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GULF POWER
A SOUTHERN COMPANY

June 30, 2000

Ms. Blanca S. Bayo, Director
Division of Records and Reporting
Florida Public Service Commission
2540 Shumard Oak Boulevard
Tallahassee FL 32399-0870

Dear Ms. Bayo:

Enclosed is Gulf Power Company's 2001 Cost of Service Load Research Plan
which is filed pursuant to Order No. 13026.

Sincerely,

Susan D. Ritenour

Susan D. Ritenour
Assistant Secretary and Assistant Treasurer

lw

Enclosure

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GULF POWER COMPANY

Cost of Service Load Research Plan

2001

June 2000

TABLE OF CONTENTS

INTRODUCTION

The purpose of this load research plan is to ensure compliance with the Cost of Service Load Research Rule, Docket No. 820491-EU, Order No. 13026, issued 02-23-84 by the Florida Public Service Commission.

This rule requires that all subject utilities shall provide for load research sampling of all rate classes that account for more than one percent of their annual retail sales and that the sampling plan shall be designed to provide estimates of the summer and winter peak demand by class and the averages of the twelve monthly coincident peaks for each class within plus or minus ten percent relative accuracy at the ninety percent confidence level. It further states that each subject utility shall submit a currently revised sampling plan to the Commission no less than every two years. Gulf Power Company submitted its initial sampling plan in May, 1984 and the plan was approved by the Commission in August, 1984.

Provided in Table 1 are the applicable rate classes subject to this rule for Gulf Power Company and their 1999 energy relationship to the total retail energy sales. As shown on this table, rate classes RS, GS, GSD, LP, LPT, RTP and CISR/CSA are subject to the requirements of this rule.

TABLE 1

Rate	1999 MWh	% of Total Energy
RS/RST	4,423,016	46.40%
GS/GST	291,815	3.06%
GSD/GSDT	2,164,644	22.71%
LP	480,386	5.04%
LPT	1,011,686	10.61%
PXT	57,395	0.60%
RTP	602,624	6.32%
OS-I	18,420	0.19%
OS-II	63,642	0.67%
OS-III	24,416	0.26%
OS-IV	3,230	0.03%
SBS	42,162	0.44%
CISR/CSA	348,655	3.66%
TOTAL	9,532,091	100.00%

(1) Excludes unbilled, Interdepartmental, company use and losses.

PREVIOUS SAMPLE DESIGN PLAN

The 1999 Load Research Study used the combined ratio
estimator methodology for sample size estimates in all rate
classes. Sample points were allocated to the various strata using
the Neyman allocation procedure. Provided in Table 2 is a
summary of the 1999 sample size for each of the applicable rate
classes and the strata allocation variable with the strata
limits.

The RS rate class, which represents 46 percent of the total
Company's annual kWh retail sales, was prestratified into six
strata based on housing type and winter peak month usage. The
break points were 900 kWh for multifamily and 1300 and 2000 kWh
for single family detached.

The GS rate class sample design was prestratified by kWh
into four strata based on winter peak month usage with break
points at 600, 1400, and 2600 kWh. The GS class accounts for
only 3 percent of the Company's annual kWh retail sales.

The GSD rate class, accounting for 23 percent of the
Company's annual kWh retail sales, was prestratified on the
winter peak month kW demand with strata break points of 20.0 kW,
50.0 kW and 130.0 kW.

The LP rate class was prestratified into two groups. The
first stratum contained a random sampling of 30 customers out of
approximately 105 customers whose billing demand during February
was lower than 800 kWh. The second stratum was a census of all
customers whose billing demand was 800 kW or higher. The LP rate

class accounts for 5 percent of the Company's annual kWh retail sales.

The LPT rate class was prestratified into two groups. The first stratum contained a random sampling of 20 customers out of approximately 60 customers whose billing demand during February was lower than 1,000 kW. The second stratum was a census of all customers whose billing demand was 1,000 kW or higher. The LPT rate class accounts for 10.6 percent of the Company's annual kWh retail sales.

The PXT rate class customers, the RTP rate class customers, and the CISR/CSA customers were 100 percent metered, thus requiring no sample design.

PREVIOUS STUDY ACCURACY

The relative accuracy of the 1999 load research data based on the sample design described above is provided in Table 3 and the results obtained in this study were used in the design of the 2001 Load Research Study. The 1999 annual system peak occurred on Friday, August 13, at 3:00 p.m. while the winter peak occurred on Tuesday, January 5, at 8:00 a.m. All rate classes achieved better than ten percent accuracy at the ninety percent confidence interval for the summer and winter peak period as well as for the averages of the twelve monthly coincident peaks.

TABLE 2
GULF POWER COMPANY
1999 Cost of Service Load Research Rule Sample Size

Rate		Strata Allocation	Sample Size	
RS	1)	MF GT 900 kWh	20	
	2)	MF 0-900 kWh	21	
	3)	MH	28	
	4)	SFD 1301-2000 kWh	47	
	5)	SFD GE 2001 kWh	53	
	6)	SFD 0-1300 kWh	56	
		TOTAL	225	
GS	1)	0-600 kWh	77	
	2)	601-1400 kWh	94	
	3)	1401-2600 kWh	94	
	4)	over 2600 kWh	115	
		TOTAL	380	
GSD	1)	0-20.0 kW	22	
	2)	20.1-50.0 kW	46	
	3)	50.1-130.0 kW	46	
	4)	over 130.0 kW	46	
		TOTAL	160	
LP	1)	Less than 800 kW	30	
	2)	800 kW and greater	28	(census)
		TOTAL	58	
LPT	1)	Less than 1000 kW	20	
	2)	1000 kW and greater	29	(census)
		TOTAL	49	
PXT	1)	All customers	1	(census)
RTP	1)	All customers	21	(census)
SBS	1)	All customers	2	(census)
CISR/CSA	1)	All customers	2	(census)
		TOTAL	898	

Table 3

GULF POWER COMPANY
Load Research Data
January, 1999 to December, 1999

RATE SCHEDULE RS/RST 1999	Estimated CPKW	Relative Accuracy		RATE SCHEDULE GS/GST 1999	Estimated CPKW	Relative Accuracy
Winter Peak	1,161,300	6.39%		Winter Peak	63,444	9.66%
Summer Peak	1,020,301	5.27%		Summer Peak	77,618	6.00%
12 Month Avg.	830,127	3.10%		12 Month Avg.	53,674	4.22%

RATE SCHEDULE GSD/GSDT 1999	Estimated CPKW	Relative Accuracy		RATE SCHEDULE LP 1999	Estimated CPKW	Relative Accuracy
Winter Peak	268,752	9.22%		Winter Peak	63,453	6.75%
Summer Peak	425,368	4.47%		Summer Peak	78,644	5.07%
12 Month Avg.	308,090	3.01%		12 Month Avg.	67,138	3.13%

RATE SCHEDULE LPT 1999	Estimated CPKW	Relative Accuracy		RATE SCHEDULE CISR/CSA 1999	Estimated CPKW	Relative Accuracy
Winter Peak	68,063	2.87%		Winter Peak	33,900	0.00%
Summer Peak	223,760	0.85%		Summer Peak	40,221	0.00%
12 Month Avg.	136,802	0.62%		12 Month Avg.	39,425	0.00%

RATE SCHEDULE RTP 1999	Estimated CPKW	Relative Accuracy
Winter Peak	121,302	0.00%
Summer Peak	19,567	0.00%
12 Month Avg.	63,969	0.00%

PROPOSED SAMPLE DESIGN PLAN

This sample design plan uses the data collected from the 1999 Load Research Study as required by the Cost of Service Load Research Rule, which states that ". . . any new or revised plan shall be developed using data from the utility's most current load research to determine the required sampling plan to achieve the precision required . . ".

The combined ratio estimator methodology was used for the sample size estimates for this 2001 proposed sample plan. The formulas for this plan using this method are provided in Table 4. The definitions for the variables for these formulas are provided in Table 5. Stratified random sampling was used within each rate class, except those rate classes which were census-metered, to achieve better accuracy with fewer sample points. The actual calculations for each rate class, which provide sample size determinations based on the Neyman allocation methods, are provided in the description of each rate class within this study plan.

In all rate class studies where census metering is not applicable, a new sample will be drawn from the existing population and the recorders relocated to those premises.

A summary of strata allocation and sample size for all rate classes is shown in Table 9.

TABLE 4
GULF POWER COMPANY
Formulas for Sample Plan

I. Sample Size Estimates Using Combined Ratio Estimator:

$$n = \frac{\left[\sum_{h=1}^{L} W_h \sqrt{F_h} \right]^2}{\left[\frac{D \ (\hat{T}_y / N)}{1.65} \right]^2 + \frac{\sum_{h=1}^{L} W_h \ F_h}{N}}$$

$$F_h = S_{yh}^{2} + \hat{R}^2 S_{xh}^{2} - 2\hat{R}_{rh} * S_{yh} * S_{xh}$$

$$\hat{T}y = \hat{R} * \hat{T}_x$$

$$\hat{R} = \frac{\sum_{h=1}^{L} W_h \ \overline{Y}_h}{\sum_{h=1}^{L} W_h \ \overline{X}_h}$$

II. Neyman Allocation of Sample Points to Strata:

$$n_h = \frac{W_h \ S_{yh}}{\sum_{h=1}^{L} W_h \ S_{yh}} * n$$

TABLE 5

GULF POWER COMPANY
Definitions for Formulas

n = Sample Size Estimate

n_h = Stratum Sample Size

W_h = Stratum Weight

D = Percent Relative Accuracy (0.1)

T_y = Estimated Population CPKW

N = Population Number of Customers

R = Ratio Estimator

T_x = Population kWh

$\overline{Y}_h$ = Stratum Average CPKW

S_{yh} = Stratum Standard Deviation of CPKW

$\overline{X}_h$ = Stratum Average Monthly kWh

S_{xh} = Stratum Standard Deviation of Monthly kWh

r_h = Stratum Correlation Coefficient between CPKW & Monthly kWh

Subscripts

h = Stratum number

y = CPKW variable

x = Monthly kWh variable

Residential Rate Class

The 2001 RS rate class study will use a similar design to that used in 1999. The 1999 study used stratification that was necessary in order to meet the requirements of the "Demand-Side Management Monitoring and Evaluation Plan" of Gulf Power Company, dated April 26, 1996. This plan called for the Advanced Energy Management (AEM) program's control group premise metering to be obtained from the Rate Class Load Research Study. A two-way sample design was used that incorporated a primary stratification variable of housing type and a secondary stratification variable of kWh for the single-family detached and multifamily housing types only. The only changes to the 2001 study are the breakpoints. The kWh breakpoint for multifamily will be 900 kWh and the two breakpoints for single family detached will be 1,250 kWh and 2,000 kWh.

The Neyman allocation of sample to strata for the 2001 study is as follows:

STR	PRIMARY STRATA DESCRIPTION	1999 SECONDARY STRATA DESCRIPTION	WINTER WSTD CPKW	MIN n	1999 INSTALLED	2001 INSTALLED
1	Multifamily	gt 900 kWh	0.26	8	20	23
2	Multifamily	0-900 Kwh	0.25	8	21	22
3	Mobile Home		0.33	10	28	30
4	Single Family Detached	1251 to 2000 kWh	0.59	19	47	53
5	Single Family Detached	ge 2001 kWh	0.54	17	53	48
6	Single Family Detached	0-1250 kWh	0.54	17	56	49
			2.51	79	225	225

Additional date and study design calculations for this rate class are provided in Table 6.

TABLE 6

RATES RS AND RST
STRATIFIED ON 1999 PREMIS TYPE AND JANUARY KWH
SIX STRATA

01/1999 PEAK

STRATUM	WEIGHT	S.S.	=========CPKW DATA============				===============KWH DATA===============				(F)	CORR.
			AVERAGE	WGT AVG	STD DEV	WGT STD	AVERAGE	WGT AVG	STD DEV	WGT STD		
MF-GT 900	0.098920	15	4.24	0.42	2.59	0.26	1486.33	147.03	760.47	75.23	0.19	0.700769
MF-LE 900	0.168962	24	1.40	0.24	1.51	0.25	456.00	77.05	211.69	35.77	0.23	0.406446
MOBILE	0.093192	26	3.21	0.30	3.50	0.33	1294.23	120.61	752.72	70.15	0.22	0.753779
SF-1251*2000	0.168007	44	6.25	1.05	3.50	0.59	1593.00	267.64	207.63	34.88	0.61	-.160717
SF-GE2001	0.138170	49	9.38	1.30	3.93	0.54	2680.22	370.33	887.40	122.61	0.42	0.646316
SF-LE1250	0.332749	54	1.53	0.51	1.62	0.54	676.56	225.12	321.79	107.07	0.45	0.543580
=======				=======		=======		========		=======		
TOTAL				3.81		2.51		1207.7716725			2.13	

```
RATIO R_HAT =  0.00316
POP. # CUST.:305934        POP. ENERGY : 382570703
POP. CPKW  : 1207286       POP. KW/C   3.95

    ESTIMATES FOR 90% C.I., 10% RELATIVE ACCURACY
MEAN PER UNIT SAMPLE SIZE ESTIMATE = 117.02
RATIO METHOD  SAMPLE SIZE ESTIMATE =  78.51
```

07/1999 PEAK

STRATUM	WEIGHT	S.S.	=========CPKW DATA============				===============KWH DATA===============				(F)	CORR.
			AVERAGE	WGT AVG	STD DEV	WGT STD	AVERAGE	WGT AVG	STD DEV	WGT STD		
MF-GT 900	0.098920	15	2.94	0.29	1.95	0.19	1558.27	154.14	817.10	80.83	0.13	0.737699
MF-LE 900	0.168962	26	2.67	0.45	1.87	0.32	1368.96	231.30	716.69	121.09	0.22	0.712645
MOBILE	0.093192	27	3.33	0.31	2.14	0.20	1673.41	155.95	894.17	83.33	0.14	0.737833
SF-1251*2000	0.168007	43	3.97	0.67	1.75	0.29	1926.79	323.71	702.25	117.98	0.21	0.694808
SF-GE2001	0.138170	49	5.21	0.72	2.24	0.31	2745.65	379.37	1176.98	162.62	0.23	0.732704
SF-LE1250	0.332749	57	3.39	1.13	2.01	0.67	1599.95	532.38	832.73	277.09	0.42	0.785261
=======				=======		=======		========		=======		
TOTAL				3.57		1.98		1776.8564963			1.35	

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RATIO R_HAT =  0.00201
POP. # CUST.:311099        POP. ENERGY : 499597609
POP. CPKW  : 1002442       POP. KW/C   3.22

    ESTIMATES FOR 90% C.I., 10% RELATIVE ACCURACY
MEAN PER UNIT SAMPLE SIZE ESTIMATE =  83.41
RATIO METHOD  SAMPLE SIZE ESTIMATE =  47.61
```

GENERAL SERVICE (NON-DEMAND) RATE CLASS

The 1999 study contained a total of 380 sample points stratified on winter peak month energy with strata break points at 600, 1,400, and 2,600 kWh. The resulting accuracy did meet the target accuracy of 10 percent at the 90 percent confidence level during both winter and summer peaks. Since the target accuracy was met, the basic sample design will be kept for 2001 with minor changes in the breakpoints. The 2001 GS rate class is prestratified into four strata with breakpoints at 500, 1,000, and 1,700 kWh of the average of January and February energy.

Shown below is the Neyman allocation of sample to strata for the 2001 study.

STR	WINTER WSTD CPKW	MIN n	INSTALLED n
1	0.63	92	101
2	0.59	87	94
3	0.55	81	88
4	0.61	89	97
	2.83	349	380

Additional statistical data and study design calculations for this rate class are provided in Table 7.

TABLE 7

RATES GS AND GST
ONE-WAY STRATIFICATION ON AVERAGE of FEB AND JAN KWH

01/1999 PEAK

STRATUM	WEIGHT	S.S.	CPKW DATA AVERAGE	WGT AVG	STD DEV	WGT STD	KWH DATA AVERAGE	WGT AVG	STD DEV	WGT STD	(F)	CORR.
0- 500	0.533770	72	0.61	0.33	1.18	0.63	234.42	125.12	188.73	100.74	0.57	0.442653
501-1000	0.199246	60	2.82	0.56	2.95	0.59	864.02	172.15	200.42	39.93	0.54	0.512975
1001-17000	.163316	92	4.34	0.71	3.38	0.55	1491.99	243.67	372.13	60.77	0.55	0.170480
1701- UP	0.103668	134	9.03	0.94	5.93	0.61	3601.27	373.34	4132.92	428.45	1.18	0.277607
TOTAL			2.54		2.39		914.27846486			2.83		

RATIO R_HAT = 0.00277
POP. # CUST.: 26791   POP. ENERGY : 24107349
POP. CPKW : 66853   POP. KW/CUST.:   2.50

ESTIMATES FOR 90% C.I., 10% RELATIVE ACCURACY
MEAN PER UNIT SAMPLE SIZE ESTIMATE = 239.90
RATIO METHOD SAMPLE SIZE ESTIMATE = 348.66

07/1999 PEAK

STRATUM	WEIGHT	S.S.	CPKW DATA AVERAGE	WGT AVG	STD DEV	WGT STD	KWH DATA AVERAGE	WGT AVG	STD DEV	WGT STD	(F)	CORR.
0- 500	0.533770	79	1.08	0.58	1.73	0.92	435.94	232.69	552.89	295.12	0.56	0.798339
501-1000	0.199246	59	3.19	0.64	2.61	0.52	1357.71	270.52	796.74	158.75	0.36	0.730410
1001-17000	.163316	89	5.17	0.85	2.89	0.47	1993.42	325.56	856.33	139.85	0.36	0.639554
1701- UP	0.103668	123	8.17	0.85	10.87	1.13	3894.54	403.74	6053.39	627.54	0.52	0.954927
TOTAL			2.90		3.04		1232.5040974			1.80		

RATIO R_HAT = 0.00236
POP. # CUST.: 27218   POP. ENERGY : 31257808
POP. CPKW : 73634   POP. KW/CUST.:   2.71

ESTIMATES FOR 90% C.I., 10% RELATIVE ACCURACY
MEAN PER UNIT SAMPLE SIZE ESTIMATE = 297.14
RATIO METHOD SAMPLE SIZE ESTIMATE = 119.74

GENERAL SERVICE - DEMAND RATE CLASS

Since the 1999 sample design provided very accurate load research results, no change is being proposed for the 2001 sample design. The stratification variable will be February kW billing demand with break points at 20 kW, 50 kW and 130 kW. The total number of sample points is proposed to be 160 sample points, which is the same sample size as the 1999 study.

The Neyman allocation of sample to strata for the new study is as follows:

STR	WINTER WSTD CPKW	MIN n	INSTALLED n
1	4.29	28	38
2	4.37	28	38
3	4.46	29	39
4	5.14	33	45
	18.26	118	160

Additional statistical data and study design calculations for this rate class are provided in Table 8.

Table 8

RATES GSD
STRATIFIED ON January 1999 KW (NCP)

01/1999 PEAK

STRATUM	WEIGHT	S.S.	AVERAGE	WGT AVG	STD DEV	WGT STD	AVERAGE	WGT AVG	STD DEV	WGT STD	(F)	CORR.
			]=========CPKW DATA============]				]==============KWH DATA============]					
0 - 20	0.358523	20	8.84	3.17	11.96	4.29	4061.10	1456.00	2842.70	1019.17	3.04	0.781965
20.1- 50	0.410690	34	13.74	5.64	10.64	4.37	6238.59	2562.13	4879.94	2004.14	4.16	0.483056
50.1-130	0.174317	38	43.46	7.58	25.57	4.46	25105.13	4376.25	13005.44	2267.07	3.30	0.712223
130.1- UP	0.056470	32	154.91	8.75	91.04	5.14	89848.00	5073.72	54379.18	3070.79	4.35	0.685028
TOTAL				25.14		18.25		13468.09	1339		14.85	

RATIO R_HAT = 0.00187
POP. # CUST.: 13067   POP. ENERGY : 157601998
POP. CPKW :294150   POP. KW/CUST.: 22.51

ESTIMATES FOR 90% C.I., 10% RELATIVE ACCURACY
MEAN PER UNIT SAMPLE SIZE ESTIMATE = 142.69
RATIO METHOD SAMPLE SIZE ESTIMATE = 117.75

07/1999 PEAK

STRATUM	WEIGHT	S.S.	AVERAGE	WGT AVG	STD DEV	WGT STD	AVERAGE	WGT AVG	STD DEV	WGT STD	(F)	CORR.
			]=========CPKW DATA============]				]==============KWH DATA============]					
0 - 20	0.358523	22	15.93	5.71	10.58	3.79	7973.91	2858.83	5410.01	1939.61	2.17	0.828910
20.1- 50	0.410690	36	19.84	8.15	12.87	5.29	9991.72	4103.50	10284.56	4223.77	4.00	0.885464
50.1-130	0.174317	40	53.87	9.39	34.55	6.02	31636.05	5514.70	18832.21	3282.77	2.52	0.913317
130.1- UP	0.056470	31	216.98	12.25	118.29	6.68	117958.1	6661.09	69552.97	3927.66	2.10	0.958673
TOTAL				35.50		21.78		19138.12	344		10.79	

RATIO R_HAT = 0.00186
POP. # CUST.: 13406   POP. ENERGY : 226301655
POP. CPKW :419803   POP. KW/CUST.: 31.31

ESTIMATES FOR 90% C.I., 10% RELATIVE ACCURACY
MEAN PER UNIT SAMPLE SIZE ESTIMATE = 101.85
RATIO METHOD SAMPLE SIZE ESTIMATE = 32.10

LARGE POWER RATE CLASS

The 1999 study design provided a very accurate estimate of demand for this class. The 2001 sample design will retain the 1999 sample design which is two strata with census metering of all LP rate customers whose billing demand during February was 800 kW or higher and a random sampling of 29 customers of the remaining customers.

LARGE POWER TOU RATE CLASS

The 1999 study design provided a very accurate estimate of demand for this class. The 2001 sample design will retain the 1999 sample design which is two strata with census metering of all LPT rate customers whose billing demand during February was 1,000 kW or higher and a random sampling of 20 customers of the remaining customers.

RTP, PXT, CISR/CSA, SBS RATES

All customers being billed on these two rate classes have a recorder installed, thus no sample design is necessary. The number of customers on these rate classes as of June 1998 are as follows:

RTP Rate -   6 customers

PXT Rate -   1 customer

CISR/CSA Rate - 2 customers

SBS Rate   - 2 customers

Table 9
GULF POWER COMPANY
2001 Cost of Service Load Research Rule Sample Size

Rate		Strata Allocation	Sample Size	
RS	1)	MF GT 900 kWh	23	
	2)	MF 0-900 kWh	22	
	3)	MH	30	
	4)	SFD 1251-2000 kWh	53	
	5)	SFD GE 2001 kWh	48	
	6)	SFD 0-1250 kWh	49	
		TOTAL	225	
GS	1)	0-500 kWh	101	
	2)	501-1000 kWh	94	
	3)	1001-1700 kWh	88	
	4)	over 1700 kWh	97	
		TOTAL	380	
GSD	1)	0-20.0 kW	38	
	2)	20.1-50.0 kW	38	
	3)	50.1-130.0 kW	39	
	4)	over 130.0 kW	45	
		TOTAL	160	
LP	1)	Less than 800 kW	30	
	2)	800 kW and greater	29	(census)
		TOTAL	59	
LPT	1)	Less than 1000 kW	20	
	2)	1000 kW and greater	29	(census)
		TOTAL	49	
PXT	1)	All customers	1	(census)
RTP	1)	All customers	6	(census)
CISR/CSA	1)	All customers	2	(census)
SBS	1)	All customers	2	(census)
		TOTAL	884	