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September 30, 2020

Via Electronic Filing Clerk
Florida Public Service Commission
2540 Shumard Oak Blvd.
Tallahassee, FL 32399-0850

RE: Correction to Gulf Power Company's 2021 Load Research Sampling Plan Filing

Dear Mr. Teitzman:

Enclosed for filing is a corrected version of Gulf Power Company's 2021 Load Research Sampling Plan for approval of sample deployments for the years 2021 to 2023. This correction was necessary due to an inadvertent scrivener's errors in sample points referenced on page 3 for rate classes GS and RS/RSVP. The sample points for these rate classes were inadvertently transposed in Gulf's original 2021 Load Research Sampling Plan [DN 09675-2020]. The sampling points identified on page 3 for rate classes GS and RS/RSVP have been corrected in the attached.

If you have any questions or require additional information about this filing, please call me at (561) 691-2391.

Sincerely,

/s/ *Tara B. DuBose*
Tara B. DuBose
Manager, Cost and Load Research

CC: Michael C. Barrett, Economic Supervisor Conservation Section, Division Of Economics (via electronic mail)

Gulf Power Company

One Energy Place, Pensacola, FL 32520

GULF POWER COMPANY

Load Research Sampling Plan
FPSC Rule 25-6.0437
(Corrected)

September 30, 2020

Rates and Tariff Administration Department
Load Research Section

GULF POWER COMPANY

2021 Load Research Sampling Plan (Corrected)

Table of Contents

I. INTRODUCTION

Gulf Power Company (GPC) filed its last Load Research Sampling Plan on July 28, 2017. The Commission Staff approved the 2018 Plan by letter on October 13, 2017. This 2021 Load Research Sampling Plan is being submitted by GPC in compliance with Rule 25-6.0437, Florida Administrative Code (Rule). The Rule applicable to electric utilities that provide electric service to more than 50,000 retail customers at the end of any calendar year requires those utilities to sample all rate classes that account for more than 1 percent of a utility's annual retail sales. The Rule further provides that the sampling plan shall be designed to provide estimates of the averages of the 12 monthly coincident peaks for each class within plus or minus 10 percent at the 90 percent confidence level. The sampling plan shall also be designed to provide estimates of the summer and winter peak demands for each rate class within plus or minus 10 percent at the 90 percent confidence level, except for the General Service Non-Demand rate class. The sampling plan shall be designed to provide estimates of the summer and winter peak demands for the General Service Non-Demand rate class within plus or minus 15 percent at the 90 percent confidence level. The Rule also requires the filing of a revised sampling plan to the Commission no less often than every three years after the most recent sampling plan was required to be submitted.

This report summarizes GPC's proposed 2021 sample plan designs for the following rate classes:

GS: General Service Non-Demand (GS)
GSD: General Service Demand (GSD, GSDT & GSTOU)
RS/RSVP: Residential Service (RS & RSVP)

As shown on Table 1, all other rate classes meeting the "more than 1%" of annual retail sales criterion are 100% metered with recording meters for billing purposes and therefore do not require statistical sampling.

II. PROPOSED SAMPLING PLAN DESIGN METHODOLOGY

The sampling plan methodology proposed in this plan utilizes a three-year replacement cycle for the load research sampling points in the GS, GSD and RS/RSVP rate class samples.

The proposed sampling plan was developed using GPC's most currently available load research data and seasonal peak information. To ensure that a sufficient number of sample points would be selected, sample sizes were calculated for every month starting January 2019 through December 2019. The month with the largest number of required sample points over this period was selected for each rate class.

Based on the results obtained from this data GPC proposes to use of the following types of sample designs:

A one-dimensional stratified random design based on the annual average monthly energy for the GS, GSD and RS/RSVP rate classes.

The sample sizes reported herein are designed to meet Florida Public Service Commission ("FPSC" or the "Commission") accuracy requirements based on the requisite confidence level and expected data loss factors, while simultaneously minimizing costs.

GS   General Service Non-Demand (GS)

A one dimensional stratified random sample design process was used for the GS rate class. The customer population was stratified on the basis of average monthly energy consumption (kWh) for the year ended July 2020.

Stratum breakpoints were defined using the Dalenius-Hodges method. This process generated four strata based on energy consumption:

1. 0 to 500 kWh
2. 501 to 1,400 kWh
3. 1,401 to 3,400 kWh
4. 3,401 kWh and Above

GSD   General Service Demand (GSD, GSDT & GSTOU)

A one dimensional stratified random sample design process was used for the GSD rate class. The customer population was stratified on the basis of average monthly energy consumption (kWh) for the year ended July 2020.

Stratum breakpoints were defined using the Dalenius-Hodges method. The process generated three strata based on energy consumption:

1. 0 to 6,080 kWh
2. 6,081 to 18,560 kWh
3. 18,561 to 48,960 kWh
4. 48,961 kWh and Above

RS/RSVP Residential Service (RS & RSVP)

A one dimensional stratified random sample design process was used for the RS/RSVP rate class. The customer population was stratified on the basis of average monthly energy consumption (kWh) for the year ended July 2020.

Stratum breakpoints were defined using the Dalenius-Hodges method. This process generated four strata based on energy consumption:

1. 0 to 663 kWh
2. 664 to 1,196 kWh
3. 1,197 to 1,976 kWh
4. 1,977 kWh and Above

III. PROPOSED SAMPLING PLAN SUMMARY

The following table lists the expected number of sample points and deployment year for each rate class:

Rate Class	Sample Points	Deployment Year	Detailed Design Statistics
GS	345	2021	See Table 2
GSD	190	2021	See Table 3
RS/RSVP	561	2021	See Table 4

Please refer to Table 5 for definitions of variables and indices and Table 6 for formulas used in the design and estimation of these samples.

TABLE 1

GPC Retail Sales Rate Class	2019 Annual Retail Billed Sales		Data Collection Process
	MWH	**Percent**	
RS/RSVP Residential Service: RS and RSVP	384,277	49.13%	Sampling Plan
GSD General Service Demand: GSD, GSDT and GSTOU	175,850	22.48%	Sampling Plan
Major Accounts: RTP, CSA and PXT	124,671	15.94%	100% Sampled
LP Large Power: LP and LPT	61,553	7.87%	100% Sampled
GS General Service Non-Demand: GS-1	22,846	2.92%	Sampling Plan
All Other Rate Classes[1]	13,030	1.67%	Not Applicable
Total		100%	

[1]. Each rate class in this category falls below the 1% of annual retail sales criterion. Thus, load research sampling plans are not required.

TABLE 2

PROPOSED GS SAMPLE DESIGN

Rate Classes : GS
Deployment Year : 2021
Sample Design : One Dimensional Stratified Random Sample - Combined Ratio Estimation,
Dalenius-Hodges Procedure, Neyman Allocation, With Finite Population Correction
Design Precision(P) : 15%
Design Confidence : 90% (1.645)
Stratification Variable : Annual Monthly Mean Energy (KWH)

[1]	[2]	[3]	[4]	[4]x[5]	[3]x[4]	[4]x([3]^2)	[6]	[7]
Strata	Sample Size	SDRh	Wh	Nh	Wh(SDRh)	Wh(SDRh)^2	Neyman Alloc. of n with losses (nh)	Proposed Sample
1	55	1.737	0.54315	18,077	0.943	1.639	141.068	142
2	45	2.478	0.29130	9,695	0.722	1.789	107.932	108
3	54	2.962	0.14486	4,821	0.429	1.271	64.155	65
4	47	3.504	0.02069	689	0.072	0.254	10.840	30
Sum(S)	201		1.00000	33,281	2.167	4.952	323.994	345
Combined		2.705		[5]				

CALCULATIONS

YBAR = 1.8622

$n = (\Sigma Wh \cdot SDRh)^2/((P \cdot YBAR/Z)^2 + (\Sigma Wh(SDRh)^2/SNh))$
= 161.997

n(with losses) = n / 0.5 = 323.994

NOTES:

A) The most current load research data available was obtained from
Oracle Utilities Load Analysis (Gulf's Load Research System) for
the period January 2019 to December 2019.

B) The above calculations were performed for every month of 2019.
November 2019 load research data produced the largest sample size
requirement and was therefore selected.

C) The strata break points and weights were defined on the basis
of average monthly energy consumption (KWH) for the year

DEFINITIONS:

[1] Strata Break Points (KWH)
Strata 1 = 0 - 500
Strata 2 = 501 - 1,400
Strata 3 = 1,401 - 3,400
Strata 4 = 3,401 & Above

[2] Number of valid sample points in Oracle Utilties
Load Analysis for the month of November 2019
(Refer to Note B)

[3] Standard deviation for the month of November 2019
coincident peak, per Oracle Utilties Load Analysis
(Refer to Note B)

[4] Percent of customers per strata for the summer and
winter peak months from FPL's Customer Information
System
(Refer to Note C)

[5] Total number of customers for the month of
November 2019 from Gulf's Customer Information System
(Refer to Note B)

[6] nh = Wh(SDRh)/ΣWh(SDRh)

[7] Based on Neyman Allocation of n with losses.
Minimum strata size = 30, via central limit
theorem

TABLE 3

PROPOSED GSD SAMPLE DESIGN

Rate Classes : GSD, GSDT & GSTOU
Deployment Year : 2021
Sample Design : One Dimensional Stratified Random Sample - Combined Ratio Estimation,
      Dalenius-Hodges Procedure, Neyman Allocation, With Finite Population Correction
Design Precision(P) : 10%
Design Confidence : 90% (1.645)
Stratification Variable : Annual Monthly Mean Energy (KWH)

[1]	[2]	[3]	[4]	[4]x[5]	[3]x[4]	[4]x([3]^2)	[6]	[7]
Strata	Sample Size	SDRh	Wh	Nh	Wh(SDRh)	Wh(SDRh)^2	Neyman Alloc. of n with losses (nh)	Proposed Sample
1	52	5.762	0.55094	8,278	3.175	18.291	66.235	67
2	40	8.284	0.28759	4,321	2.382	19.736	49.709	50
3	41	17.371	0.11816	1,775	2.053	35.655	42.827	43
4	49	32.268	0.04331	651	1.397	45.093	29.158	30
Sum(S)	182		1.00000	15,025	9.007	118.776	187.928	190
Combined		19.156		[5]				

CALCULATIONS

YBAR = 15.2148

n = (ΣWh*SDRh)^2/((P*YBAR/Z)^2+(ΣWh(SDRh)^2/SNh))
= 93.964

n(with losses) = n / 0.5 = 187.928

NOTES:

A) The most current load research data available was obtained from
Oracle Utilities Load Analysis (Gulf's Load Research System) for
the period January 2019 to December 2019.

B) The above calculations were performed for every month of 2019.
March 2019 load research data produced the largest sample size
requirement and was therefore selected.

C) The strata break points and weights were defined on the basis
of average monthly energy consumption (KWH) for the year

DEFINITIONS:

[1] Strata Break Points (KWH)
Strata 1 = 0 - 6,080
Strata 2 = 6,081 - 18,560
Strata 3 = 18,561 - 48,960
Strata 4 = 48,961 & Above

[2] Number of valid sample points in Oracle Utilties
Load Analysis for the month of March 2019
(Refer to Note B)

[3] Standard deviation for the month of
coincident peak, per Oracle Utilties Load Analysis
(Refer to Note B)

[4] Percent of customers per strata for the summer and
winter peak months from FPL's Customer Information
System
(Refer to Note C)

[5] Total number of customers for the month of
March 2019 from Gulf's Customer Information System
(Refer to Note B)

[6] nh = Wh(SDRh)/ΣWh(SDRh)

[7] Based on Neyman Allocation of n with losses.
Minimum strata size = 30, via central limit
theorem

TABLE 4

PROPOSED RS/RSVP SAMPLE DESIGN

Rate Classes : RS & RSVP
Deployment Year :   2021
Sample Design : One Dimensional Stratified Random Sample - Combined Ratio Estimation,
          Dalenius-Hodges Procedure, Neyman Allocation, With Finite Population Correction
Design Precision(P) :   10%
Design Confidence :   90% (1.645   )
Stratification Variable : Annual Monthly Mean Energy (KWH)

[1]	[2]	[3]	[4]	[4]x[5]	[3]x[4]	[4]x([3]^2)	[6]	[7]
Strata	Sample Size	SDRh	Wh	Nh	Wh(SDRh)	Wh(SDRh)^2	Neyman Alloc. of n with losses (nh)	Proposed Sample
1	48	2.365	0.30332	116,190	0.717	1.697	208.527	209
2	45	1.505	0.36885	141,293	0.555	0.835	161.369	162
3	51	1.908	0.25237	96,674	0.482	0.919	139.974	140
4	43	2.256	0.07546	28,906	0.170	0.384	49.487	50
Sum(Σ)	187		1.00000	383,063	1.924	3.835	559.357	561
Combined		2.019		[5]				

CALCULATIONS

YBAR =   1.8920

n = (ΣWh*SDRh)^2/((P*YBAR/Z)^2+(ΣWh(SDRh)^2/ΣNh))
   =   279.679

n(with losses) = n   /   0.5   =   559.357

NOTES:

A) The most current load research data available was obtained from
 Oracle Utilities Load Analysis (Gulf's Load Research System) for
 the period January 2019 to December 2019.

B) The above calculations were performed for every month of 2019.
  March 2019   load research data produced the largest sample size
 requirement and was therefore selected.

C) The strata break points and weights were defined on the basis
 of average monthly energy consumption (KWH) for the year
 ended July 2020.

DEFINITIONS:

[1] Strata Break Points (KWH)
Strata 1 = 0 - 663
Strata 2 = 664 - 1,196
Strata 3 = 1,197 - 1,976
Strata 4 = 1,977 & Above

[2] Number of valid sample points in Oracle Utilties
Load Analysis for the month of   March 2019
(Refer to Note B)

[3] Standard deviation for the month of   March 2019
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March 2019   from Gulf's Customer Information System
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[6] nh = Wh(SDRh)/ΣWh(SDRh)

[7] Based on Neyman Allocation of n with losses.
Minimum strata size = 30, via central limit
theorem

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TABLE 5

DEFINITIONS OF VARIABLES AND INDICES

$YBAR$ =   Existing sample mean coincident demand (kW)

$XBAR$ =   Existing sample mean energy (kWh)

R =   Ratio of mean coincident demand to mean energy for the existing sample

h =   Index for each stratum within the sample

i =   Index for each customer

Y_{hi} =   Coincident demand for each customer "I" in stratum "h"

X_{hi} =   Energy for each customer "i" in stratum "h"

nc_h =   Number of customers in the existing sample in stratum "h"

SDR_h =   Standard deviation of the residuals in stratum "h"

W_h =   Stratum "h" weight

P =   Precision (0.10 for RS and GSD and 0.15 for GS)

$Z_{\alpha/2}$ =   Two tailed normal variate (1.645 for 90% confidence)

n =   Required new sample size

N_h =   Stratum "h" population (customers)

n_h =   Required new sample size for stratum "h"

TABLE 6

FORMULAS USED IN SAMPLE DESIGNS

I.   Calculations using rate load research data (Refer to Table 6 for definitions):

$$YBAR = \sum_{h} W_h x \left[\frac{\sum_{i} Y_{hi}}{nc_h} \right] \qquad XBAR = \sum_{h} W_h x \left[\frac{\sum_{i} X_{hi}}{nc_h} \right] \qquad R = \frac{YBAR}{XBAR}$$

$$SDR_h = \sqrt{\frac{\sum_{i} (Y_{hi} - Rx\, X_{hi})^2}{nc_h - 1}}$$

II.   Sample size calculation (Refer to Table 6 for definitions):

$$n = \frac{\left[\sum_{h} (W_h x\, SDR_h) \right]^2}{\left[\frac{PxYBAR}{Z_{\alpha/2}} \right]^2 + \frac{\sum_{h} (W_h x\, SDR_h^2)}{\sum_{h} N_h}}$$

$$n_h = \left[\frac{W_h x\, SDR_h}{\sum_{h} W_h x\, SDR_h} \right] xn$$