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1   common stock prices and dividends as well as expected dividend growth,

2   while CAPM results are derived from current capital market conditions and

3   the expected variance (or "risk") of a company's stock returns relative to

4   "market" returns. CAPM is one version of risk premium cost of equity

5   analysis.

6

7   ## The DCF Model

8   Q. Please describe the DCF model and its application.

9   A. The infinite version of the DCF model simplifies to the

10   following expression:

11        $$P_o = \frac{D_1}{k-g}$$

12   where: P_o = current price of stock per share

13   D_1 = indicated dividend per share

14   g = expected growth rate in dividends

15   k = investors' cost of capital (required rate of return)

16   Solving this expression for the investors' required rate of return (k)

17   gives:

18        $$k = \frac{D_1}{P_o} + g$$

19   The first term in this expression is the expected dividend yield, while

20   the second term is the expected constant growth in dividends. The growth

21   in dividends (also implies growth in earnings) will be reflected in market

22   price, therefore this model also recognizes the capital gain potential

23   associated with owning a stock.

24   The DCF is a continuous stock valuation model and the theory

25   behind its development imposes some assumptions on the model, namely that:

26   1. Earnings and dividends grow at the same constant rate
27   (implies a constant payout ratio),

28   2. The price/earnings ratio remains constant (i.e., constantly
           growing earnings will be value at a constant multiple),

1. on the uncertainty of dividends and future price, and this is the required

2. rate of return represented by k in the DCF model.

3.

Description of the CAPM

5. Q. Please describe the CAPM and its application.

6. A. CAPM is expressed mathematically as follows:

7. $$k = R_f + (E(R_m) - R_f) B$$

8. k = the expected (required) rate of return on any asset

9. R_f = the risk-free rate of return

10. $E(R_m)$ = the expected return on the market portfolio m

11-13. B = the covariance between returns on an asset and the market portfolio divided by the variance of the market portfolio (a risk measure associated with a particular asset, referred to as "beta").

14. The CAPM describes the security market line (SML), which plots the expec-

15. ted return of a security or portfolio of securities against the beta value

16. (B) for the security or portfolio. The CAPM assumes that all securities

17. and portfolios plot on this SML going through a point representing the

18. market portfolio and a point representing the risk-free rate of interest.

19. The CAPM also assumes risk-averse investors with homogeneous expectations

20. about security returns, and highly efficient capital markets with no

21. imperfections.

22. The CAPM attempts to quantify the risk associated with owning a

23. particular security by comparing the variance of returns on that security

24. with the variance of returns on a "market" portfolio representing all

25. capital assets. Market (or systematic) risk is the amount of variance in

26. security returns associated with changes in inflation, interest rates,

27. political climates, or anything that might affect market returns in

28. general. Non-market (or unsystematic risk) is security-specific risk

1 expected in the future (as evidenced by the earnings growth projections

2 cited above). Therefore, historic EPS growth rates probably don't provide

3 a good estimate of investor expectations in this case.

4   My conclusion, from examining these historic and projected

5 growth rates, is that an assumption of a return to some "normal" growth

6 rate in dividends for KCPL in the range of 4.5 to 5.5 percent is not

7 unreasonable. This assumption will be compared to growth and total return

8 expectations for other electric utilities later in this testimony.

9   Q. What DCF cost of equity do the yield and growth rate data

10 imply for KCPL?

11   A. The resulting DCF cost of equity for KCPL is calculated

12 below and is 11.5 to 12.5 percent:

13

Yield	+	Growth Rate	=	Cost of Equity
7.0%	+	4.5%	=	11.5%
7.0%	+	5.5%	=	12.5%

14

15   Q. What information have you used to calculate a CAPM cost of

16 equity for KCPL?

17   A. I have used historic and projected short-term interest rates

18 and risk premiums, in conjunction with Value Line's beta.

19   Q. Why have you examined historic and projected data?

20   A. The CAPM, as with the DCF model, is intended to be "forward-

21 looking". This is why projected data is theoretically best. My access to

22 projected stock "market" forecasts is limited (in this instance I dis-

23 covered only one forecast), so I felt it was necessary to use historic

24 data to prevent total reliance on limited data.

25   Q. What are the risk-free rates (R_f) you have used in the CAPM?

26   A. I have used the six month average of one-year Treasury bills

27 adjusted to constant maturity as the recent historic risk-free rate. This

28 rate is 5.9 percent and is displayed in Schedule FA-3. I have used 5.6

1 percent for the projected risk-free rate. This number was derived by

2 adding 0.4 percent (the approximate difference in six-month averages

3 between one-year and 91-day Treasury bills in Schedule FA-3) to 5.2

4 percent (the approximate average of the 91-day Treasury bill rate projec-

5 tions in Schedule FA-8), since I didn't have a specific projection for

6 one-year Treasury bills.

7 Q. What values have you used for the risk premiums $(E(R_m)-R_f)$

8 in the CAPM?

9 A. I have used 8.4 percent or the historic value, which was the

10 average risk premium of common stock returns over Treasury bill returns

11 from 1926 through 1985 according to Stocks, Bonds, Bills, and Inflation –

12 1986 Yearbook (Ibbotson Associates Capital Market Research Center). I

13 have used 10.4 percent as the projected risk premium. This number was

14 derived from a forecast in Standard & Poor's Outlook (12/17/86). The S&P

15 500 index was predicted to reach a level of 275 to 280 by the end of 1987

16 from a level of 247 at that time. This would be a percentage change of

17 around 12.4 percent during the year. Adding the 3.4 percent current

18 dividend yield on the S&P 500 to the 12.4 percent price change results in

19 an approximate 16.0 percent total return expectation from this index of

20 stocks. This 16.0 percent minus the 5.6 percent projected risk-free rate

21 results in the 10.4 percent projected risk premium (it should be noted

22 that this is a spot estimate which can vary significantly from day to day

23 and that longer term expectdations could vary significantly since the

24 forecasted data is only for the next twelve months).

25 Q. What value have you used for beta (B) in the CAPM?

26 A. I have used a beta value of .70 for KCPL (Value Line's

27 published beta for KCPL is .65 (10/24/86) and Merrill Lynch's published

28 beta for KCPL is .70 (10/31/86)).

1 Q. What is the resulting CAPM cost of equity using these
2 values?

3 A. The resulting CAPM cost of equity for KCPL is in the range
4 of 11.8 percent to 12.9 percent and is calculated as follows:

5

	R_f	+	B	x	$(E(R_m)-R_f)$	=	Cost of Equity
Historic	5.9%	+	.7	x	(8.4%)	=	11.8%
Projected	5.6%	+	.7	x	(10.4%)	=	12.9%

7 Q. How does the CAPM cost of equity range compare to the DCF
8 cost of equity range?

9 A. The CAPM results are 30 to 40 basis points greater than the
10 DCF results, but in general, support the DCF range.

11

12 Comparison of KCPL Equity Cost to Other Electric Utility Equity Costs

13 Q. How does KCPL's resulting equity cost compare to equity
14 costs derived in a similar manner for other electric utilities?

15 A. Schedule FA-12 shows results from DCF and CAPM calculations
16 for 99 other electric utilities and KCPL. The companies are sorted by
17 bond ratings from Standard and Poor's and Moody's. In addition, this
18 schedule lists current market-to-book ratios and a nuclear operation
19 indicator.

20 Q. Are there any differences in the cost of equity calculations
21 used for these companies versus what you did for KCPL?

22 A. Yes. The average growth rate ("G") displayed in the
23 schedule was calculated from the most recent three-month EPS growth
24 projections provided by IBES (a three-month average growth rate), the
25 growth rate in DPS and EPS projected by Salomon Brothers in the most
26 recent Electric Utility Monthly, and the five-year dividend growth rate
27 projected in Value Line's Investment Survey. This "G" is an average of
28 the projections provided by these three sources.