PREFILED TESTIMONY OF GREGORY L. SHAFER, PSC BUREAU OF SPECIAL ASSISTANCE

DIVISION OF WATER AND WASTEWATER

FILED ON BEHALF OF

THE STAFF OF THE FLORIDA PUBLIC SERVICE COMMISSION

SOUTHERN STATES UTILITIES, INCORPORATED

DOCKET NO. 920199-WS

FILED: OCTOBER 12, 1992

DIRECT TESTIMONY OF GREGORY L. SHAFER

Q. Would you please state your name and address?

A. Gregory L. Shafer, 101 E. Gaines Street, Tallahassee, Florida 32399.

Q. By whom are you employed and in what capacity?

A. I am employed by the Florida Public Service Commission, Division of Water and Wastewater, as Chief of the Bureau of Special Assistance.

Q. What are your current responsibilities as Bureau Chief in the Special Assistance Bureau?

A. I presently manage two section supervisors. Combined, the sections consist of eight Regulatory Analysts and three Engineers--all of which are under my supervision. The Bureau processes Staff Assisted Rate Cases for Class C Water and Wastewater utilities, limited proceedings for A, B and C utilities, index and pass-through applications for Class A, B and C utilities, miscellaneous complaints and inquiries, and tariff related matters.

Q. Please summarize your educational and professional background.

A. I have a Bachelors degree in Economics from the University of South Florida and a Masters degree in Economics from Florida State University. My emphasis in the Masters program was in Labor Economics and Econometrics.

My professional experience includes two years as a Field Economist with the U.S. Department of Labor, Bureau of Labor Statistics. I have been employed by the Florida Public Service Commission since September 1983. I spent five plus years in the Division of Communications in various capacities, the final two years as a Supervisor of the Economics Section. My responsibilities primarily focused on policy development in the areas of Access Charges, Long Distance Service, Cellular telephone, and Shared Tenant

Services. While working in the Division of Communications, I testified in the Interexchange Carrier Rules docket and in the A.T. & T. Waiver Request docket and have testified in two previous water and wastewater cases on the calculation of margin reserve. I have been working in the Division of Water and Wastewater in my current capacity for over four years.

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

A. I am advocating a more accurate method for calculating a margin reserve. If the Commission allows Southern States Utilities, Inc. a margin reserve in this case, I recommend that the margin reserve be calculated using a simple linear regression analysis.

Q. What is your understanding of the concept of margin reserve in the regulation of water and wastewater utilities?

A. The Commission requires every utility to serve all customers in its service territory within a reasonable time. Utility facilities are designed to serve not just current customers but future customers as well. Essentially, a margin reserve allowance is recognition in rate base of that portion of plant needed to serve short-term growth. Through the margin reserve, a utility will earn a return on that capacity needed for growth.

Q. Has the Florida Public Service Commission recognized margin reserve?

A. Yes. The Commission has recognized margin reserve at least as far back as 1985 and continues to do so for most cases where applicable.

Q. How does the Commission currently calculate margin reserve?

A. Margin reserve has been based on the product of a simple five-year average for growth in the number of customers (or ERCs if applicable) multiplied by one and one-half years of construction time in the case of treatment plant or

by one year of construction time in the case of collection and/or distribution systems. The construction time factors represent the average amount of time needed to construct additional treatment plant or distribution or collection facilities. More recently in the case of Florida Cities Water Company, Docket No. 910477-SU, the Commission chose to use simple linear regression using five years of historical data for the margin reserve calculation.

Q. Is there anything wrong with the simple average method?

A. Nothing is wrong with the simple average method per se; however, it is the most basic approach possible. As a strictly mathematical extrapolation, it totally ignores the fact that there may be a relationship between the two pertinent factors, time and the rate of growth. I believe that there is a superior forecasting method which can take such a relationship into account without requiring a much more sophisticated calculation.

Q. Can you describe the method you believe is superior to simple average?

A. The method of statistical linear regression would be a relatively easy and superior method on which to base growth projections. The linear regression can more accurately quantify a relationship between time and growth and would therefore more reliably reflect positive or negative trends in growth than would simple averaging.

In using a linear regression analysis to calculate margin reserve, you track the relationship between time and growth over five or more observations and can reasonably predict future growth by projecting out along the same path. Exhibit GLS-1 shows a comparison of margin reserve in three past water and wastewater rate cases according to the simple average and the simple linear regression methods. As is shown in these examples, by the simple

linear regression analysis, you establish a straight line relationship for the observations with the minimum amount of dispersion between the observations and the line. In addition, the equation that describes the straight line allows us to enter a new year and plot the resulting growth on the line.

Q. Under the current method for calculating margin reserve you stated that the growth figure is multiplied by construction time. Once the growth figure is established by the linear regression analysis, should that figure likewise be multiplied by the construction time factor?

A. Yes. The purpose for the construction time factor is the same. These forecast periods should be retained with the linear regression methodology.

Q. Are there shortcomings to the regression analysis?

A. Yes, as with any type of forecast or projection, the linear regression analysis has shortcomings. As is shown in the examples in the Exhibit, we assume with this method that growth over time is linear, that is, a straight line trend. In fact, the trend may show a logarithmic, polynomial or some other type of relationship.

Q. Does that assumption create any problems?

A. The reliability of the estimates is diminished by incorrectly specifying the relationship. This can be a serious shortcoming with long-range estimates in particular. In order to correct this problem when projecting short-term growth for a margin reserve, however, the sophistication of the analysis would increase disproportionately to the benefit of its application.

Q. Do you believe that the assumption of a straight line relationship for the purpose of determining growth for a margin reserve is a serious shortcoming?

A. No. The severity of the problem in determining growth for a margin

reserve is relatively minor since we are only forecasting (at most) one and one-half years of growth based on the previous five. Since a straight line relationship is suggested for only a relatively short time frame, the amount of any distortion is mitigated. This minor problem notwithstanding, I believe that the application of simple regression analysis is a sufficient improvement over simple averages to warrant its use. In addition, the Commission has shown considerable flexibility with regards to incorporating in a margin reserve determination additional factors that might not be reflected in a regression analysis.

Q. Do you believe it is appropriate to use linear regression as the basis for calculating margin reserve in this case?

A. Yes, in the absence of any compelling evidence to the contrary I believe linear regression is the appropriate method of calculating margin reserve in this case.

Q. Does this conclude your testimony?

A. Yes, it does.

Docket No. 920199-WS
Florida Public Service Commission
GLS-1
6 Pages

EXHIBIT GLS-1 - EXAMPLES OF LINEAR REGRESSION

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SOUTHERN STATES UTILITIES, INCORPORATED

DOCKET NO. 920199-WS

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SANLANDO UTILITIES CORPORATION DOCKET 900338-WS
WATER TREATMENT PLANT

YEAR	TOTAL ERCs WATER	YEAR	GROWTH IN ERCs
1984	11,361		
1985	12,866	1	1,505
1986	14,046	2	1,180
1987	15,059	3	1,013
1988	15,845	4	786
1989	16,293	5	448
	85,470		4,932

MARGIN OF RESERVE

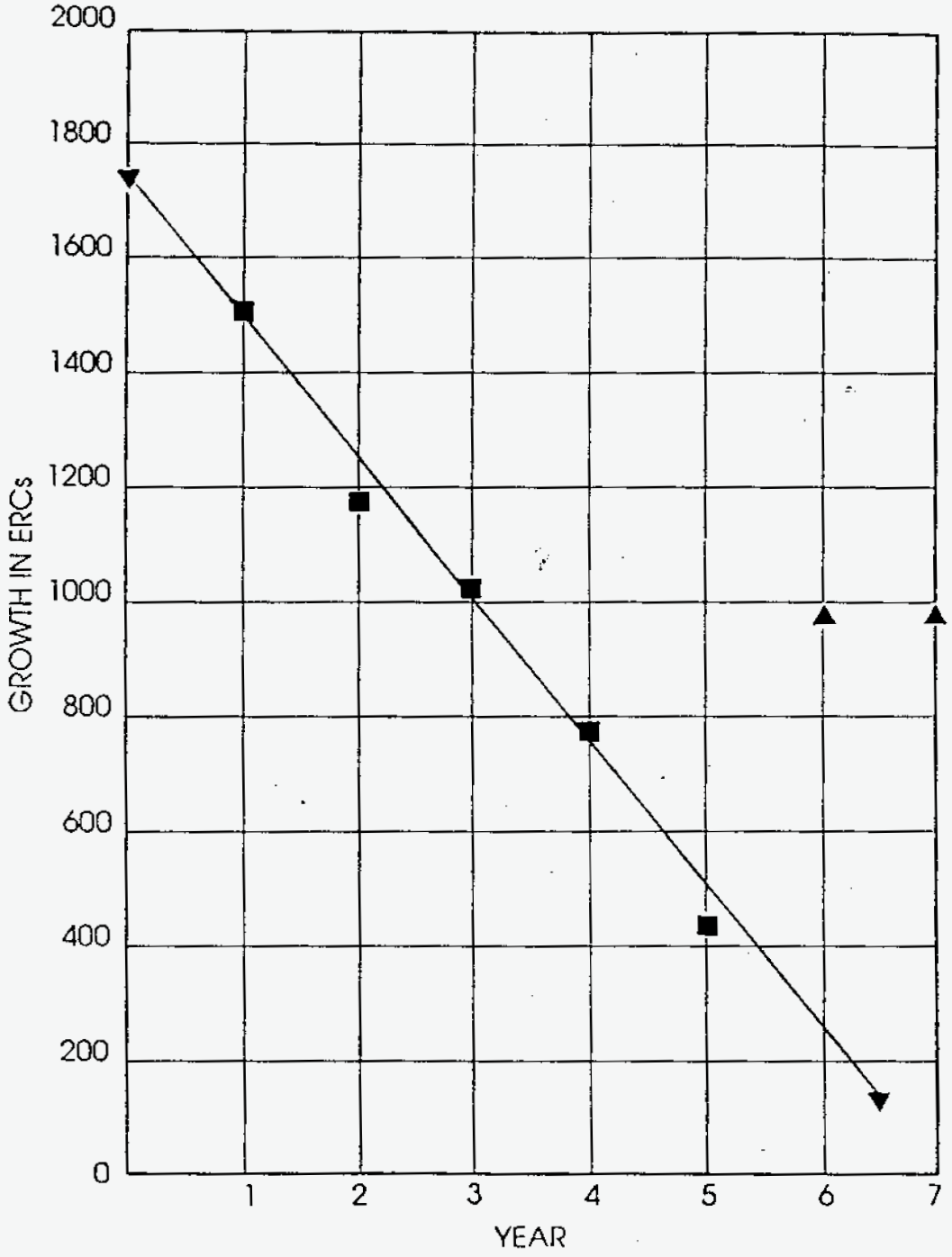
AVERAGE METHOD	6	986
AVERAGE METHOD	7	986
REGRESSION METHOD	6.5	107

Regression Output:

Constant	1738.8	Y = 1739 - 251
Std Err of Y Est	52.1625	Y = 1739 - 251
R Squared	0.98718	Y = 107
No. of Observations	5	
Degrees of Freedom	3	
X Coefficient(s)	-250.80	
Std Err of Coef.	16.50	

SANLANDO UTILITIES CORPORATION

WATER TREATMENT PLANT
DOCKET 900338-WS



■ OBSERVED GROWTH IN ERCs
▲ ESTIMATED GROWTH IN ERCs - AVERAGE METHOD
▼ ESTIMATED GROWTH IN ERCs - REGRESSION METHOD

SANLANDO UTILITIES CORPORATION DOCKET 900338-WS
WASTEWATER TREATMENT -- WEKIVA

YEAR	TOTAL ERCs WASTEWATER	YEAR	GROWTH IN ERCs
1985	8,721		
1986	9,617	1	896
1987	10,258	2	641
1988	10,881	3	623
1989	10,798	4	(83)
1990	11,434	5	636
	52,988		2,713

MARGIN OF RESERVE

AVERAGE METHOD	6	543
AVERAGE METHOD	7	543
REGRESSION METHOD	6.5	106

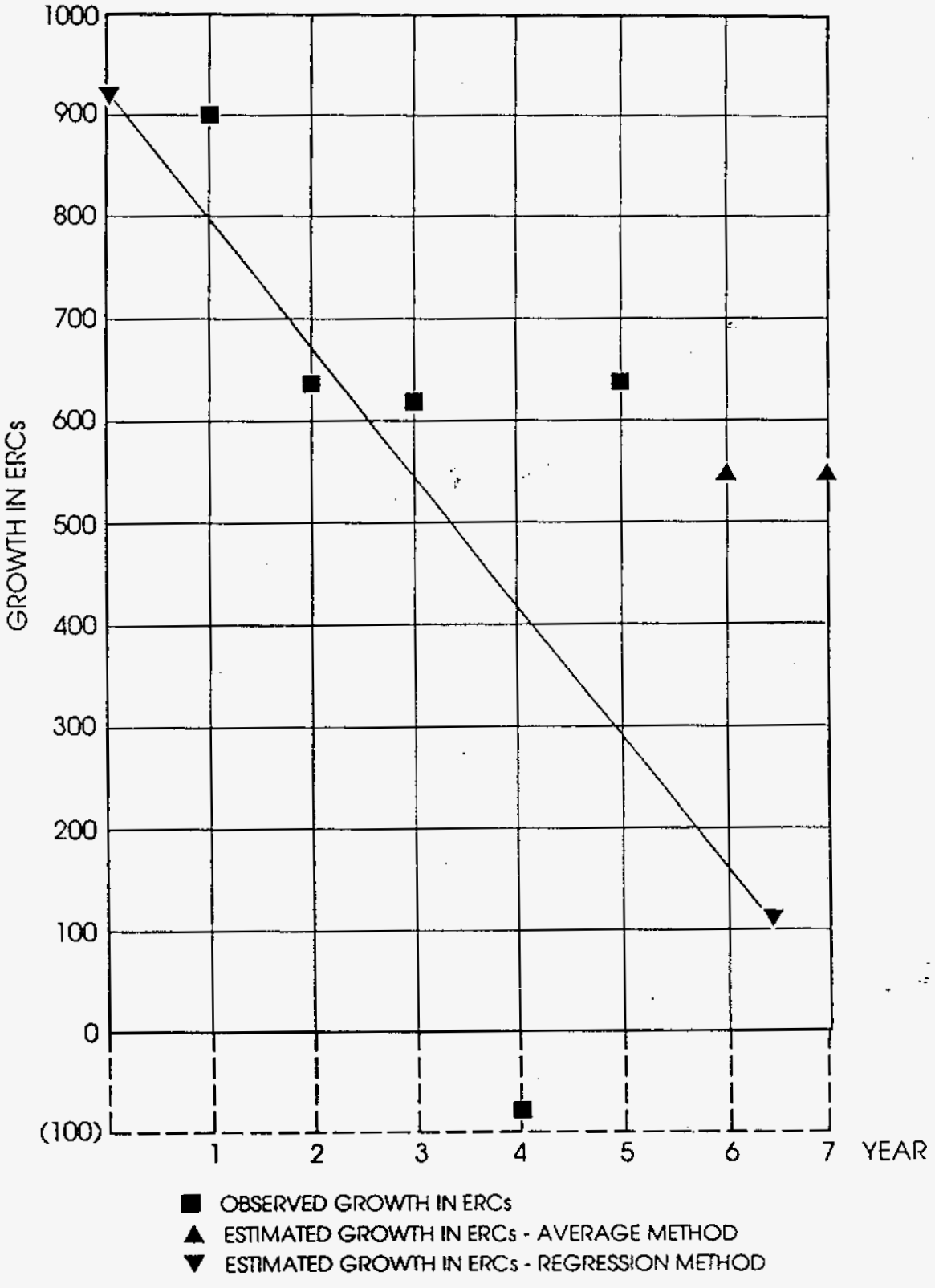
Regression Output:

Constant	915.8	Y = 915 - 124.4X
Std Err of Y Est	358.879	Y = 915 - 124.4(6.5)
R Squared	0.28597	Y = 106
No. of Observations	5	
Degrees of Freedom	3	
X Coefficient(s)	-124.40	
Std Err of Coef.	113.49	

SANLANDO UTILITIES CORPORATION

WASTEWATER TREATMENT - WEKIVA

DOCKET 900338-WS



SOUTHERN STATES UTILITIES INC. DOCKET NO. 900929-WS
MARCO ISLAND - WASTEWATER

YEAR	TOTAL ERCs WASTEWATER	YEAR	GROWTH IN ERCs
1984	3,793		
1985	4,077	1	284
1986	4,228	2	151
1987	4,274	3	46
1988	4,605	4	331
1989	4,798	5	193
	21,982		1,005

MARGIN OF RESERVE

AVERAGE METHOD	6	201
AVERAGE METHOD	7	201
REGRESSION METHOD	6.5	201

Regression Output:

Constant	201.6	Y = 202 - 0.2X
Std Err of Y Est	129.586	Y = 202 - 0.2(6.5)
R Squared	0.00000	Y = 201
No. of Observations	5	
Degrees of Freedom	3	
X Coefficient(s)	-0.20	
Std Err of Coef.	40.98	

SOUTHERN STATES UTILITIES INC.
MARCO ISLAND - WASTEWATER
DOCKET 900929-WS