal Reserve reduced the Discount Rate seven times in the second half of 1982 in an

9   attempt to stimulate the economy. Within five months, the Discount Rate was cut from

10   11.5 to 8.5 percent (see Schedule 2). This also led to a reduction in the Prime Interest

11   Rate (the base rate on corporate loans and loans to borrowers with high credit ratings)

12   from 16.50 percent in June 1982, to 11.50 percent in December 1982 (see Schedule 3).

13   The recovery continued and the economy was stimulated even more when the Federal

14   Reserve cut the Discount Rate six more times in 1986. At year-end 1986, the Discount

15   Rate was 5.5 percent and the Prime Interest Rate was 7.50 percent.

16   As the second quarter of 1987 came around, the expansion began to slow. Fears

17   of increasing inflation (see Schedule 4), the falling dollar, and high Federal deficits led to

18   increased interest rates for the second and third quarters of 1987. These fears also led to

19   the stock market crash of October 1987 in which the Standard & Poor's 500 Composite

1   Stock Price Index declined approximately 20 percent. After the crash, the Prime Interest

2   Rate fell to 8.50 percent, but additional fears of inflation led to the increase in the Prime

3   Interest Rate to 11.50 percent during the first quarter of 1989, after which the Prime

4   Interest Rate began to drop again. However, on February 24, 1989, the Federal Reserve

5   increased the Discount Rate to 7.0 percent. This was only the third increase in the

6   Discount Rate since May 1984. This increase resulted from a need to hedge the economy

7   against the fears of increasing inflation.

8   The economic expansion ceased after approximately eight years when the

9   economy entered into a recession in July 1990. In August 1990, the Iraqi invasion of

10 Kuwait produced higher crude oil prices and spurred inflation fears again. The pressures

11 of war in the Persian Gulf, the Savings and Loan bailouts and unfavorable business trends

12 led to a slow down in economic growth.

13 In February 1991, the economic uncertainties centered around the length of the

14 Persian Gulf War and the length and severity of the economic recession. By March 1991,

15 the issue of the Persian Gulf War was resolved with a quick victory by U.S. and coalition

16 troops. As a result, the market shifted its focus to the unresolved economic issues in the

17 United States.

18 On April 30, 1991, the Federal Reserve responded to the slumping economy by

19 lowering the Discount Rate to 5.5 percent. During the second quarter of 1991 the

recession ended. However, the leading economic indicators at that time did not give an indication of a strong economic recovery. As a result, the Discount Rate was cut four more times with the Discount Rate being reduced to 3.0 percent on July 2, 1992 which represents the lowest level in approximately thirty years. These monetary credit-loosening steps resulted in the Prime Rate being reduced to 6.00 percent. Economic concerns throughout the remainder of 1992 focused on the domestic economy and the presidential election in which incumbent Republican President George Bush was soundly defeated by Bill Clinton, the Democratic governor of Arkansas.

In 1993, as part of the Clinton Administration's plan to raise additional revenues, certain corporate and personal income tax rates were raised. Corporate downsizing resulted in large layoffs to white-collar and other skilled occupations in which employment has traditionally been considered as secure. Perhaps the most important factor for the U.S. economy in 1993 was the passage of the North American Free Trade Agreement (NAFTA) which creates a free trade zone consisting of the United States, Canada and Mexico. The rate of economic growth for the fourth quarter was one which the Federal Reserve believed could not be sustained without experiencing higher inflation. In the first quarter of 1994, the Federal Reserve took steps to try and restrict the economy by increasing interest rates. As a result, on March 24, 1994, the Prime Interest Rate as reported by The Wall Street Journal increased to 6.25 percent. On April 18, 1994, the

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1   Federal Reserve ~~announced its intention to raise its targeted interest rates~~ which resulted

2   in the Prime Interest Rate ~~being increased to 6.75 percent.~~ The Federal Reserve took

3   action on May 17, 1994, by raising the discount rate to 3.5 percent. Three additional

4   restrictive monetary actions were taken by the Federal Reserve, with the last occurring

5   on February 1, 1995. These actions raised the discount rate to 5.25 percent and in turn

6   banks raised the Prime Interest Rate to 9.00 percent.

7   The Federal Reserve then ~~reversed its policy in late 1995, by lowering the~~

8   Discount Rate 0.25 percentage points on two different occasions. This had the effect of

9   lowering the Prime Interest rate to 8.50 percent. On January 31, 1996 the Federal

10   Reserve lowered the Discount Rate to its current rate of 5.00 percent, which had the

11   effect of lowering the Prime Interest Rate to its current rate of 8.25 percent.

12   Current economic topics seem to revolve around continued economic growth and

13   minimal levels of inflation in the foreseeable future.

14   Economic changes and capital cost changes for utilities are closely reflected in the

15   yields on public utility bonds and yields of Thirty Year U.S. Treasury Bonds (see

16   Schedule 5-1 and 5-2). Schedule 5-3 shows how closely the Moody's "Public Utility

17   Bond Yields" have followed the yields of Thirty Year U.S. Treasury Bonds during the

18   period from 1982 to the present. The average spread for this time period between these

19   two composite indices has been 136 basis points, with the spread ranging from a low of

1   80 basis points and a high of 304 basis points (see Schedule 5-4). These spread

2   parameters can be utilized with numerous published forecasts of Thirty Year U.S.

3   Treasury Bond yields to estimate future long-term debt costs for utility companies.

4   Moody's "Public Utility Bond Yields" are also graphically compared to both Standard &

5   Poor's "Utilities Stock Yields" and Standard & Poor's "Industrials Stock Yields" (see

6   Schedule 6).

7   Q. Have the utility and industrial stocks recovered from the stock market crash

8   of October 19, 1987?

9   A. According to The Value Line Investment Survey: Selection and Opinion,

10   utility stocks have fully recovered from the stock market crash on October 19, 1987, and

11   have added 41.6 percent to Value Line's "Geometric Average Index for Utilities" over the

12   period from September 1987 through July 11, 1996. Industrial stocks however, only fully

13   recovered June 6, 1995. This is based on the Value Line's geometric averages for both

14   industrials and utilities. The utility index dropped 11.7 percent for the fourth quarter of

15   1987, while the industrial index dropped 28.8 percent during the fourth quarter of 1987.

16   In addition, during the stock market correction on October 13, 1989, the percentage drop

17   for the utility index was not as sharp as the percentage drop for the industrial index. This

18   suggests that the utility stocks were a better investment, when compared to industrial

19   stocks, following the stock market crash and correction. However, since the respective

1 highs of each index, the utility index dropped 22.3 percent for the period of September

2 13, 1993 through November 22, 1994, while the industrial index has only dropped 12.9

3 percent for the period of March 18, 1994 through December 9, 1994. Both indices have

4 advanced since the 1994 end-of-year lows. As a result of the current rally industrials have

5 finally recovered from the stock market crash of 1987 and have increased in overall value

6 42.5 percent as of January 8,1998. The Utilities have increased as well by adding 74

7 percent in overall value since the stock market crash of 198. As a result, when compared

8 to industrial stocks, it suggests that utility stocks are more stable, more defensive in

9 nature and are better investments during slumping economic times but are less stable

10 during times of increasing interest rates.

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12 ## Economic Projections

13 Q. What are the inflationary expectations for the remainder of 1998 and beyond?

14 A. The latest inflation rate, as measured by the Consumer Price Index-All Urban

15 Consumers (CPI), was 1.7 percent for the 12 months ended December 31, 1997. The

16 Value Line Investment Survey: Selection & Opinion, November 30, 1997, predicts

17 inflation to be 2.5 percent for 1997 and 2.6 percent for 1998 (see Schedule 7). Salomon

18 Brothers Inc's Comments On Credit, December 5, 1997, predicts the CPI will increase by

19 1.9 percent through 1997 and increase by 2.2 percent in 1998.

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Q. What are interest rate forecasts for 1998?

A. Short-term interest rates, those measured by Three-Month U.S. Treasury Bills, were 5.1 percent in 1996, 5.2 percent in 1997, and expected to be 5.2 percent in 1998 according to Value Line's predictions. Value Line indicates that long-term interest rates, those measured by Thirty Year U.S. Treasury Bonds, was 6.2 percent for 1996 and 6.2 for 1997, and will be 6.3 percent for 1998. The current rates are 5.09 percent for 3-month T-Bills and 5.85 percent for 30-year T-Bonds, as noted from The Wall Street Journal, February 13, 1998.

Q. What are the growth expectations for real Gross Domestic Product (GDP) in the future?

A. GDP is a benchmark utilized by the Commerce Department to measure economic growth within the United States' borders. Real GDP is measured by the actual Gross Domestic Product adjusted for inflation. During 1996 real GDP increased by 3.3 percent (see schedule 7). Salomon Brothers Inc predicts that real GDP is likely to increase by 3.6 percent for 1997 and 2.4 percent for 1998.

Q. Please summarize the expectations of the economic conditions for the foreseeable future.

A. In summary, when combining the previously mentioned sources, inflation is expected to be in the range of 1.9 to 2.2 percent, real GDP in the range of 2.4 to 3.6

percent and long-term interest rates are expected to range from 5.93 to 6.61 percent. The Value Line Investment Survey: Selection & Opinion, January 16, 1998, states that:

> It's just that recent figures on manufacturing, consumer borrowing, and the average work week all now suggest that the rate of improvement shown by the economy in 1996 and 1997 will not be repeated in 1998. Even so, there should be enough momentum in place - assuming that the apparent deepening slide throughout Asia, including now Indonesia, which helped to send the U.S. stock market into a sharp retreat during the first part of January, is ultimately contained - for the long up trend to remain in place.
>
> Interest costs continue to head lower, with rates on 30-year Treasury bonds (which are keyed to inflationary expectations) now comfortably below 6%. This decline in long-term interest rates is sending mortgage costs down as well, a development that will help sustain the long housing expansion. The Federal Reserve, which has kept short-term borrowing costs (which it directly controls) level for some time now, but which continues to signal that it is sensitive to the possibility of deflation as well as inflation, could opt to cut short-term interest rates later this year.

In addition, Standard & Poor's Corporation's The Outlook, December 17, 1997, states:

> The economy will lose some of its vigor, with slowing exports the main reason. The odds favor containment of Asia's problems, but a meltdown there can't be completely ruled out. That's a threat to continued worldwide prosperity. In any event, the word "recession" will be heard increasingly here as the focus turns to 1999. Worries about inflation will slowly abate.
>
> Bond yields will remain low, aided by global deflationary forces stemming from excessive production capacity. Also, it's not in the interests of the Japanese and Chinese to abandon U. S. Treasuries.

Business Operations of Southern Union Company

Q. Please describe Southern Union's business operations.

A. In Southern Union Company's 1997 Stockholders' Annual Report, Southern Union states:

Southern Union Company's principal business is the distribution of natural gas as a public utility through Southern Union Gas, serving 497,000 customers in Texas (including the cities of Austin, Brownsville, El Paso, Galveston and Port Arthur), and Missouri Gas Energy (MGE), acquired on January 31, 1994, serving 474,000 customers in central and western Missouri (including the cities of Kansas City, St. Joseph, Joplin and Monett). The company also operates natural gas pipeline systems, markets natural gas to end-users, distributes propane and holds investments in real estate and other assets.

To achieve profitability and continued growth, the Company continues to emphasize gas sales in nontraditional markets, operating efficiencies of existing systems, and expansion through selective acquisitions of new systems.

Southern Union's total operating revenues were $699,939,004 for the 12 months ended December 31, 1997. These total operating revenues resulted in an overall net income of $19,604,915. These revenues and net incomes were generated from a net utility plant in service with a book value of $805,034,122 at December 31, 1997. These figures were taken from Southern Union's Data Request No. 3801.

Q. Please describe the credit ratings of Southern Union.

A. Currently, Standard & Poor's Corporation rates the senior secured debt of Southern Union as "BBB". Also, Moody's Investors Service rates Southern Union's first

1 mortgage bonds as "Baa3". All of these ratings are considered to be of "investment

2 grade." It should be noted that in the financial community Standard & Poor's

3 Corporation's "BBB-" credit rating is comparable to Moody's Investment Service's "Baa3"

4 credit rating.

5   Q. What is Standard & Poor's Corporation credit rating approach toward

6 investor-owned natural gas distribution utilities?

7   A. Standard & Poor's Corporation's CreditWeek, December 6, 1993, states:

8   S&P [Standard & Poor's Corporation] is revising its financial benchmark
9   ratios for U.S. investor-owned natural gas distributors and pipelines.
10   With this modification, S&P is publishing a risk-adjusted or matrix
11   approach to the financial benchmarks, which incorporates a more detailed
12   comparison of financial performance and a company's business risk profile
13   . . . .

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15   At the same time S&P is recognizing moderate changes in business risk
16   for the entire gas industry due to the implementation of Federal Energy
17   Regulatory Commission Order 636. Only minor changes are being made
18   to the financial guidelines, because the industry, as a whole, is well
19   positioned to deal with the implications of Order 636. In fact, S&P does
20   not see the need to stiffen the targeted financial ratios for gas distributors,
21   despite a moderate increase in gas supply risks they face . . . .
22
23   The risk-adjusted ratio guidelines depict the role that financial ratios play
24   in S&P's utility rating process, since financial ratios are viewed in the
25   context of a firm's business risk profile. For a given rating category,
26   expected levels of financial ratios vary with the business or operating risk
27   of a company. A utility with a stronger competitive position, more
28   favorable business prospects, and more predictable cash flows can afford
29   to withstand greater financial risk while maintaining the same credit rating
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. . . the distributors in S&P's rating universe [of which Southern Union is included] . . . are believed to be of significant size and possess the management talent to efficiently handle this responsibility. Of course, S&P will monitor every utility's performance, paying particular attention to how each utility deals with its respective commissions. If a management has a well thought out supply plan, and effectively communicates and educates its regulatory commission on this plan, then regulatory risk can and will be mitigated.

An evaluation of business risk . . . is important to best understand a company's ability to generate cash for debt servicing. In this regard, S&P is most concerned with a company's ability to both earn a reasonable return on investment and successfully compete in its markets; i.e. to retain existing customers and attract new ones. While rates to the consumer strongly impact competition, there are several other areas to analyze to determine whether a utility has an above average, average, or below average business position.

First, S&P analyzes a firm's customer base for diversity, growth opportunities, and susceptibility to weather or economic volatility. Next a complete understanding of a company's ability to compete is critical. This includes a rate comparison versus competitors, projections for total cost of service, a study on the need for and impact of discounted rates, and an evaluation of the adequacy and diversity of gas supplies.

Regulation plays a huge role in a company's business position, because all decisions by a commission not only impact earnings but will act to support or not support competitive rates in all markets. Rate case rulings . . . have a great effect on the rates to individual customers and the company's chance to attract new ones.

Lastly, management's operating and competitive strategies may be the most important factor to evaluate. Management must cohesively link marketing, supply, and regulatory strategies so as to best provide a competitive product to the consumer. S&P will monitor the success of these plans, along with financing practices and diversification activities.

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. . . S&P believes all rated companies have the ability to do the job correctly and should do the job correctly . . . . S&P is not anticipating or planning major rating changes or rating outlook revisions due to either the new benchmarks or the implementation of Order 636 . . . .

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In the April 25, 1994, issue of Standard & Poor's Corporation's CreditWeek,

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Standard & Poor's reaffirmed their financial ratio benchmarks set in December 1993, and

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further defined the business position classification by stating that:

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S&P has established a system that better illustrates the business-risk positions of gas distribution and pipeline companies. This system compliments S&P's risk-adjusted ratio guidelines published late last year. Both the ratio bunchmarks and business-risk positions incorporate the comprehensive comparison of financial performance and business risk involved in the credit analysis process. S&P has always performed this task in the past, but this methodology makes the linkage more explicit.

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Companies are listed in seven categories, ranging from "Above Average" to "Below Average", and are ranked within those categories by their relative quality. Risk evaluations are based solely on utility or pipeline operations and are provided for individual operating units where enough information is available to do the analysis . . . .

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Standard & Poor's updated their main areas of focus in the determination of business

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position as being:

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Customer Markets
- Market share and local economy.
- Customer diversity and growth prospects.
- Gas use saturation levels in service territory.
- Load factor.

- Industrial and power-generation customers as percentage of load and margin.

Competitive Position
- By-pass risk.
- Length of contracts with industrial and power generation customers.
- Proximity of interstates to industrial and power-generation customers.
- All-in rates versus alternate fuels in all markets.
- All-in rates versus interstate pipelines in industrial and power-generation markets.
- Cost of operations.
- Integrity of pipeline system.
- Cost of pipeline access and transmission.
- Cost of gas.

Supply Postion
- Diversity of producers and pipeline suppliers.
- Access to storage.
- Length of pipeline capacity and gas supply contracts.

Regulatory Enviroment
- Diversity of jurisdictions.
- Rate design and cost-allocation decisions.
- Supportiveness of gas-purchasing practices.
- Supportiveness of captial spending programs and cost-recovery decisions.
- Earnings stabilization clauses for weather or economy.
- Flexibility of rate to large customers.
- Ability to earn allowed returns

The seven categories of business position used by Standard & Poor's are:

- above-average,
- somewhat above-average,
- high average,
- average,
- low average,
- somewhat below-average, and
- below-average.

Q. Please provide Standard & Poor's Corporation's most recent outlook concerning the credit rating assigned to Southern Union.

A. Standard & Poor's Corporation's <u>Utilities Ratings Service</u>, April, 1997, provides a summary explaining the outlook. Specifically the report states:

OUTLOOK: STABLE
RATIONALE
Southern Union Co.'s ratings anticipate gradual but steady recovery of the $400 million cost of Missouri Gas Energy (MGE), acquired in January 1994. The Missouri gas distribution system, which serves the western Missouri region including Kansas City, St. Joseph, and Joplin, doubled the size of Southern Union. Southern Union Gas serves major areas of Texas, including Austin, El Paso, Galveston, and the Rio Grande Valley. Over the past several years, the company has been acquiring Texas distribution systems, including the Rio Grande Valley system. Additional acquisitions are anticipated, especially in areas where gas has a competitive advantage over electric utility service. The company has a fairly stable customer base of primarily residential customers and the Texas regulatory climate is favorable. Rates are negotiated at the local level, obviating the need to appeal to the Texas Railroad Commission. Earnings stability is further supported by a weather normalization clause in Austin, one of the company's largest markets, and by increased fixed monthly customer charges. As a result, 75% of all Texas revenue and 70% of all Missouri revenue are not affected by the

1   weather. In Missouri, the company will continue to file for recovery of
2   expenses incurred to make required pipeline improvements. Since
3   Southern Union does not pay a cash dividend, surplus cash flow will be
4   dedicated to debt reduction. Most of the equity is held by a small group
5   of investors.

6

7   Q. Please provide some historical financial information for Southern Union.

8   A. Schedules 8 and 9 present historical capital structures and selected financial

9   ratios from 1994 to 1997 for Southern Union. Southern Union and its subsidiaries'

10   consolidated common equity ratio has ranged from a high of 35.55 percent to a low of

11   28.60 percent over the time period of 1994 though 1997. It is Staff's opinion that the

12   wide swing in Southern Union's common equity ratio is due to the debt leverage used to

13   purchase the Missouri gas properties. The Value Line Investment Survey: Ratings &

14   Reports June 28, 1996, reported that the average common equity ratio for the natural gas

15   distribution industry for 1995 was 47.0 percent. Southern Union's common equity ratio

16   is significantly lower than the "industry average", but that is one factor that has led to

17   Staff's concern with Southern Union's capital structure. According to Standard & Poor's

18   Utilities Rating Service, June 1995, ". . . [u]sing preferred stock and internally-generated

19   funds, the company expects to bring leverage down to around 55% by 1997.

20   Management has stated that, if necessary, common stock would be sold to bring the

21   capital structure in line with the current ratings."

1 Southern Union's consolidated return on year-end common equity (ROE) has been

2 extremely low during this time period ranging from a high of 8.47 percent in 1996 to a

3 low of 4.01 percent in 1994. Southern Union's 1996 ROE of 8.47 percent was below the

4 average earned by other natural gas distribution utilities of 12.60 percent according to

5 The Value Line Investment Survey: Ratings & Reports, September 26, 1997. In addition,

6 Edward Jones's Natural Gas Industry Summary: Monthly Financial & Common Stock

7 Information, January 31, 1998, reports the average return on equity for its composite list

8 of 33 natural gas distribution companies was 11.5 percent for the latest 12 month period

9 ending September 30, 1997. Southern Union's market-to-book ratio has varied from a

10 high of 1.52 times in 1997 to a low of 0.92 in year 1994.

Determination of the Cost of Capital

13 Q. Please describe the cost of capital approach for determining a utility

14 company's cost of capital.

15 A. The total dollars of capital for the utility company are determined for a

16 specific point in time. This total dollar amount is proportioned into each specific capital

17 component. A weighted cost for each capital component is determined by multiplying

18 each capital component ratio by the appropriate embedded cost or the estimated cost of

19 common equity. The individual weighted costs are summed to arrive at a total weighted

1 cost of capital. This total weighted cost of capital is synonymous with the fair rate of

2 return for the utility company.

3   Q. Why is a total weighted cost of capital synonymous with a fair rate of return?

4   A. From a financial viewpoint, a company employs different forms of capital to

5 support or fund the assets of the company. These funds are invested proportionately to

6 support each dollar of the company's assets. Each different form of capital has a cost and

7 these costs are weighted proportionately to fund each dollar invested in the assets.

8   Assuming that the various forms of capital are within a reasonable balance and are

9 costed correctly, the resulting total weighted cost of capital, when applied to rate base,

10 will provide the funds necessary to service the various forms of capital. Thus, the total

11 weighted cost of capital corresponds to a fair rate of return for the utility company.

12

Capital Structure and Embedded Costs

14   Q. What capital structure did you use?

15   A. I have employed a combined capital structure as of December 31, 1997, for

16 Southern Union. The capital structure I have used for this case is for Southern Union on

17 a consolidated basis including Southern Union Financing I the company's subsidiary that

18 holds the preferred stock. Schedule 10 presents Southern Union's capital structure and

19 associated capital ratios. The resulting capital structure consists of 38.06 percent

1   common stock equity, 12.68 percent preferred stock, 49.26 percent long-term debt and

2   0.00 percent short-term debt (see Schedule 10).

3   Southern Union did not have any short-term debt outstanding as of December 31,

4   1997.

5   The amount of long-term debt outstanding on December 31, 1997, includes

6   current maturities due within one year and was reduced by $20,200,960 (see Schedule 10)

7   for the net balance associated with the unamortized premium or discount expense and

8   debt issuance expense (including losses on reacquired debt).

9   The amount of preferred stock outstanding on December 31, 1997, includes

10   current maturities due within one year and was reduced by $3,627,365 (see Schedule 12)

11   for the net balance associated with the unamortized premium or discount expense and

12   debt issuance expense.

13   Q. What was the embedded cost of long-term debt for Southern Union on

14   December 31, 1997?

15   A. I determined the embedded cost of long-term debt on December 31, 1997,

16   for Southern Union to be 8.19 percent (see Schedule 11).

17   Q. What was the embedded cost of preferred stock for Southern Union on

18   December 31, 1997?

1   A. I determined the embedded cost of preferred stock on December 31, 1997,

2   for Southern Union to be 9.97 percent (see Schedule 12). It should be noted that the

3   preferred stock Southern Union has issued is a hybrid between debt and equity. It has the

4   tax deductibility of interest like debt and the option of deferring the interest payments like

5   preferred stock. Consequently, the interest payments do not need to be factored up for

6   taxes, and the Staff is recommending that all the benefits of this security go to the

7   ratepayer.

8

Cost of Equity

9

10   Q. How do you propose to analyze those factors by which the cost of equity for

11   Southern Union may be determined?

12   A. I have selected the discounted cash flow (DCF) model as the primary tool to

13   determine the cost of equity for Southern Union, but I will use a risk premium model and

14   the Capital Asset Pricing Model to check the reasonableness of the DCF results.

15

The DCF Model

16

17   Q. Please describe the DCF model.

18   A. The DCF model is a market-oriented approach for deriving the cost of equity.

19   The return on equity calculated from the DCF model is inherently capable of attracting

capital. This results from the theory that security prices adjust continually over time, so

that an equilibrium price exists, and the stock is neither under-valued nor over-valued.

It can also be stated that stock prices continually fluctuate to reflect the required and

expected return for the investor.

The continuous growth form of the DCF model was used in estimating the cost

of equity for Southern Union. This model relies upon the fact that a company's common

stock price is dependent upon the expected cash dividends and upon cash flows received

through capital gains or losses that result from stock price changes. The rate which

discounts the sum of the future expected cash flows to the current market price of the

common stock is the calculated cost of equity. This can be expressed algebraically as:

$$\text{Present Price} = \frac{\text{Expected Dividends}}{\text{Discounted by } k} + \frac{\text{Expected Price in 1 year}}{\text{Discounted by } k} \qquad (1)$$

Since the expected price of a stock in one year is equal to the present price multiplied by

one plus the growth rate, equation (1) can be restated as:

$$\text{Present Price} = \frac{\text{Expected Dividends}}{(1+k)} + \frac{\text{Present Price } (1+g)}{(1+k)} \qquad (2)$$

where g equals the growth rate, and k equals the cost of equity. Letting the present price

equal P_0 and expected dividends equal D_1, the equation appears as:

$$D_1 \qquad P_0(1+g)$$

$$P_0 \quad = \quad \frac{}{(1+k)} \quad + \quad \frac{}{(1+k)} \qquad (3)$$

The cost of equity equation may also be algebraically represented as:

$$k \quad = \quad \frac{D_1}{P_0} \quad + \quad g \qquad (4)$$

Thus, the cost of common stock equity, k, is equal to the expected dividend yield (D_1/P_0) plus the expected growth in dividends (g) continuously summed into the future. The growth in dividends and implied growth in earnings will be reflected in the current price. Therefore, this model also recognizes the potential of capital gains or losses associated with owning a share of common stock.

The discounted cash flow method is a continuous stock valuation model. The DCF theory is based on the following assumptions:

    1. Market equilibrium,

    2. Perpetual life of the company,

    3. Constant payout ratio,

    4. Payout of less than 100% earnings,

    5. Constant price/earnings ratio,

    6. Constant growth in cash dividends,

7. Stability in interest rates over time,

8. Stability in required rates of return over time; and

9. Stability in earned returns over time.

Flowing from these, it is further assumed that an investor's growth horizon is unlimited and that earnings, book values and market prices grow hand-in-hand. Even though the entire list of above assumptions is rarely met, the DCF model is a reasonable working model describing an actual investor's expectations and resulting behaviors.

Q. Can you directly analyze the cost of equity for Southern Union?

A. No. In order to arrive at a company-specific DCF result, a company must have common stock that is market-traded and pay cash dividends. Southern Union does not pay cash dividends; therefore, I can not directly analyze Southern Union Company.

Q. Please explain how you approached the determination of the cost of equity for Southern Union.

A. I have decided to do an analysis of the cost of equity for the natural gas distribution industry, as well as a smaller group of comparable companies.

Q. How did you determine which companies you would include to represent the natural gas distribution industry?

A. Schedule 13 presents a list of thirty-four market-traded natural gas distribution companies monitored by Edward Jones of which Southern Union is one. This list was reviewed for the following criteria:

1. Information printed in Value Line: This criterion eliminated sixteen companies;

2. Pretax interest coverage greater than 2.80 times: This criterion eliminated six additional companies;

3. Long-term debt to total capital less than 53 percent: This criterion eliminated one additional company;

4. Distribution revenue to total revenues greater than 90 percent: This criterion eliminated no additional companies;

5. Positive Dividends Per Share Annual Compound Growth Rate for the period of 1986 through 1996: This criterion eliminated one additional company; and

6. No Missouri Operations: This criterion eliminated one additional company.

This final group of eight publicly traded natural gas distribution companies (natural gas distribution industry companies) was assumed to represent the natural gas distribution industry. These eight companies are significantly stronger financially than Southern Union, but they are assumed to represent the industry. These eight companies have an average bond rating in the "A" category according to Standard & Poor's Corporation, and Standard & Poor's Corporation current ratings distributions list 74% of the gas

1   distribution companies that they rate in the "A" category or higher. The eight natural gas

2   distribution companies assumed to represent the industry are listed on Schedule 14.

3   Q. Please explain how you approached the determination of the cost of equity

4   for the comparable natural gas distribution companies.

5   A. I have calculated a DCF cost of equity for each of the eight natural gas

6   distribution industry companies. The first step was to calculate a growth rate. I reviewed

7   the actual dividends per share (DPS), earnings per share (EPS), and book values per share

8   (BVPS) as well as projected growth rates for the industry companies. Schedule 15 lists

9   the annual compound growth rates for DPS, EPS, and BVPS for the periods 1986

10   through 1996. Schedule 16 presents the average historical growth rates and the projected

11   growth rates for the industry companies. The projected growth rates were obtained from

12   three outside sources; I/B/E/S Inc.'s Institutional Brokers Estimate System, Standard &

13   Poor's Corporation's Earnings Guide, and The Value Line Investment Survey: Ratings

14   and Reports. The three projected growth rates were averaged to develop an average

15   projected growth rate of 5.57 percent which was averaged with the historical growth rates

16   to produce an average historical and projected growth rate of 4.77 percent. All the

17   growth rates were then analyzed to arrive at a growth rate range for the industry

18   companies of 4.80 percent to 5.60 percent.

1   The next step was to calculate an expected yield for each of the eight natural gas

2   distribution industry companies. The yield term of the DCF model is calculated by

3   dividing the amount of common dividends per share expected to be paid over the next

4   twelve months by the market price per share of the firm's stock. Even though the model

5   requires a spot price, I have chosen to use a monthly average market price for each of the

6   natural gas distribution industry companies. This averaging technique is an attempt to

7   minimize the effects on the dividend yield which can occur due to daily volatility in the

8   stock market. Schedule 17 presents the average high / low stock price for the period of

9   November 1, 1997 through January 31, 1998 for each natural gas distribution industry

10   company. Column 1 of Schedule 18 shows the expected dividend for each of the natural

11   gas distribution industry companies over the next 12 months as projected by The Value

12   Line Investment Survey: Ratings & Reports, December 26, 1997. Column 3 of Schedule

13   18 is the projected dividend yield for each of the eight natural gas distribution industry

14   companies. The dividend yield for each industry company was averaged to reach the

15   dividend yield for the industry of 4.74 percent.

16   The growth rates for each of the industry companies and the projected dividend

17   yield for each of the industry companies were then added together to reach an estimated

18   DCF cost of equity for each of the eight natural gas distribution industry companies (see

1   Schedule 18). This produces a DCF cost of equity estimates for the industry of between

2   9.51 percent and 10.31 percent.

3   Q. What analysis was performed to determine the reasonableness of your DCF

4   model derived return on common equity for the comparable company group?

5   A. I performed a risk premium and CAPM cost of equity analysis for the natural

6   gas distribution industry company group.

7   Q. Please describe the risk premium model.

8   A. The risk premium concept implies that the required return on equity is found

9   by adding an explicit premium for risk to a current interest rate. Schedule 19-1 through

10   19-8 shows the average risk premium above the yield of the appropriately rated Moody's

11   Public Utility Bond for each of the industry companies' expected return on common

12   equity. This analysis shows, on average, that the expected return on equity as reported

13   by The Value Line Investment Survey: Ratings & Reports ranges from 173 basis points

14   to 463 basis points higher than the average yield on the appropriately rated Moody's

15   Public Utility Bonds for the period of January 1986 to December 1997 (see Schedule 20).

16   The risk premium is then added to the current yield on thirty year public utility bonds of

17   the appropriate rating for the individual company. Column 4 of Schedule 20 shows that

18   the risk premium cost of equity estimate for each of the natural gas distribution industry

19   companies ranged from 8.89 percent to 11.70 percent, with an average of 10.59 percent.

1   Q. Please describe the capital asset pricing model (CAPM).

2   A. The CAPM describes the relationship between a security's investment risk and

3 its market rate of return. This relationship identifies the rate of return which investors

4 expect a security to earn so that its market return is comparable with the market returns

5 earned by other securities that have similar risk. The general form of the CAPM is as

6 follows:

$$k = R_f + \beta (R_m - R_f)$$

7

8 where:

9   k = the expected return on equity for a specific security;

10

11   R_f = the risk free rate;

12   β = beta; and

13     $R_m - R_f$ = the market risk premium.

14

15 The first term of the CAPM is the risk free rate (R_f). The risk free rate reflects

16 the level of return which can be achieved without accepting any risk. In reality, there is

17 no such riskless asset, but it is generally represented by U.S. Treasury securities. For

18 purposes of this analysis, the risk free rate was represented by the yield on 30-Year U.S.

19 Treasury Bonds. The appropriate rate was determined to be 5.99, as published in The

20 Federal Reserve Bulletin, January 6, 1998.

1   The second term of the CAPM is beta (β). Beta is an indicator of a security's

2   investment risk. It represents the relative movement and relative risk between a particular

3   security and the market as a whole (where beta for the market equals 1.00). Securities

4   with betas greater than 1.00 exhibit greater volatility than do securities with betas less

5   than 1.00. This causes a higher beta security to be less desirable and therefore requires

6   a higher return in order to attract investor capital away from a lower beta security. For

7   purposes of this analysis, the appropriate beta was determined to be the value for each of

8   the industry companies as published in The Value Line Investment Survey: Ratings &

9   Reports, December 26, 1997.

10   The final term of the CAPM is the market risk premium ($R_m - R_f$). The market

11   risk premium represents the expected return from holding the entire market portfolio less

12   the expected return from holding a risk free investment. For purposes of this analysis, the

13   appropriate market risk premium was determined to be 7.30 percent as calculated for

14   1926 to 1996, and 5.89 percent as calculated for 1987 tom 1996 in Ibbotson Associates,

15   Inc.'s Stocks, Bonds, Bills, and Inflation: 1996 Yearbook.

16   Schedule 21 presents the CAPM analysis with regard to each of the eight natural

17   gas distribution industry companies. The CAPM analysis for each of the natural gas

18   distribution industry companies produces an estimated cost of equity range of 9.86

19   percent to 10.78 percent. It should be noted that recent debate has somewhat diminished

1   the reliability of CAPM as a cost of equity evaluation tool. As a result, I do not believe

2   that the CAPM analysis should be given equal weight to the DCF cost of equity analysis

3   and should only be used as a check to the DCF analysis.

4   Q. Did you perform any cost of equity analysis on other utility companies?

5   A. Yes. I have also selected a group of natural gas distribution companies

6   comparable to Southern Union to analyze for determining the reasonableness of the

7   industry results. The comparable companies were selected from the thirty-three market-

8   traded natural gas distribution companies monitored by Edward Jones of which Southern

9   Union is one (see Schedule 22). This list was reviewed for the following criteria:

10   1. Information printed in Value Line: This criterion eliminated sixteen
11   companies;

12
13   2. Company rated "BBB" by Standard & Poor's Corporation. This criterion
14   eliminated thirteen companies;
15

16   3. Distribution revenue to total revenues greater than 90 percent: This
17   criterion eliminated no additional companies;

18
19   4. No Missouri Operations. This criterion did not eliminate any additional
20   companies.
21

22   This left four companies in the comparable company group. On average, this final group

23   of four publicly traded natural gas distribution companies (comparable natural gas

24   distribution companies) is comparable to Southern Union because of similar business

1   operations and financial conditions.   The four comparable natural gas distribution

2   companies are listed on Schedule 24.

3   Q. Please explain how you approached the determination of the cost of equity

4   for the comparable natural gas distribution companies.

5   A. I have calculated a DCF cost of equity for each of the four comparable natural

6   gas distribution companies. The first step was to calculate a growth rate. Basically, I

7   used the same approach of obtaining a growth rate estimate for the four comparable

8   natural gas distribution companies as I used in calculating a growth rate for the industry

9   companies (see Schedules 24 and 25).   The comparable natural gas distribution

10   companies' average historical growth rates ranged from -0.37 percent to 7.87 percent.

11   The projected growth rates ranged from 3.00 to 10.40 percent with an average of 6.02

12   percent. Taking into account all the projected growth rates a proposed range of growth

13   of 5.50 to 6.00 percent was used in the DCF calculation for the comparable companies.

14   The next step was to calculate an expected dividend yield for each of the four

15   comparable natural gas distribution. Schedule 26 presents the average high / low stock

16   price for the period of November 1, 1997, through January 31, 1998, for each gas utility

17   company. Column 3 of Schedule 27 shows that the projected dividend yields ranged from

18   3.70 percent to 5.97 percent for the four comparable natural gas distribution companies

19   with the average at 5.07 percent.

1   The estimated growth rates and projected dividend yields were then added

2   together to reach an estimated DCF cost of equity for each of the four comparable natural

3   gas distribution companies (see Schedule 27). These estimates produced a DCF cost of

4   equity ranging from 9.12 to 12.57 percent for the comparable natural gas distribution

5   companies with an average of 11.19 percent. Using the average dividend yield of 5.17

6   percent and adding that to the proposed growth rate range of 5.50 to 6.00 percent

7   produces a proposed cost of common equity range of 10.67 percent to 11.19 percent for

8   the three comparable natural gas distribution companies.

9   Q. What analysis was performed to determine the reasonableness of your DCF

10   model derived return on common equity for the comparable company group?

11   A. I performed a CAPM cost of equity analysis for the comparable company

12   group. A CAPM cost of equity analysis was preformed. The betas for the four

13   comparable natural gas distribution companies averaged 0.59. The CAPM analysis

14   implies that, on average, the required return on equity for the four comparable natural gas

15   distribution companies falls within the range of 9.95 to 10.28 percent (see Schedule 28).

16   Q. Please summarize your cost of equity analysis to this point.

17   A. I have performed a DCF and CAPM cost of equity analysis on a group of

18   eight industry companies and a group of four comparable companies, and I have also

19   performed a risk premium cost of equity analysis on the eight industry companies. The

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1 results of the risk premium analysis for the comparable companies was not meaningful,

2 and therefore not included in this analysis. The results are summarized below.

3

	DCF	CAPM	Risk Premium
Industry Companies	9.51% -10.31%	9.86% - 10.78%	10.59%
Comparable Companies	10.67% -11.19%	9.45% - 10.28%	N.M.

6

7   Q. Based on the analysis you performed, what is your recommended return on

8 common equity in this proceeding?

9   A. I am recommending a return on common equity in the range of 10.67 percent

10 to 11.35 percent. This range was determined by starting with the DCF cost of common

11 equity range for the industry companies and comparing those results with the DCF cost

12 of common equity results for the comparable companies. The comparable companies are

13 riskier than the industry companies as indicated by the fact that the industry companies

14 average bond rating is "A+" and an average common equity ratio of 53 percent as

15 opposed to the comparable companies which have an average bond rating of "BBB+" and

16 an average common equity ratio of 49 percent (see Schedule 29). Based on my analysis,

17 the Company is closely held and managed as a growth company. Therefore, any risk

18 above the comparable group is the result of management actions and should be absorbed

19 by the shareholders, not the ratepayers.

1   Q. Did you perform an analysis on Southern Union's resulting pre-tax interest

2   coverage ratios?

3   A. Yes. A pro forma pre-tax interest coverage calculation was completed for

4   Southern Union (see Schedule 30). It reveals that the return on equity range of 10.67

5   percent to 11.19 percent would yield a pre-tax interest coverage ratio in the range of 3.09

6   times to 3.26 times. This interest coverage range is much better than Standard & Poor's

7   "BBB" average business position gas distribution companies benchmark of 1.86 times.

8

9   **Rate of Return for Southern Union**

10   Q. Please explain how the returns developed for each capital component are used

11   in the rate making approach you have adopted to be applied to Missouri Gas Energy

12   (Southern Union's Missouri natural gas distribution operations).

13   A. The cost of service rate making method was adopted in this case. This

14   approach develops the public utility's revenue requirement. The cost of service (revenue

15   requirement) is based on the following components: prudent operation costs, rate base

16   and a return allowed on the rate base (see Schedule 31).

17   It is my responsibility to calculate and recommend a rate of return that should be

18   authorized on the Missouri jurisdictional rate base of Southern Union. Under the cost of

19   service rate making approach, a weighted cost of capital in the range of 9.35 to 9.55

1   percent was developed for Southern Union's Missouri natural gas distribution operations

2   (see Schedule 32). This rate was calculated by applying an embedded cost of long-term

3   debt of 8.19 percent, an embedded cost of preferred stock of 9.97 percent and a return

4   on common equity range of 10.67 percent to 11.19 percent to a capital structure

5   consisting of 49.26 percent long-term debt, 12.68 percent preferred stock and 38.06

6   percent common equity. Therefore, from a financial risk / return prospective, as I

7   suggested earlier, I am recommending that Southern Union Gas Company's Missouri

8   natural gas distribution operations be allowed to earn a return on its original cost rate base

9   in the range of 9.35 to 9.55 percent.

10   Through my analysis, I believe that I have developed a fair and reasonable return

11 and, when applied to Southern Union Gas Company's Missouri jurisdictional rate base,

12 will allow Southern Union the opportunity to earn the revenue requirement developed in

13 this rate case.

14

Potential Adjustment to Return on Equity

16   Q. Are there any other adjustments that the Commission may wish to consider?

17   A. Yes. According to Standard and Poor's Utility Rating Service, April, 1997

18 the Company's chairman of the board and chief executive officer, together with his family,

19 own approximately 41% of the Southern Union stock. This, combined with the growth

1   aspects of the Company's management philosophy results in a more aggressively run

2   operation. If the Commission is so inclined, it is Staff's position, that the Commission has

3   the power to consider the low end of the range for Southern Union's return on common

4   equity in order to make sure the shareholders bear their fair share of this risk, as opposed

5   to the ratepayers.

6   Secondly, it is the Staff's opinion that the Commission has the power to consider

7   poor customer service when determining a reasonable rate of return. If this were to occur

8   in this case, it should cause the shareholders of Southern Union to encourage their

9   management to improve quality of service to a point that they comply with the

10 Commission's directives.

11   Q. Does this conclude your prepared direct testimony?

12   A. Yes, it does.

BEFORE THE PUBLIC SERVICE COMMISSION

OF THE STATE OF MISSOURI

In the matter of Missouri Gas Energy's)
Tariff Sheets Designed to Increase Rates)   Case No. GR-98-140
for Gas Service in the Company's Missouri)
Service Area.)

AFFIDAVIT OF RONALD L. BIBLE

STATE OF MISSOURI   )
)   ss.
COUNTY OF COLE   )

Ronald L. Bible, is, of lawful age, on his oath states: that he has participated in the preparation of the foregoing Direct Testimony in question and answer form, consisting of __43__ pages and __32__ schedules to be presented in the above case; that the answers in the foregoing Direct Testimony were given by him; that he has knowledge of the matters set forth in such answers; and that such matters are true and correct to the best of his knowledge and belief.

_____
RONALD L. BIBLE

Subscribed and sworn to before me this __12th__ day of March 1998.

_____
Notary Public

Randall Z. Wright
Notary Public, State of Missouri
County of Cole
My Commission Exp. 01/02/2001

My Commission Expires: _____
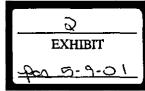
DIRECT TESTIMONY

OF

DAVID P. BROADWATER

MISSOURI GAS ENERGY, a division of

SOUTHERN UNION COMPANY

CASE NO. GR-96-285

Q. Please state your name.

A. My name is David P. Broadwater.

Q. Please state your business address.

A. My business address is P.O. Box 360, Jefferson City, Missouri, 65102.

Q. What is your present occupation?

A. I am employed as a Financial Analyst for the Missouri Public Service Commission. I accepted this position in March 1995. From December 1993 to February 1995, I was employed as a Management Services Specialist with the Missouri Public Service Commission (Commission). It should be noted that part of my training while a member of the Management Services Department included serving in the Financial Analysis Department.

Q. Were you previously employed before you joined the Commission's staff (Staff)?

1   Q. Please summarize your cost of equity analysis to this point.

2   A. I have performed a DCF and CAPM cost of equity analysis on a group of nine

3   industry companies and a group of three comparable companies, and I have also

4   performed a risk premium cost of equity analysis on the nine industry companies. The

5   results of the risk premium analysis for the comparable companies was not meaningful,

6   and therfore not included in this analysis. The results are summarized below.

	DCF	CAPM	Risk Premium
Industry Companies	9.99% - 10.53%	10.34% - 11.56%	11.19%
Comparable Companies	10.79% - 11.84%	10.06% - 11.28%	N.M.

11 Q. Based on the analysis you performed, what is your recommended return on

12 common equity in this proceeding?

13 A. I am recommending a return on common equity in the range of 11.30 percent

14 to 12.35 percent. This range was determined by starting with the DCF cost of common

15 equity range for the industry companies and comparing those results with the DCF cost

16 of common equity results for the comparable companies. The comparable companies are

17 riskier than the industry companies as indicated by the fact that the industry companies

18 average bond rating is "A+" and an average common equity ratio of 53 percent as

19 opposed to the comparable company which has a bond rating of "BBB" and an average

20 common equity ratio of 44 percent (see Schedule 30). Based on my analysis, this risk

21 difference is worth 80 basis points in return on common equity, from low end to low end

1   and that appeared reasonable. I then compared the comparable company group to

2   Southern Union and determined that Southern Union is even more risky than the

3   comparable company group; this is based on the common equity ratio of Southern Union

4   being approximately 33 percent. I do not believe that this risk difference is as great as the

5   risk difference between the industry companies and the comparable companies, due to the

6   large amount of preferred stock that Southern Union has as compared to the comparable

7   company group. However, I have added another 50 basis points to the comparable

8   company's return on equity range to arrive at Southern Union's return on common equity

9   range of 11.30 percent to 12.35 percent.

10   Q. Are there any other adjustments to Southern Union's recommended return

11   on equity range that the Commission should consider?

12   A. Yes. There should be some consideration given to the fact that Southern

13   Union's Missouri operations are more risky than the total company. This is due to the

14   fact that the Company has a weather normalization clause for a portion of their Texas

15   customers. The existence of a weather normalization clause stabilizes cash flow thus

16   reduces the risk placed on the Company, and it is the Staff's position that this reduction

17   in risk to the Company translates into a lower required return on common equity by the

18   Company's shareholders. The weather normalization clause only effects approximately

19   17 percent of Southern Union's total customers, or 43 percent of Southern Union's non-

20   Missouri customers (this information was obtained from Southern Union's 1995 Annual

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Direct Testimony of
David P. Broadwater

1   Report to Shareholders). The Staff believes that the additional risk associated with the

2   Missouri operations would have the effect of raising the low end of the return on equity

3   range between 10 and 25 basis points. It should be noted that the Company does not

4   agree with the Staff on this issue. In the past Southern Union has indicated to the Staff

5   that the existence of a weather normalization clause does not have an effect on the

6   required return on common equity.

7   Q. Did you perform an analysis on Southern Union's resulting pre-tax interest

8   coverage ratios?

9   A. Yes. A pro forma pre-tax interest coverage calculation was completed for

10   Southern Union (see Schedule 31). It reveals that the return on equity range of 11.30

11   percent to 12.35 percent would yield a pre-tax interest coverage ratio in the range of 2.66

12   times to 2.79 times. This interest coverage range is in line with Standard & Poor's "BBB"

13   average business position gas distribution companies benchmark of 2.75 times. It should

14   also be noted that the total debt component of 54.66 percent falls below Standard &

15   Poor's "BBB" benchmark ratio of 53.0 percent (see Schedule 10).

16

17   **Rate of Return for Southern Union**

18   Q. Please explain how the returns developed for each capital component are used

19   in the ratemaking approach you have adopted to be applied to Missouri Gas Energy

20   (Southern Union's Missouri natural gas distribution operations).

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Bond Ratings, Common Equity Ratios, and Market to Book Ratios
for the Natural Gas Distribution Industry Companies and
the Three Comparable Natural Gas Distribution Companies

Company Name	(1) Bond Rating	(2) Common Equity Ratio	(3) Market to Book Ratio
AGL Resources, Inc. (formally Atlanta Gas Light)	A-	47.60%	1.71x
Bay State Company	A	51.80%	1.50x
Brooklyn Union Gas Company	A	53.20%	1.46x
Connecticut Natural Gas Corporation	A-	49.80%	1.35x
Indiana Energy, Inc.	AA-	61.40%	2.06x
Northwest Natural Gas Company	A	50.30%	1.53x
Peoples Energy Corporation	A+	50.80%	1.65x
Piedmont Natural Gas Company, Inc.	A	49.60%	1.64x
Washington Gas Light Company	AA-	58.90%	1.58x
Average	**A**	**52.60%**	**1.61x**
Cascade Natural Gas Corporation	BBB+	45.00%	1.39x
NUI Corporation	BBB	37.70%	1.04x
Providence Energy Corporation	BBB+	48.80%	1.11x
Average	**BBB+**	**43.83%**	**1.18x**
Southern Union Company	**BBB**	**32.74%**	**1.43x**

Source: Column 1 is from Standard & Poor's Corporation's Utilities Rating Service, Financial Statistics for the
12 months ended December 31, 1995.

Column 2 is from The Value Line Investment Survey: Ratings & Reports, June 28, 1996 with the exception of Southern Union
which is the common equity ratio from Schedule 11.

Column 3 is from Edward Jones' Financial & Common Stock Information: Natural Gas Industry, June 30, 1996.

BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF MISSOURI

In the Matter of Missouri Gas Energy's)
tariff sheets designed to increase rates for)
gas service in the company's Missouri)   Case No. GR-2001-292
service area.   )

AFFIDAVIT OF DAVID MURRAY

STATE OF MISSOURI   )
) ss
COUNTY OF COLE   )

David Murray, of lawful age, on his oath states: that he has reviewed a copy of the testimony of Ronald L. Bible submitted in Case No. GR-98-140 portions of which were highlighted and underlined by Missouri Gas Energy and states that the underlined and highlighted portions of Ronald Bible's testimony are identical or substantially similar to related portions of the testimony of David Murray in Case No. GR-2001-292 except:

- On page 6, line 15, of my testimony, page 7, line 18 of Ronald L. Bible's testimony, I removed the term "wrongful."
- On page 8, line 22, of my testimony, page 12, line 8 of Ronald L. Bible's testimony, I changed "Discount Rate" to "Fed Funds Rate."
- On page 12, lines 19 and 20, of my testimony, page 15, line 13 of Ronald L. Bible's testimony, I did not include "During 1996."
- On page 15, line 30, of my testimony, page 17, line 24 of Ronald L. Bible's testimony, I changed "secured" to "unsecured."
- On page 18, line 15, of my testimony, page 24, line 3 of Ronald L. Bible's testimony I changed "1996" to "2000."
- On page 28, line 10, of my testimony, page 36, line 18 of Ronald L. Bible's testimony, I did not include the term "range."

Other than that mentioned above, there were a few other "minor" wording changes where I may have used different words with essentially the same meaning. Also, in various areas of my testimony, there may be additional explanations or updates in the information.

Schedule JCD-12

David Murray

David Murray

Subscribed and sworn to before me this ‖ℍ. day of May, 2001.

Sharon S. Wiles

Notary Public

My commission expires_____

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BIBLIOGRAPHY

DIVISION CAPITAL STRUCTURE

TARGET CAPITAL RATIO

The following bibliography and comments in no way are meant to be a comprehensive or complete bibliography on the issue of division capital structure and division cost of capital. It is rather a sample. Each of the references contain a list of references which can be used to supplement this list.

The literature on division capital structure and capital costs can be accessed under a variety of different topics and each of those topics leads to a reasonably distinct literature. The most direct access to the literature is through the topic of division capital structure and division cost of capital. The interests in this area relate to the allocation of capital for business lines and, in particular, the financing of both divisions and subsidiaries. In this context, divisions are not distinguished from subsidiaries and as will be discussed below, even individual investment projects are now subject to the same financing theories and procedures.

The literature can also be accessed through the topics of capital budgeting and financial decision-making. For a capital budget, most standard approaches to investment project analysis rely upon not only a risk analysis of the project itself, but also incorporate a financing decision package related to the investment. In combination, the budget decision is based on a risk adjusted, fully financed return or hurdle rate. The current position of this literature is that no project financial decision or capital budget decision can be made without a concurrent financing decision for the project. Only the most naive approaches consider average cost of capital and average capital structure appropriate for this type of analysis in the context of a diversified or multi-line firm. These naive approaches are rejected in the literature that follows.

A separate segment of this literature is accessed through the capital asset pricing model literature and literature on "pure plays". The relevance here has to do with the construction of hypothetical betas or accounting betas for subsets of larger activities. It also has to do with bottom up development of betas and capital structures.

In the area of general financial decision analysis, the literature examines the interplay of new investments, the lifetime financing of investments and overall financial policy. Among other things, the current positions in this literature include the position that in the multi-line business environment, the addition of a significant asset to the firm changes the appropriate capital structure of the firm and the firm's debt capacity. This is based on the concept that the average or consolidated capital structure is a weighted average of all of its different components.

In connection with lifetime asset financing, the literature also concludes that the dynamics of sinking funds, capital markets and periodic capital decisions make life of asset

forecasts impractical in the financial decision and make the use of policy or target based capital structure appropriate. Finally, this literature suggests a high level of complex analysis in the area of capital commitment because of the serious negative implications of simplified or average based analysis.

In the bibliography that follows, selected quotations and comments are presented. The dates associated with the various articles demonstrate that the issue has been actively discussed for many years. The more recent notations with respect to division capital structure now appear in managerial finance textbooks which treat the issue as resolved, although subject to further refinement and extension. A typical statement from a 1985 textbook on division capital structure is as follows:

> "Because of the vast differences in business and financial risk among various lines of business and because of the growth of conglomerates and other diversified firms, many companies have begun to use risk adjusted divisional costs of capital. By division, we mean some sub-unit of the firm whether it is an actual division, a subsidiary, a project or a line of business. If the capital expenditure projects undertaken by the division are essentially similar with respect to risk (but differ in general risk level from projects of other divisions), the use of divisional screening rates which are the division- specific MCCs (marginal costs of capital) should be used. Those divisions with greater risk than that of the firm as a whole will have higher MCCs, whereas those with below average risk will have lower costs of capital than the firm-wide MCC.

> The concepts discussed earlier in the chapter apply as well to divisional screening rates; that is, we must concern ourselves with the appropriate target capital structure for each division, and then calculate the explicit costs for each source of financing. The explicit cost of debt and preferred stock should be adjusted from those for the firm as a whole, but typically they are not. However, the cost of common equity, which reflects economic conditions in the exposure to business risk for a firm with no debt or preferred stock must be determined for each division. In calculating divisional costs of capital, the important elements are the division's target capital structure (reflecting primarily financial risk) and its cost of equity capital (reflecting primarily business risk)." *Managerial Finance*, Lawrence J. Gittman, Michael D. Joehnk and George E. Pinches, Harper and

Lowe Publishers, New York 1985.

BIBLIOGRAPHY IN CHRONOLOGICAL ORDER

Samuel C. Weaver, Peter J. Clemmens, III, Jack A. Gunn, and Bruce D. Dannenburg, Panel Discussion/Cost of Capital, "Divisional Hurdle Rates and the Cost of Capital, *Journal of The Financial Management Association* (Spring 1989), pp. 18-25.

Comment:

        This is a practical application discussion of corporate use of division capital cost.

Robert S. Harris, Thomas J. O'Brien, and Doug Wakeman, "Divisional Cost-of-Capital Estimation for Multi-Industry Firms," *Financial Management* (Spring 1989), page 74-83.

Comment:

        Harris, O'Brien and Wakeman state that, "conceptually a firm can be subdivided in many ways and in theory each prospective investment may have different risks and return requirements ... two main questions in divisional cost of capital theory are: (i) how to set the hurdle rate in an all equity company and (ii) how the divisional rates should be adjusted for financial leverage especially given that financial decisions are often made at the firm level." (page 75).

        To respond to these two questions, the authors conclude that the cost of capital for a firm is:

$$K_w = \sum_{j=I}^{n} W_j K_{wj} \; ,$$

Where:

    K_w =   a company's weighted cost of capital,

    K_j =   the appropriate weighted cost of capital for the firm's jth division or $K_{wj} = (1 - t) \, d \, K_d + (1 - d) \, K_r$ or the debt ratio times the cost of debt (tax adjusted), plus the equity ratio times the cost of equity

    W_j =   the ratio of the value of the jth

division of the firm to the total value
of the firm (V_j/V).

The formula states in effect that the weighted average
cost of capital for the firm is the weighted cost of capital for
each of the divisions or subsidiaries of the firm, summed. This
formula implies that each division or subsidiary has a unique cost
of capital and capital structure.

The authors go on to state that a substantial referenced
literature demonstrates that to assume the firm's leverage policy,
i.e. the overall consolidated or average capital structure of the
company applies to each division, is inappropriate. They conclude
that even though financing occurs at the corporate level, divisions
with different operating risks are likely to have different effects
on the firm's overall cost of capital.

Thomas E. Conine, Jr. and Maurry Tamarkin, "Divisional Cost of
Capital Estimation: Adjusting for Leverage," *Financial Management*,
(Spring 1983), pp. 54-57.

Comment:

This paper extends the work of Fuller and Kerr
(referenced below) based on the position that even the close
approximation in capital structure which exists based on the pure
play approach cannot be disregarded.

Donald R. Chambers, Robert S. Harris, and John J. Pringle,
"Treatment of Financing Mix in Analyzing Investment Opportunities,"
Financial Management (Summer 1982), pp. 24-41.

Comment:

The introduction of Chambers, Harris and Pringle's paper
states that most standard approaches to the analysis of prospective
capital investment projects attempt to take into account the method
by which the investment is to be financed. This is because in
theory investment decisions and financing decisions are
interdependent. However, they point out that generally investments
are made one at a time and unfold over time presenting themselves
sequentially. Financing in contrast is normally undertaken in
relatively large blocks although specific financing decisions may
be made to support particular investment decisions. They conclude
it is necessary as a result to relate individual investment
decisions to financing policies rather than specific financing
decisions.

In this context, a policy can be construed as the target capital structure approach.

R. Fuller and H. Kerr, "Estimating the Divisional Cost of Capital: An Analysis of the Pure Play Technique," *Journal of Finance* (December 1981), pp. 997-1009.

George E. Pinches, "Myopia, Capital Budgeting and Decision Making," *Financial Management* (Autumn 1982), pp. 6-19.

Comment:

This Pinches article is the Presidential Address to the Financial Management Association of the Eleventh Annual Meeting in Cincinnati, Ohio in 1981. This article was written before it was absolutely concluded that financing and investment were interrelated decisions. Pinches states that it is troublesome and there is a question as to the viability of assuming that an investment decision can be made separately from a financing decision. This is the same Pinches who five years later in his *Managerial Finance* textbook assumes division capital structures and division cost of capital.

This article has a substantial list of references.

T. Conine and M. Tamarkin, "Divisional Cost of Capital Estimation: Adjusting for Leverage," *Financial Management* (Spring 1985), pp. 54-58.

James C. Van Horne, "An Application of the Capital Asset Pricing Model to Divisional Required Returns," *Financial Management* (Spring 1980), pp. 14-19.

Comment:

The purpose of this article is to describe the application of the capital asset pricing model to corporate finance decisions. The company discussed in a demonstration of the application of CAPM has two divisions -- one, the instruments division, and the other, the disk subsidiary. One was considered to be substantially more risky than the other and the corporation established different rates of return for the two subsidiaries. The application also involved using a capital structure assigned to each division, but each capital structure consisted of one-third

debt, two-thirds equity. A critical comment by the author points out that this application which Van Horne finds worth reviewing and studying was deficient in that no allowance was made for the two separate divisions of the company having different debt capacities.

James C. Van Horne is the author of a popular finance textbook and a former president of several professional organizations.

Bower, Richard S. and Jeffrey M. Jenks, "Divisional Screening Rates," *Financial Management* (Autumn 1975), pp. 42-49.

Comment:

This article is frequently referenced in the financial literature. The article involves using the capital asset pricing model in the development of individual screening rates for different types of investment. Part of the rationale for the article is based on the authors' position that differences exist among assets with respect to systematic risk and debt capacity. Both debt capacity and systematic risk vary among types of assets or investment projects. The debt ratio of the asset must be included in the determination of the asset's screening rate.

Myron J. Gordon and Paul J. Halpern, "Cost of Capital for a Division of a Firm," *Journal of Finance* (September 1974), pp. 1153-1163.

Donald L. Tuttle and Robert H. Litzenberger, "Leverage, Diversification, and Capital Market Effects on a Risk Adjusted Capital Budgeting Framework," *Journal of Finance* (June 1968), pp. 427-443.

Comment:

This 1968 paper states at the outset that, "In its simplest form, traditional capital budgeting theory says the firm should accept independent investment opportunities that promise either internal rates of return larger than the firm's "average cost of capital" or positive net present value with the average cost of capital as the appropriate discount rate." The authors go on to state that implicit in the simplified approach is the assumption that the acceptance of a particular investment opportunity will neither increase nor decrease the risk of the firm. They conclude that such an approach is untenable and proceed with an early demonstration that under certain simplifying

assumptions, returns from various opportunities can be made risk equivalent to the firm's equity capital by adding the proper amount of borrowing or lending to the project.

OTHER MATERIAL

Robert S. Hamada, "The Effect of the Firm's Capital Structure on the Systematic Risk of Common Stocks," *Journal of Finance* (May 1972), pp. 435-452.

Eli Schwartz and J. Richard Aronson, "Some Surrogate Evidence in Support of the Concept of Optimal Financial Structure," *Journal of Finance* (March 1967), pp. 10-18.

David F. Scott, Jr., "Evidence on the Importance of Financial Structure," *Financial Management* (Summer 1972), pp.45-50.

THE COST OF CAPITAL –

A PRACTITIONERS GUIDE

BY

DAVID C. PARCELL

PREPARED FOR THE NATIONAL SOCIETY OF
RATE OF RETURN ANALYSTS FOR USE
IN THE CERTIFIED RATE OF RETURN
ANALYST PROGRAM

1995 EDITION

Author's Note: This manual has been prepared as an educational
reference on cost of capital concepts. It is intended for use as a study
guide for the 1996 Certified Rate of Return Analyst Program. No cost
of equity model or other concept is recommended or emphasized, nor
is any procedure for employing any model recommended. Furthermore,
no opinions or preferences are expressed by either the author or the
National Society of Rate of Return Analysts.

Dividend Yield

Several functional forms of the DCF method have been developed. They differ mainly in the way the dividend yield is calculated.

Continuous Compounding Model

This method assumes dividends are paid and compounded continuously. Its form is:

$$(8.7) \ K = \frac{D_o}{P_o} + g$$

where: K = cost of equity

D_o = annual dividends per share in period o (i.e., current DPS)

P_o = current stock price

g = constant growth rate in DPS in future

Annual Compounding Model

This method differs from the continuous compounding model since it recognizes that dividends are paid in a discrete manner rather than in a continuous manner. This form is:

$$(8.8) \ K = \frac{D_1}{P_o} + g$$

where: K = cost of equity

D₁ = annual dividends per share in period 1

Pₒ = current stock price

g = constant growth rate in DPS in future

This is sometimes alternately be stated as:

$$(8.9) \quad K = \frac{D_0(1+g)}{P_o} + g$$

or

$$(8.10) \quad K = \frac{d_1 + d_2 + d_3(1+g) + d_4(1+g)}{P_o} + g$$

where: d_i = quarterly dividends (and the quarterly dividend is projected to increase by the value of g in the quarter when the utility normally increases the dividend rate - the third quarter in the example here).

It should also be noted that the interpretation of the D_1 term is not universally accepted as a full year. Gordon, for example, has maintained that D_1 is the next quarterly dividend on an annualized basis (Gordon, 1974, 81).

The interpretation of D_1, or $D_0(1+g)$, can take two alternative forms. First, D_1 can be viewed as the dividends paid during the next period (Morin, 1984; Brealey and Myers, 1984; Reilly, 1985).

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Second, D_1 can be viewed as the dividend rate at the <u>end</u> of the next period (Linke and Zumwalt, 1984; Brigham, 1989; Bonbright, Danielsen and Kammerschen, 1988). Gordon summarized this issue by concluding "the (end of period D_1) poses problems of implementation that are not worth the effort in view of the fact that (during period D_1) and (end of period D_1) typically differ by a very small amount" (Gordon, 1974, 81).

Quarterly Compounding Model

The annual compounding model can be further modified to recognize quarterly dividend payments. This form is:

$$(8.11)\ K = \frac{d_1(1+K)^{.75}+d_2(1+K)^{.50}+d_3(1+K)^{.25}+d_4}{P_o}+g$$

where: d_1 = dividends per share paid in first quarter

d_2 = dividends per share paid in second quarter

d_3 = dividends per share paid in third quarter

d_4 = dividends per share paid in fourth quarter

P_o = current stock price

g = constant growth in DPS in future

Since "K" is in both sides of equation (8.11), it must be solved interactively.

Two alternative quarterly DCF models can be expressed as follows:

$$(8.12) \quad K = \frac{\sum\limits_{q=1}^{4} D_{oq}(1+g)(1+K)^{1-\{x+0.25(q-1)\}}}{P_o} + g$$

and

$$(8.13) \quad K = \left[\frac{D_o(1+g)^{.25}}{P_o} + (1+g)^{.25} \right]^4 - 1 = \left[1 + \frac{D_o}{P_o} \right]^4 (1+g) - 1$$

Appendix 8.2 shows the derivation of these quarterly DCF formulas.

The quarterly DCF model can also be implemented by "compounding" the "g" factor, rather than the yield component. This will be described in the "Growth Rate" section of this chapter.

Semi-Annual Compounding Model

Another version of the DCF model represents a compromise between the annual compounding model and the continuous compounding model. This model is the semi-annual model and has also been referred to as the FERC model, since the Federal Energy Regulatory Commission utilized this version in its generic rate of return measure for electric utilities. This form is:

$$(8.14)\ K = \frac{D_o(1+0.5g)}{P_o} + g$$

where: D_o = dividends per share in period o (i.e., current DPS)

           P_o = current stock price

           g = constant growth rate in DPS in future

This DCF model recognizes the timing of dividend payments and dividend increases. If the investment is made between the time that a new dividend per share has been announced and the ex-dividend date, the expected yield will equal D_1/P_0 (i.e., continuous compounding model). If the investment is made after four quarterly dividends have been paid at the current rate and before a dividend increase is announced, the expected yield will equal D_1/P_0 or $D_0(1+G)/P_0$ (i.e., annual compounding model). There are actually five possible expected annual dividends to be received within one year depending on the timing of the investment. They are expressed in terms of D_0 as follows:

Number	Expected Annual Dividend
1	4 $(D_0/4)$
2	3 $(D_0/4)$ + $[D_0(1-G)/4]$
3	2 $(D_0/4)$ + 2 $[D_0(1+G)/4]$
4	$(D_0/4)$ + 3 $[D_0(1+G)/4]$
5	4 $[D_0(1+G)/4]$

The sum of the five possible expected dividends is 10 $(D_0/4)$ + 10 $[D_0(1+G)/4]$ or 2.5 $[D_0(2+G)]$. The average expected annual dividend is equal to the sum of all possible annual dividends divided by five. The average expected annual dividend is .5 $[D_0(2+G)]$ or $D_0(1+.5G)$.

This formula can also be justified when a DCF is performed on a group of comparison companies. At any point during a twelve-month period, some companies will increase dividends during the next few weeks, others at some time much later during the next year, and the remainder spread rather uniformly over the year. Therefore, for any one-year period, the investor can expect, on average, dividends to increase at the midpoint of the year. The implication is that the current dividend must be adjusted by one-half the annual growth rate to arrive at the expected dividend payment during the first year.

An alternative formulation of the semi-annual compounding model is:

$$(8.15) \quad K = \frac{D_0(1+n/4\ g)}{P_0} + g$$

where: D_0 = dividends per share in period 0

P_0 = current stock price

g = constant growth rate in DPS in future

n = number of quarters since last dividend increase (assuming annual increases in DPS take place during same quarter).

This model specifically recognizes the timing of dividends, as well as the timing of dividend increases.

Comparison of Yields in Various Models

Each of these four models produce somewhat different yield estimates. Table 8.1 shows a set of hypothetical input values which can be used to show the yields from each model.

Table 8.1
Input Values

Variable	Value
D_o	$0.80
$d_1 = d_2 = d_3 = d_4$	$0.20
P_o	$10.00
g	5.00%

Use of these values results in the following yields:

Continuous Compounding Model

$$(8.7)\ Yield = \frac{D_o}{P_o} = \frac{\$.80}{\$10.00} = 8.00\%$$

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Annual Compounding Model

$$(8.9) \quad Yield = \frac{D_o(1+g)}{P_o} = \frac{\$0.80(1.05)}{\$10.00} = 8.40\%$$

Quarterly Compounding Model

$$(8.11) \quad Yield = \frac{d_1(1+K)^{.75} + d_2(1+K)^{.50} + d_3(1+K)^{.25} + d_4}{P_o} =$$

$$\frac{.20(1+K)^{75} + .20(1+K)^{50} + .20(1+K)^{25} + .20}{10} = 8.67\%$$

Semi-Annual Compounding Model

$$(8.14) \quad Yield = \frac{D_o(1+0.5g)}{P_o} = \frac{\$.80(1.025)}{\$10.00} = 8.20\%$$

Annual Versus Quarterly Models

A frequent DCF issue in rate proceedings concerns whether it is appropriate to utilize the annual or quarterly versions of the DCF model. Advocates of the quarterly model maintain that the existence of quarterly payments of dividends (and investor recognition of these payments) requires that the quarterly model be employed in order to properly match the "D" and "P" components of dividend yield (Cicchetti and Makholm, 1987; Linke and Zumwalt, 1984; 1987; Cargill and Wendel, 1994). Advocates of the annual

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model maintain, on the other hand, that use of a quarterly model over-compensates investors because the ratemaking process (through the practice of monthly customer payments and use of average or year-end rate base) already recognizes this factor (Nyegaard, 1987; Rosenberg and Lafferty, 1988).

A third viewpoint is offered by Cicchetti, who maintains that the required return should be determined using a quarterly DCF model, but the effective rate of return should be adjusted to a nominal rate of return for use in determining revenue requirements (Cicchetti, 1989). This method is designed to recognize and balance the respective time value of money to investors (i.e., the quarterly receipt of dividends) and ratepayers (i.e., through the company's monthly accrual of earnings). A similar proposal is advocated by Siegel (1985) who maintains that quarterly DCF rates be determined and then discounted at the continuously compounded rate of return rather than the discrete, per period return.

Estimation of Yield Components

The previous analysis has identified three components which require input values. These are

D_0 - current annual dividends per share

D_1 - dividends per share in period 1

P_0 - current stock price.

The first term - D_0 - is straightforward and represents the current annualized level of dividends per share. For example, if the current dividend per share rate is $0.20, D_0 is $0.80 ($0.20 X 4, reflecting four quarterly payments).

The second term - D_1 - can be determined in two alternative ways. First, as shown in equation (8.9), D_1 can be estimated by increasing D_0 by the growth rate, or $D_1 = D_0(1+g)$. Second, analysts' forecasts of dividends per share for the next period can be utilized for D_1. Sources such as Value Line and Salomon Brothers provide annual dividends per share estimates for most public utilities.

The third term - P_0 - is technically the current (spot) price of a utility's stock. Two basic approaches are normally used to estimate P_0: use of the latest closing price, or (2) use of an average of recent prices. Advocates of the use of the latest spot price note that the spot price reflects all known information about the company and its stock, and thus that the spot price is most consistent with the efficient market hypothesis, which is a basic assumption of the DCF approach. Therefore, the latest closing price is theoretically the best one to use.

On the other hand, advocates of average prices note that stocks are subject to random fluctuations as buy or sell orders flow in, so the price at any moment can represent a temporary

disequilibrium. For this reason, they recommend the use of an average of recent prices.

Growth Rate

The growth rate component of the DCF equation - g - is usually the most crucial, and controversial, element in the use of this methodology. In estimating the appropriate growth rate, it is important to recognize two factors. First, the proper growth rate reflects the growth expectations of investors embodied in the price (i.e., yield component) of the company's stock. Analysts should recognize that individual investors have different expectations regarding growth and therefore no single indicator captures the growth expectations of all investors. Second, since the DCF model combines price (i.e., yield) and growth, the focus on growth expectations should target estimates of growth within a consistent time frame of the stock price contained in the yield component. Each of these factors relate to a "matching" of the yield and growth components of the DCF model.

An almost limitless array of techniques have been used in rate proceedings to estimate the constant growth rate component. Since the dividend discount model is technically concerned with growth in dividends, many methods are concerned directly with dividend growth. On the other hand, other methods examine factors other than dividend growth to estimate g. The objective of each of these