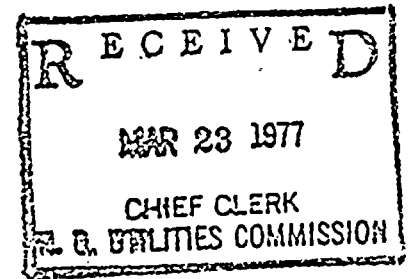


Docket # 50-400/403
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REGULATORY DOCKET FILE

BEFORE THE NORTH CAROLINA UTILITIES COMMISSION

In the Matter of

APPLICATION OF
CAROLINA POWER AND LIGHT COMPANY
FOR INCREASE IN RATES



DOCKET NO. E-2, SUB 297

Testimony of

H. Randolph Currin, Jr.
Senior Operations Analyst, Operations Analysis Section
Division of Engineering

Staff, North Carolina Utilities Commission

March 23, 1977

GENERAL

1 Q. Would you please state your name, business address, and position
2 with the North Carolina Utilities Commission?

3 A. My name is H. Randolph Currin, Jr. My business address is One West
4 Morgan Street, Raleigh, North Carolina. I am presently employed
5 as Senior Operations Analyst in the Operations Analysis Section of
6 the Engineering Division of the North Carolina Utilities Commission.
7

8 Q. Would you please outline your educational background and experience?

9 A. I graduated in 1972 from Duke University, Durham, North Carolina
10 with a Bachelor of Science degree in Electrical Engineering.
11 Upon graduation, I accepted employment with Duke Power Company
12 in Charlotte, North Carolina. I spent three months in the
13 General Office in Charlotte, developing a computer program
14 for Duke's Construction Management Program. Thereafter, I
15 worked thirteen months in the Durham District as an Assistant
16 Engineer. My responsibilities there included large commercial and
17 industrial installations, coordination of circuit protective
18 devices, system planning, new circuit design, analysis of circuit
19 voltage levels, supervision and instruction of student engineers,
20 and emergency situation duty.
21

22 In August, 1973, I left Duke Power Company to enter the Graduate
23 School of Industrial Administration at Carnegie-Mellon University
24 in Pittsburgh, Pennsylvania. During the summer of 1974, I was
25 coordinator of a \$5,000,000 project for a Burlington Industries
26 plant in Rome, Georgia. Concurrent with my final year of studies

1 at Carnegie-Mellon, I undertook management consulting work for WRS
2 Motion Picture Laboratories and the University. In May, 1975 I
3 was awarded a Master of Business Administration degree (or
4 Industrial Administration, as it is called there). My studies
5 there were concentrated in finance, corporate planning, and
6 management consulting. I joined the North Carolina Utilities
7 Commission on June 1, 1975.

8

9Q. What is the nature of your testimony in this docket?

10A. I shall testify as to the cost of capital and fair rate of
11 return of Carolina Power and Light Company.

12

13Q. Have you previously offered testimony before this Commission?

14A. Yes. I have testified as to the cost of capital and fair rate of
15 return in numerous cases before this Commission.

16

17Q. Are you generally familiar with the organization and operation of
18 CP&L?

19 A. Yes, I have reviewed the application of the Company to adjust its
20 rates for electric power service within North Carolina. I have
21 studied the information submitted by the Company with regard to
22 the information request of the Commission Staff. I have also
23 examined the testimony offered to the Commission by the witnesses
24 representing the Company.

25

26 Q. What sources of information did you employ in preparing your cost
27 of capital and fair rate of return analysis?

1A. In addition to the data supplied by the applicant I gathered
2 information from the following journals and news publications:
3 Wall Street Journal, Barrons, Moody's Manuals, and Value Line
4 Investment Survey. I also referred to the North Carolina General
5 Statutes and a number of publications and texts in business and
6 finance.

7 THE COST OF CAPITAL APPROACH

8Q. As a theoretical proposition, how should the cost of capital and
9 the fair rate of return be determined?

10A. The cost of capital is the price a firm must pay to "rent" money
11 from those who are willing and able to supply it, just as the cost
12 of renting an operations center is the amount paid by the utility
13 to the owner of the building. Since uncertainty exists as to the
14 actual return that a firm will realize from its operations, the
15 return expected by investors will vary among the different forms
16 of capital (bonds, preferred stock, and common equity) to allow
17 for temporal and risk differentials. The overall cost of capital
18 to a particular firm can be derived from the weighted average of
19 the cost rates and capital structure proportions of the different
20 sources of capital. This is, in essence, the cost of capital
21 approach.

22

23 A determination of the cost rate of bonds and preferred stock is a
24 simple exercise because the prices paid for these sources of
25 capital are fixed when they are initially supplied to the firm.

26

1 A determination of the cost rate for common equity is a far more
2 complex and controversial problem since there is no guaranteed
3 return by the firm to the stockholder. A potential shareholder
4 only provides capital to the firm when his expected returns are
5 sufficiently high to induce him to invest in the particular firm
6 rather than some other risk-return alternative. Thus, an analysis
7 of the cost of equity capital is actually an analysis of the
8 expectations of potential investors.

9

10Q. How is the fair rate of return related to the cost of capital?

11A. With regards to the regulation of public utilities, the fair rate
12 of return can only be determined by giving recognition to the
13 costs of the Company incurred in serving its customers. The simul-
14 taneous equitable treatment of both the Company's stockholders and
15 customers demands that the company be granted rates which will
16 yield an amount equal to operating costs and capital costs. As
17 public utilities are very capital intensive, the capital costs
18 will comprise a substantial percentage of the total service costs.

19

20 Should the Company be allowed a rate of return in excess of its
21 cost of capital, the investor will earn monopoly profits through
22 the unreasonably high rates. This excessive return would unfairly
23 redistribute income from the consumer to the investor. By the
24 same token, should the company be granted a rate of return below
25 its cost of capital, the value of equity shares would decline,
26 which would, in effect, allow the consumers to confiscate a

1 portion of the shareholder's investment. This level of return
2 would also have a deleterious long-run effect on the consumer,
3 because the Company would be unable to attract sufficient capital
4 to maintain or improve the quantity and quality of future service.

5
6 Consequently, a total dollar return based on the operating expenses and
7 the cost of capital will allow the company to meet its service and
8 financial obligations and to establish a sufficiently sound repu-
9 tation to attract future investors. Thus, there is one, and only
10 one, rate of return that is fair in terms of efficient resource
11 allocation and distributional justice. That fair rate of return
12 is the cost of capital.

13

14Q. How do you define the cost of equity capital?

15A. From the perspective of the Company, the cost of equity is the
16 supply price of equity, the rental rate the Company must pay in
17 the equity market. Thus, the cost of equity capital is the
18 expected return which the investor requires before he is willing
19 to lend capital to the Company. Why his expected rate of return?
20 Unlike the holder of bonds or preferred stock, the equity investor
21 has no contractual agreement with the Company as to the rate of
22 return, if any, he will receive. Accordingly, the purchase of an
23 equity interest is riskier than the purchase of a fixed interest
24 security. The investor makes the decision to purchase common
25 stock based upon his expectations of the Company's future earnings.
26 Only if the investor perceives his expected return from a stock to

1 be large enough to compensate him for the apparent risk involved,
2 will he be willing to rent his capital to the Company.

3

4Q. What considerations are involved in determining an investor's re-
5 quired rate of return?

6A. The investor must anticipate the cost incurred by him in supplying
7 his capital to a particular firm. The cost is the expected return
8 forfeited by not purchasing the stocks of alternative companies of
9 similar risk. This is the economic concept of opportunity cost.
10 When an investor purchases the common equity of a particular
11 company, he is saying, in effect, that his expected return exceeds
12 or equals the cost incurred by not purchasing a different stock of
13 similar risk.

14

15Q. What technique did you employ to estimate the cost of equity capital
16 to CP&L?

17A. I used the Discounted Cash Flow valuation model. The model states
18 that the price of a share of stock is a result of all future returns
19 (known or expected) to the investor, discounted at the investor's
20 opportunity cost of capital, or his capitalization rate. The
21 discounting process is required since returns tomorrow are less
22 valuable than returns today. Given a flow of returns, the investor's
23 capitalization rate can be precisely derived if there is market
24 information on the price of the asset. The efficient market for
25 equity issues provides this market information.

26

The DCF model states that the market value of the equity of the firm is equal to the discounted future cash flows received by the investor in each time period, t .

$$\text{Price} = \frac{D_t}{(1+K)} + \frac{D_{t+1}}{(1+K)^2} + \frac{D_{t+2} \dots + D_{t+n-1}}{(1+K)^n}$$

where D is the dividend and K is the capitalization rate. If we assume that dividends grow at a constant rate, g_D , in the limit,

$$K = \frac{D_t}{P} + g_D, \text{ or}$$

the capitalization rate equals the current dividend yield plus the expected growth in dividends (assuming that the price of the stock will appreciate at the same rate, g_D , as the dividends).

Thus, the investor can realize his required return from a combination of current yield and price appreciation.

Although the DCF model is a theoretically precise method of determining the cost of capital to a growing firm, the model can not be implemented empirically with mathematical precision because the future cash flows to the investor can not be known with certainty. This is not to say we are completely ignorant of the future. Since investor expectations are formed from past company performance and informed projections of the future, the analyst can approximate investor behavior by carefully studying the same expectation-forming information.

THE COST OF EQUITY CAPITAL TO CAROLINA POWER AND LIGHT COMPANY

1 The application of the DCF technique requires the use of estimates
2 of the dividend yield and growth rate. The dividend yield is
3 observable in the daily market transactions in a company's stock,
4 but the dividend yield determined from one daily price may be
5 misleading if the price fluctuates. An average dividend yield
6 figured over some period of time is preferable to the choice of
7 any single daily yield figure, but the time period used for
8 averaging should not be so long as to obscure changes in the cost
9 of equity in the capital markets.

10

11 The estimates of future growth are somewhat more difficult to
12 obtain. Investors are looking to the future, and there is always
13 some uncertainty associated with any estimation of the future.
14 It is generally reasonable, however, to postulate that a major
15 determinant of expected future growth is past realized rates of
16 growth.

17

18 Q. Specifically, how did you calculate the dividend yield?

19 A. As illustrated in Currin Exhibit 1, first, I calculated weekly
20 dividend yields for the six months September 1976 - February 1977.
21 Then I averaged the weekly yields to obtain monthly yields. Finally,
22 I calculated a weighted average of the monthly average yields,
23 weighting the most recent month the heaviest. The resultant yield
24 was 7.57%.

25

26 Q. How did you calculate the growth rate?

1 A. As shown in Currin Exhibit No. 2, I used company data to calculate
2 the growth rates in earnings and dividends per share for the peri-
3 ods 1966-1967 to 1975-1976. Then I calculated a weighting average
4 of the yearly average growth rates, weighting the most recent
5 period the heaviest. I then averaged the weighted average earn-
6 ings and dividends growths. The resultant growth rate is 4.61%.

7

8 Q. What is the bare cost of equity capital to Carolina Power and Light
9 Company as indicated by the DCF technique?

10 A. 12.18%, which results from adding the growth rate to the dividend yield.

11

12 Q. Is this the cost of equity for Carolina Power and Light that
13 you employ in subsequent calculations?

14 A. No. To enable the company to net book value on a common stock
15 sale, an increment must be added to the bare cost of equity to
16 allow for issuance expenses and market pressure, if any.

17

18 Q. What allowance, then, did you make for issuances expenses?

19 A. The issuance expenses in Carolina Power and Light's two most
20 recent common stock sales have been 3.69% and 2.70%. I used the
21 average $((3.69 + 2.70)/2 = 3.20)$ of these two numbers as a reason-
22 able representation of what the company might experience in its
23 next sale of common stock.

24

25 Q. What allowance did you make for market pressure?

26 A. I made a study of market pressure based on Carolina Power and

1 Light's most recent common stock sale. On September 16, 1976,
2 a registration statement was filed with the Securities and
3 Exchange Commission. On October 20, 1976, three million shares
4 of common stock were sold.

5
6 Given that the SEC registration marked the first instance that
7 the "public" had knowledge of CP&L's specific stock sale plans,
8 it is reasonable to assume that there might have been some
9 downward pressure on CP&L's stock price immediately following
10 the registration announcement. Accordingly, I looked at the
11 closing prices of CP&L's common stock for a period of 10 trading
12 days immediately before registration and 10 trading days immed-
13 iately after registration. For the same time period, I also
14 looked at the closing values of the Standard and Poors Utilities
15 Index for a frame of reference. Obviously, a 5% drop in CP&L's
16 stock during the week after registration would not indicate
17 market pressure if the Index declined 10% over the same time
18 period.

19
20 A visual inspection of the graph in Currin Exhibit No. 3 does
21 not indicate any apparent market pressure during the registration
22 period. This is confirmed by calculating the net change in the
23 relationship between the average price of CP&L's stock vs. the
24 average S&P Utilities Index for the 10 days prior to registration
25 to the appropriate ratio for the 10 days subsequent to registration.
26 As shown in Currin Exhibit No. 4, CP&L experienced a net gain of

1 1.64% over the Index after registration. Clearly there was no
2 market pressure on CP&L's stock from the registration.

3

4 The second date about which I attempted to measure market pres-
5 sure was the date of the common stock sale. Using the same
6 methodology as with the registration date, Currin Exhibits No. 5
7 and 6 show the results. CP&L experienced a decline of .53%
8 relative to the Index in the period after the common stock sale.

9

10 In further comparison of CP&L vs. the S&P Utilities Index for
11 the 10 days prior to registration with the 10 days subsequent
12 to sale indicates that there has been more than the .53% market
13 pressure which occurred during the sale period. Currin Exhibit
14 No. 7 shows this gradual decline in CP&L's relationship with the
15 Index to the 2.45%.

16

17 Q. What, then, is the total allowance for issuance expenses and
18 market pressure which you deem to be reasonable?

19 A. I found the sum of issuance expenses and market pressure to
20 be 5.65%.

21

22 Q. What is the resultant cost of equity to Carolina Power and Light
23 Company?

24 A. As shown in Currin Exhibit No. 8, I found CP&L's adjusted cost of
25 equity to be 12.91%.

26

1Q. What did you find to be the total cost of capital to CP&L?

2A. Using 12.91% as the cost of equity, and 7.71% and 8.01% as the
3 costs of debt and preferred stock, I calculated the weighted
4 cost of capital to CP&L to be 9.21%. This is shown in Currin
5 Exhibit No. 9.

6

7Q. In your analysis of the cost of capital for CP&L, did you perform
8 any other studies other than those already discussed?

9A. Yes, I did. As a check on the results of my application of the
10 DCF formula to CP&L, I made the same calculations for Duke Power
11 Company. Though there are many similarities between Duke and CP&L,
12 it should be almost universally recognized that an investment in
13 Duke is not as risky as an investment in CP&L. Duke is larger, has
14 a better bond rating, has lower plant construction costs, more
15 efficient plants, etc. Accordingly, the cost of capital, debt and
16 equity, is lower for Duke than CP&L.

17

18 Using the DCF formula in exactly the same manner for Duke as CP&L,
19 I calculated Duke's bare cost of equity. As shown in Currin Exhibits
20 10 and 11, the dividend yield of 7.37% and the growth rate of 4.47%
21 add to indicate a bare cost of equity for Duke of 11.84%. This
22 compares with 12.18% for the same number for CP&L. While this
23 doesn't verify my findings for CP&L, it does show that the DCF
24 formula does yield consistent, and not obviously unreasonable, results.

25

26Q. Does this conclude your testimony?

27A. Yes, it does.

Carolina Power and Light Company
Dividend Yield

September	3	7.9
	10	7.7
	17	7.6
	24	7.4
		<hr/>
Average		7.65

October	1	7.3
	8	7.8
	15	7.9
	22	8.0
	29	<u>7.9</u>
		<hr/>
Average		7.78

November	5	8.0
	12	7.9
	19	7.7
	26	7.4
		<hr/>
Average		7.75

December	3	7.4
	10	7.2
	17	7.1
	24	7.2
	31	<u>7.1</u>
		<hr/>
Average		7.20

January	7	7.5
	14	7.7
	21	7.8
	28	7.4
		<hr/>
Average		7.60

February	4	7.4
	11	7.6
	18	7.7
	25	7.8
		<hr/>
Average		7.63

Weighted Average Dividend Yield =

$$(1(7.65)+2(7.78)+3(7.75)+4(7.20)+5(7.60)+6(7.63))/21 = 7.57\%$$

Carolina Power and Light Company
Growth Yield

	Earnings Per Share	Dividends Per Share
1966	\$1.87	\$1.30
1967	1.91	1.35
1968	1.98	1.39
1969	2.05	1.43
1970	1.56	1.45
1971	1.97	1.46
1972	2.86	1.48
1973	2.58	1.56
1974	2.21	1.60
1975	2.70	1.60
1976	2.74	1.69

Growth		
66-67	2.14 x 1 =	2.14
67-68	3.66 x 2 =	7.33
68-69	3.54 x 3 =	10.61
69-70	-23.90 x 4 =	-95.61
70-71	26.28 x 5 =	131.41
71-72	45.18 x 6 =	271.07
72-73	-9.79 x 7 =	-68.53
73-74	-14.34 x 8 =	-114.73
74-75	22.17 x 9 =	199.55
75-76	1.48 x 10 =	<u>14.81</u>

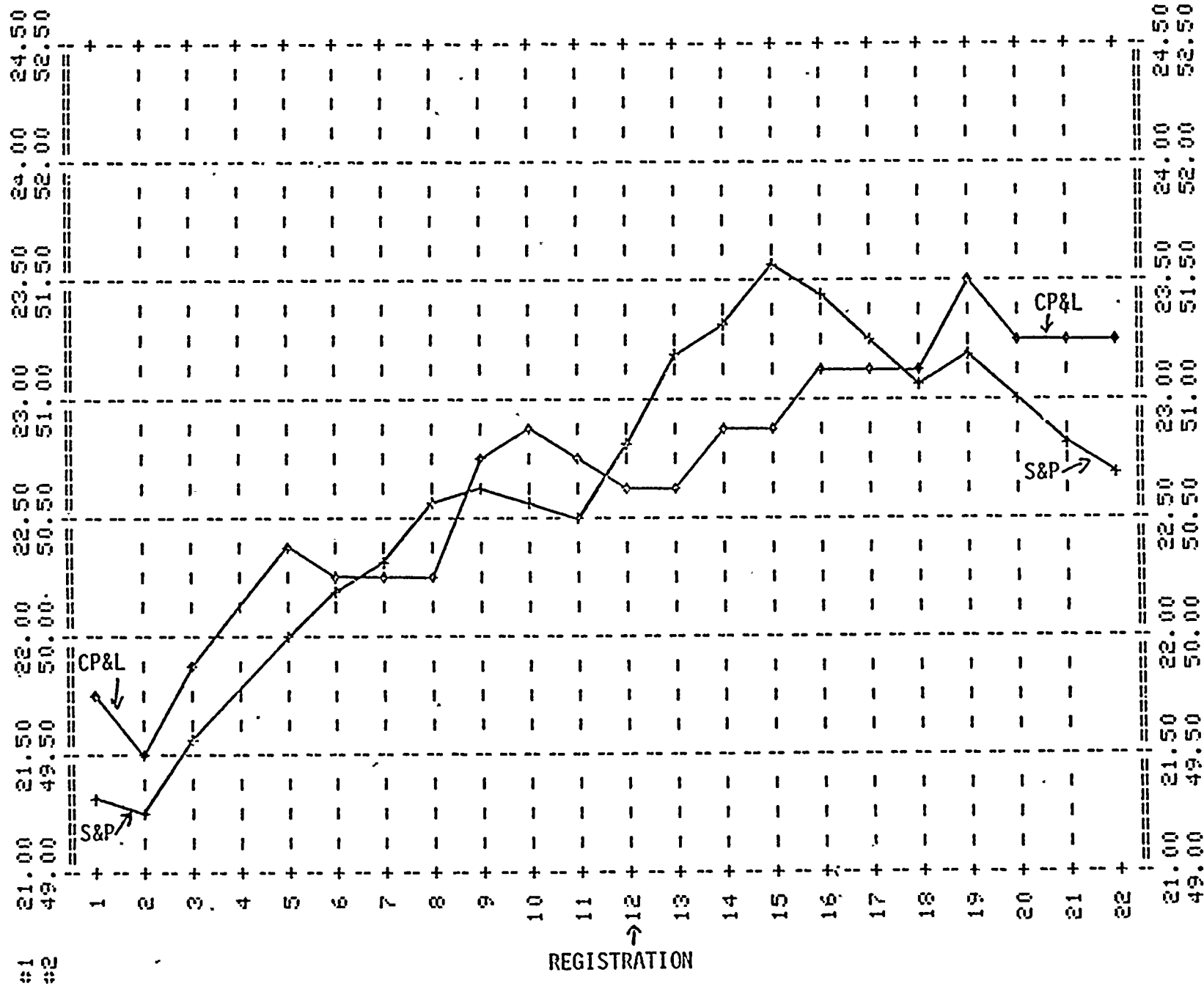
3.85 x 1 =	3.85
2.96 x 2 =	5.93
2.88 x 3 =	8.63
2.10 x 4 =	8.39
0 x 5 =	0
1.37 x 6 =	8.22
5.41 x 7 =	37.84
2.56 x 8 =	20.51
0 x 9 =	0
5.63 x 10 =	<u>56.25</u>

$$358.04/55 = 6.51$$

$$149.62/55 = 2.72$$

$$\text{Average Growth Yield} = (6.51 + 2.72)/2 = 4.61\%$$

CP&L Common Stock Price Vs. S&P Utilities Index
9/1/76 - 9/30/76



Market Pressure Analysis
Registration Period

	CP&L	S&P Utilities Index
	\$21.75	49.30
	21.50	49.28
	21.875	49.58
	22.375	50.03
	22.25	50.2
	22.25	50.3
	22.25	50.58
	22.75	50.60
	22.875	50.56
	22.75	50.53
REGISTRATION	22.625	50.79
	22.625	51.19
	22.875	51.29
	22.875	51.56
	23.125	51.46
	23.125	51.22
	23.125	51.04
	23.50	51.20
	23.25	50.99
	23.25	50.79
	23.25	50.71

Market Pressure Analysis
Registration Period

Ten Trading Days Prior

CP&L Average	S&P Utilities Index Average	<u>CPL/S&P UI</u>
22.26	50.10	.4444

Ten Trading Days Subsequent

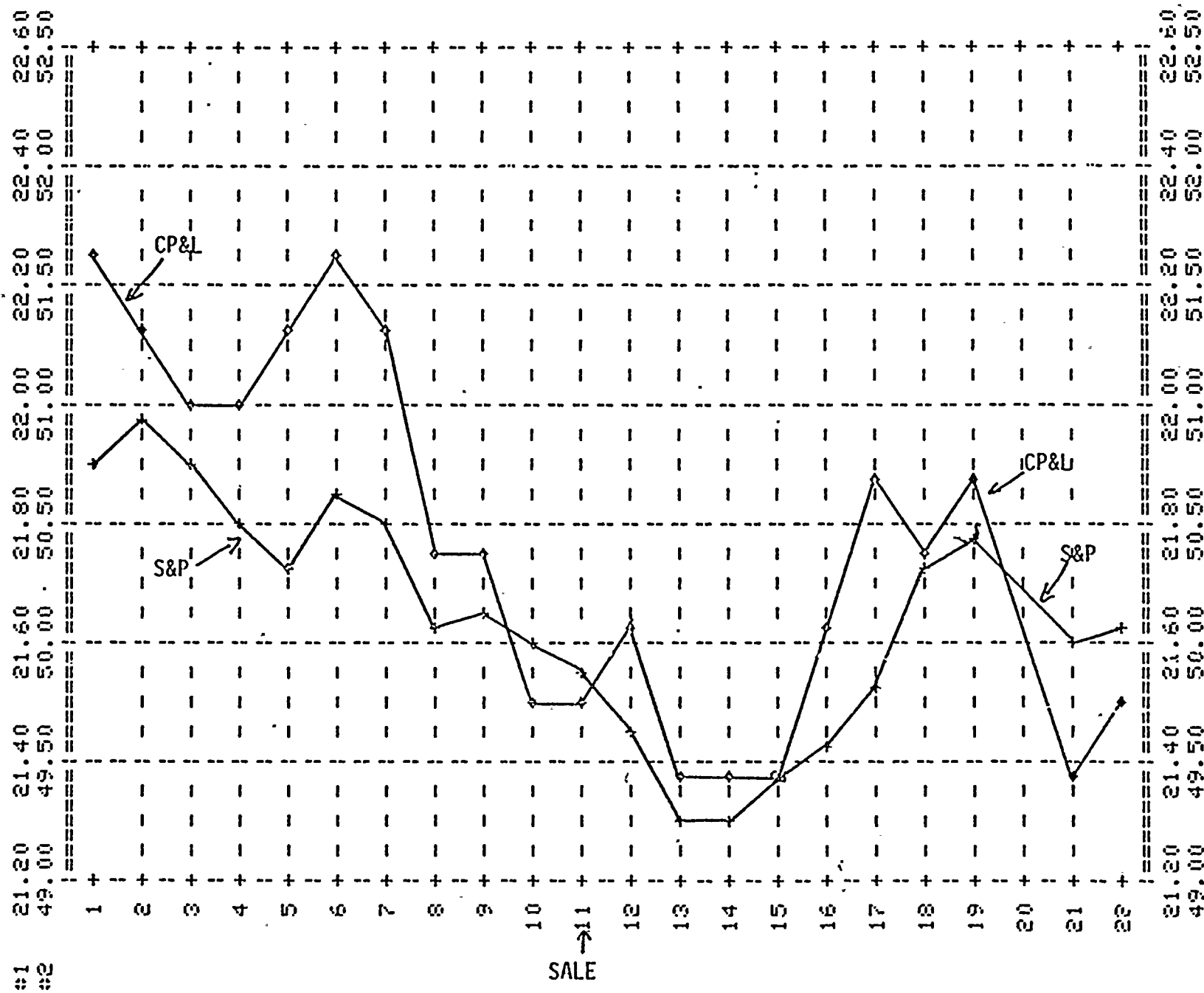
CP&L Average	S&P Utilities Index Average	<u>CPL/S&P UI</u>
23.10	51.15	.4517

Net Change in CP&L-S&P UI Relationship

$$= \frac{.4517 - .4444}{.4444} \times 100\%$$

$$= +1.64\%$$

CP&L Common Stock Price Vs. S&P Utilities Index
 10/6/76 - 11/4/76



Market Pressure Analysis
Sales Period

	CP&L	S&P Utilities Index
	\$22.25	50.74
	22.125	50.91
	22.00	50.76
	22.00	50.47
	22.125	50.32
	22.25	50.65
	22.125	50.48
	21.75	50.09
	21.75	50.12
	21.50	49.99
SALE	21.51	49.89
	21.625	49.63
	21.375	49.25
	21.375	49.26
	21.375	49.41
	21.625	49.57
	21.875	49.81
	21.75	50.29
	21.875	50.44
	21.375	50.01
	21.50	50.07

Market Pressure Analysis
Sales Period

Ten Trading Days Prior

CP&L Average	S&P Utilities Index Average	<u>CP&L/S&P UI</u>
21.99	50.45	.4358

Ten Trading Days Subsequent

CP&L Average	S&P Utilities Index Average	<u>CP&L/S&P UI</u>
21.58	49.77	.4335

Net Change in CP&L-S&P UI Relationship

$$= \frac{.4335 - .4358}{.4358} \times 100\%$$

$$= -.53\%$$

Market Pressure Analysis

Ten Trading Days Prior To Registration

CP&L Average	S&P Utilities Index Average	$\frac{\text{CP\&L}}{\text{S\&P UI}}$
22.26	50.10	.4444

Ten Trading Days Subsequent To Sale

CP&L Average	S&P Utilities Index Average	$\frac{\text{CP\&L}}{\text{S\&P UI}}$
21.58	49.77	.4335

Net Change in CP&L-S&P UI Relationship

$$= \frac{.4335 - .4444}{.4444} \times 100\%$$

$$= -2.45\%$$

CP&L Cost of Equity
Adjustments for Market Pressure and Issuance Expenses

Bare Cost of Equity = 12.18%

Pressure & Issuance Expenses = 5.65%

Adjusted Cost of Equity = $\frac{12.18\%}{(100.00\% - 5.65\%)}$

= 12.91%

Carolina Power and Light Company

Cost of Capital
(12-31-76)

	<u>Amount</u>	<u>Fraction</u>	<u>Cost</u>	<u>Weighted Cost</u>
Debt	\$1,103,463,000	.4517	7.71	3.48
Preferred Stock	336,018,000	.1376	8.01	1.10
Common Equity	875,967,000	.3586	12.91	4.63
Cost-Free Capital	<u>127,161,000</u>	<u>.0521</u>	0	<u>0</u>
Total	\$2,442,609,000	1.0000		<u>9.21%</u>

Duke Power Company
Dividend Yield

September	3	7.3
	10	7.1
	17	7.0
	24	6.9
		<hr/>

Average 7.08

October	1	6.9
	8	6.9
	15	7.1
	22	7.5
	29	7.6
		<hr/>

Average 7.20

November	5	7.5
	12	7.4
	19	7.4
	26	7.2
		<hr/>

Average 7.38

December	3	7.2
	10	7.0
	17	7.1
	24	7.4
	31	7.3
		<hr/>

Average 7.20

January	7	7.5
	14	7.3
	21	7.2
	28	7.2
		<hr/>

Average 7.30

February	4	7.3
	11	7.7
	18	7.8
	25	7.8
		<hr/>

Average 7.65

Weighted Average Dividend Yield =

$$(1(7.08)+2(7.20)+3(7.38)+4(7.20)+5(7.30)+6(7.65))/21 = 7.37\%$$

Duke Power Company
Growth Yield

	Earnings Per Share	Dividends Per Share
1966	1.72	1.10
1967	1.85	1.20
1968	1.91	1.30
1969	2.05	1.40
1970	1.57	1.40
1971	1.88	1.40
1972	1.69	1.40
1973	1.87	1.40
1974	1.80	1.40
1975	1.84	1.40
1976	2.40	1.53

Growth		
66-67	7.56 x 1 =	7.56
67-68	3.24 x 2 =	6.48
68-69	7.33 x 3 =	21.99
69-70	-23.41 x 4 =	-93.64
70-71	19.75 x 5 =	98.75
71-72	-10.11 x 6 =	-60.66
72-73	10.65 x 7 =	74.55
73-74	-3.74 x 8 =	-29.92
74-75	2.22 x 9 =	19.98
75-76	30.43 x 10 =	<u>304.35</u>

9.09 x 1 =	9.09
8.33 x 2 =	15.67
7.69 x 3 =	23.08
0 x 4 =	0
0 x 5 =	0
0 x 6 =	0
0 x 7 =	0
0 x 8 =	0
0 x 9 =	0
9.29 x 10 =	<u>92.86</u>

$$349.44/55 = 6.35$$

$$141.70/55 = 2.58$$

$$\text{Average Growth Yield} = (6.35 + 2.58)/2 = 4.47\%$$