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August 1, 2008

HAND DELIVERED

Ms. Ann Cole, Director
Division of Commission Clerk
Florida Public Service Commission
2540 Shumard Oak Boulevard
Tallahassee, FL 32399-0850

Re: Load Research Sampling Report – Tampa Electric Company

Dear Ms. Cole:

In compliance with Rule 25-6.0437, enclosed are five copies of Tampa Electric Company's Load Research Sampling Plan report.

Please acknowledge receipt and filing of the above by stamping the duplicate copy of this letter and returning same to this writer.

Thank you for your assistance in connection with this matter.

Sincerely,

James D. Beasley

JDB/pp
Enclosure

cc: Paula K. Brown

COM ____
ECR ____
GCL 1
OPC ____
RCP ____
SSC ____
SGA ____
ADM ____
CLK ____

TECO℠

TAMPA ELECTRIC

LOAD RESEARCH SAMPLING PLAN

FILED: August 1, 2008

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APPLICABLE RATE CLASSES

Tampa Electric Company's retail rate classes and the respective annual MWH sales for each rate class are shown in the table below. Additionally, the third column provides the percent of total annual sales for each rate class and demonstrates the company's compliance with Rule 25-6.0437, Florida Administrative Code, which requires sampling of all rate classes that account for more than one percent of a utility's annual sales. The annual sales reported are for the 12-month period ending December 31, 2007.

PERCENTAGE OF ANNUAL MWH SALES BY RATE

Rate	Annual Sales (MWH)	Percent of Total Sales
Residential (RS & RST)	8,858,563	45.6%
General Service Non-Demand (GS, GST, TS)	1,072,602	5.5%
General Service Demand (GSD & GSDT)	5,371,295	27.6%
General Service Large Demand (GSLD, GSLDT, SBFT)	2,526,154	13.0%
Interruptible Service (IS-1, IST-1, IS-3, IST-3, SBIT-1, SBIT-3)	1,395,123	7.2%
All Other Rate Classes	209,164	1.1%
Total	**19,432,901**	**100.0%**

EXISTING SAMPLE METHODOLOGY

During 2007, each of the rate classes listed in the table above were monitored as part of Tampa Electric Company's load research program. Samples for the General Service Non-Demand rate classes were selected and installed in late 2005 and data was collected during 2006 and 2007. Samples for the Residential and General Service Demand classes were selected and installed in late 2006 and data was collected during 2007 and will continue through 2008. Samples for the General Service Large Demand and Interruptible Service classes are not necessary because recorders are installed on all of these meters for billing purposes. Therefore, the data collected by the recorders is used for load research purposes as well.

On an ongoing basis, samples for one or two rate classes will be selected and installed every year and data will be collected from the samples for 24 months. Once the new sample is fully installed and data collection has begun, the previously selected sample for the class(es) will be retired and removed.

EXISTING SAMPLE DESIGN

The Residential Service (RS) class sample was pre-stratified by three categories of housing type: single family detached, multi-family and mobile home. The stratification is needed because the load patterns for the three housing types are dissimilar and the percentage of mobile homes in the population changes with the seasons. For example, the percentage of mobile homes was 9.5 percent and 9.9 percent in the summer and winter, respectively. Because the sample is stratified by housing type and the inter-strata migration is insignificant, the stratum weights are varied on a month-by-month basis when estimating class demands. Thus, the estimated demands reflect the seasonal changes in the housing type mix.

The sample points were allocated to the strata using Neyman allocation with stratum means and variances estimated from previous sample results. A minimum sample size of 50 was used in the multi-family and mobile home categories to ensure greater accuracy of data for those sub-populations. The resulting allocation is shown below.

RS SAMPLE

Stratum	Total
Single Family Detached	175
Multi-family	50
Mobile Home	50
Total	**275**

The stratification variable used for the General Service Non-Demand (GS) sample was the annual kilowatt-hour (kWh) consumption at the time of sample selection. The sample is comprised of two strata. The stratum boundary was set at 15,000 kWh of annual usage. The sample points were allocated to the strata using Neyman allocation with stratum variances estimated from previous sample results. The allocation is shown below.

GS SAMPLE

Stratum	Total
0 – 14,999 kWh	257
15,000 – infinity kWh	243
Total	**500**

The stratification variable used for the General Service Demand (GSD) sample was the highest billed demand in the 12 months prior to sample selection. For cost of service analysis, class demands are separated by voltage level. To facilitate this separation, a stratum of all customers served at primary voltage and one at secondary voltage, but metered at primary voltage was established. For secondary voltage customers, the stratum boundaries were 200 kW and 500 kW. All customers over 500 kW were included in a 100 percent sampled stratum. For any customer subsequently exceeding this threshold, recorders were installed and they were included in the sample as well. The sample points in the two sampled strata were allocated using Neyman allocation. The allocation is shown below and reflects totals in the 100 percent sampled strata as of December 2007.

GSD SAMPLE

Stratum	Total
Secondary 0 – 199 kW	70
Secondary 200 – 499 kW	70
Secondary over 499 kW (100%)	518 (1)
Primary Metered/Primary Served (100%)	57 (1)
Primary Metered/Secondary Served (100%)	29 (1)
Total	**744**

1. 100 percent sampled stratum; therefore, size will vary depending upon the number of customers meeting the criteria.

The General Service Large Demand (GSLD) class has recorders installed on each customer meter. For cost of service analysis, the customers are divided by voltage level. On a month-by-month basis, as customers migrate into and out of the GSLD rate, the analysis population changes accordingly. The population size was 221 as of December 2007.

The Interruptible Service (IS) class has recorders installed on each customer meter. For cost of service analysis, the customers are divided by voltage level. In the event of customer migration out of the IS rate, the analysis population is changed accordingly. The population size was 55 was as of December 2007.

EXISTING SAMPLE ACCURACY

The accuracy achieved for the three classes sampled was calculated for each month's coincident peak for 2007 and the average of the 12 monthly coincident peaks as well. The accuracy for each class was calculated in the conventional manner for combined ratio analysis. The results are shown below.

**2007 COINCIDENT PEAK PERCENTAGE ACCURACIES
AT 90 PERCENT CONFIDENCE LEVEL
USING COMBINED RATIO ESTIMATION**

Month	RS	GS	GSD
January	8.0	11.1	7.6
February	7.4	9.4	7.5
March	7.1	7.9	5.8
April	5.2	6.7	5.3
May	4.5	5.5	5.6
June	4.5	5.4	5.4
July	3.6	5.1	5.7
August	4.1	5.5	5.3
September	3.7	5.1	5.0
October	4.0	5.0	5.1
November	5.6	5.7	6.1
December	8.4	8.4	6.8
12 Coincident Peak Average	**2.4**	**3.5**	**4.3**

The 2007 annual system winter peak occurred in February and the summer peak occurred in August. *All samples achieved better accuracy than the target of ±10 percent accuracy* at the 90 percent confidence limit for the 12 coincident peak averages. The RS and GSD samples achieved better accuracy than the target of ±10 percent accuracy at the 90 percent confidence limit for the winter and summer coincident peaks. The GS sample achieved better accuracy than the target of ±15 percent accuracy at the 90 percent confidence limit for the winter and summer coincident peaks.

PROPOSED SAMPLING PLAN FOR 2010 LOAD RESEARCH STUDY

The Residential Service (RS) class sample met the required levels of accuracy for 2007; therefore, no changes are required in this sample design. Proposed sample allocations for this class remain the same and are shown in the table below.

PROPOSED RS SAMPLE

Stratum	**2010 Sample Size**
Single Family Detached	175
Multi-family	50
Mobile Home	50
Total	**275**

The General Service Non-Demand (GS) class sample also met the required levels of accuracy for the 2007 winter coincident peak, summer coincident peak and 12 coincident peak average; therefore, no changes are required in the sample design. Proposed sample allocations for this class are shown in the table below.

PROPOSED GS SAMPLE

Stratum	**2010 Sample Size**
0 – 14,999 kWh	257
15,000 – infinity kWh	243
Total	**500**

The General Service Demand (GSD) class sample also met the required winter coincident peak, summer coincident peak and 12 coincident peak average levels of accuracy for 2007; therefore, no changes are required in the sample design. The proposed GSD sample allocation is shown below and reflects totals in the 100 percent sampled strata as of June 2008.

PROPOSED GSD SAMPLE

Stratum	2010 Sample Size
Secondary 0 – 199 kW	70
Secondary 200 – 499 kW	70
Secondary over 499 kW (100%)	527 (1)
Primary Metered/Primary Served (100%)	55 (1)
Primary Metered/Secondary Served (100%)	28 (1)
Total	**750**

1. 100 percent sampled stratum; therefore, size will vary depending upon the number of customers meeting the criteria.

Samples for the General Service Large Demand and Interruptible Service classes are not necessary because recorders are installed on all of these meters for billing purposes. The data collected by the recorders is also used for load research purposes. Under this plan, the collection of load data for the GSLD and IS classes will continue in this manner.

SAMPLE SELECTION

Once sample sizes, stratum definitions, and sample allocations are determined, sample selection begins. Random numbers are assigned to each customer in the class; then, the list of customers is sorted in ascending order by the assigned random number. The first group of customers on the list is the prime sample, while the following group is used, if necessary, as a source of replacement customers. The replacement list is maintained in random order and used in order, as needed. For customers selected, the standard billing watt-hour meter is replaced with a pulse-initiating meter. In addition, a recording device is installed to collect and retain pulse information in 15 minute intervals. The recorded information is collected and processed on a monthly basis.

SAMPLE REMOVALS AND REPLACEMENTS

Tampa Electric proposes to allow a specific number of removals per class that will not require replacements. Therefore, the RS class will be allowed five removals per stratum, before installation of replacements begins. The GS class and the GSD class will be allowed 10 and five removals per stratum, respectively. There is no expectation that accuracy levels will be impacted by this change. Sample sizes are well above the computed sample size levels for meeting accuracy requirements.

FORMULAS AND DEFINITIONS

Combined Ratio Estimate:

$$\hat{R}_c = \frac{\sum_h W_h \bar{y}_h}{\sum_h W_h \bar{x}_h}$$

Where,

$\hat{R}_c$ = *combined ratio estimate*
W_h = *stratum weight for stratum h*
$\bar{Y}_h$ = *mean coincident demand for stratum h*
$\bar{X}_h$ = *mean billed energy for stratum h*

Coincident Peak Estimate:

$$\hat{Y}_{rc} = \hat{R}_c X$$

Where,

$\hat{R}_c$ = *combined ratio estimate*
$\hat{Y}_{rc}$ = *estimated class total coincident peak*
X = *class total billed energy*

Standard Deviation of Sample Residuals:

$$s_{dh}^2 = \frac{\sum_{i=1}^{n_h} (y_{hi} - \hat{R}_c x_{hi})^2}{n_h - 1}$$

Where,

$\hat{R}_c$ = combined ratio estimate
n_h = sample size for stratum h
s_{dh} = standard deviation of sample residuals
y_{hi} = coincident demand for sample Customer i of stratum h
x_{hi} = billed energy for Customer i of stratum h

Variance of Coincident Peak Estimate:

$$\hat{V}(\hat{Y}_{rc}) = \sum_h \frac{N_h^2\left(1 - \frac{n_h}{N_h}\right)}{n_h} s_{dh}^2$$

Where,

$\hat{V}(\hat{Y}_{rc})$ = variance of coincident estimate
N_h = population size for stratum h
n_h = sample size for stratum h
s_{dh} = standard deviation of sample residuals

Accuracy at 90 Percent Confidence Level:

$$A = \frac{1.645\sqrt{\hat{V}(\hat{Y}_{rc})}}{\hat{Y}_{rc}}$$

Where,

$$\hat{Y}_{rc} = \textit{estimated class total coincident peak}$$
$$\hat{V}(\hat{Y}_{rc}) = \textit{variance of coincident estimate}$$
$$A = \textit{accuracy at 90\% confidence level}$$

Sample Size:

$$n = \frac{\left(\sum_h W_h s_{dh}\right)^2}{\left(\frac{d}{1.645}\right)^2 \left(\frac{\hat{Y}_{rc}}{N}\right)^2}$$

Where,

$$W_h = \textit{stratum weight for stratum } h$$
$$\hat{Y}_{rc} = \textit{estimated class total coincident peak}$$
$$N = \textit{population size}$$
$$s_{dh} = \textit{standard deviation of sample residuals}$$
$$n = \textit{total sample size}$$
$$d = \textit{desired relative accuracy}$$

Sample Allocation (Neyman):

$$n_h = n \frac{W_h s_{dh}}{\sum_h W_h s_{dh}}$$

Where,

$$W_h = \textit{stratum weight for stratum } h$$
$$n_h = \textit{sample size for stratum } h$$
$$s_{dh} = \textit{standard deviation of sample residuals}$$
$$n = \textit{total sample size}$$

12 Coincident Peak Estimate:

$$12\hat{C}P = \frac{1}{12}\sum_{m=1}^{12}\hat{Y}_{rcm}$$

Where,

$$\hat{Y}_{rcm} = \textit{Coincident Peak Estimate for Month M}$$

Variance of 12 Coincident Peak:

$$VAR(12\hat{C}P) = \left(\frac{1}{12}\right)^2 \left(\sum_{m=1}^{12}\hat{V}(\hat{Y}_{rcm}) + 2\sum_{m=1}^{12}\sum_{k<m}\hat{C}(\hat{Y}_{rcm},\hat{Y}_{rck}) \right)$$

Where,

$$\hat{V}(\hat{Y}_{rcm}) = \textit{Variance of Coincident Peak Estimate Month m}$$

$$\hat{C}(\hat{Y}_{rcm},\hat{Y}_{rck}) = \textit{Covariance of Month m and Month k Estimates}$$

Month-To-Month Covariance:

$$\hat{C}(\hat{Y}_{rcm},\hat{Y}_{rck}) = \sum_{h=1}^{l}\frac{N_{hm}N_{hk}}{\bar{n}_{hmk}}(fpc_{mk})\, s_{hd_m d_k}$$

Where,

$$N_{hm} = \textit{Population Size in Month m}$$

$$N_{hk} = \textit{Population Size in Month k}$$

$$\bar{n}_{hmk} = \textit{Average Sample Size in Months m and k}$$

$$fpc_{mk} = 1 - \min\left(\frac{n_m}{N_m},\frac{n_k}{N_k}\right)$$

$$s_{hd_m d_k} = \sum_{i=1}^{n_{hmk}}\frac{(y_{hmi} - \hat{R}_m x_{hmi})(y_{hki} - \hat{R}_k x_{hki})}{n'_{hmk} - 1}$$

$$n'_{hmk} = \textit{Sample Size with good data in Month m and k}$$

Combining Estimates from Two Samples:

$$\hat{Y}_{rc} = \alpha \hat{Y}_{rcA} + (1 - \alpha) \hat{Y}_{rcB}$$

Where,

$$\hat{Y}_{rcA} = Sample\ \ A\ \ Estimate$$
$$\hat{Y}_{rcB} = Sample\ \ B\ \ Estimate$$
$$\alpha = Weighting\ \ factor$$

Combining Variances from Two Samples:

$$\hat{V}(\hat{Y}_{rc}) = \alpha^2 \hat{V}(\hat{Y}_{rcA}) + (1 - \alpha)^2 \hat{V}(\hat{Y}_{rcB})$$

Where,

$$\hat{V}(\hat{Y}_{rcA}) = Variance\ \ of\ \ Sample\ \ A\ \ Estimate$$
$$\hat{V}(\hat{Y}_{rcB}) = Variance\ \ of\ \ Sample\ \ B\ \ Estimate$$
$$\alpha = Weighting\ \ factor$$

Weight to Obtain Minimum Variance:

$$\alpha = \frac{\hat{V}(\hat{Y}_{rcA})}{\hat{V}(\hat{Y}_{rcA}) + \hat{V}(\hat{Y}_{rcB})}$$

Where,

$$\hat{V}(\hat{Y}_{rcA}) = Variance\ \ of\ \ Sample\ \ A\ \ Estimate$$
$$\hat{V}(\hat{Y}_{rcB}) = Variance\ \ of\ \ Sample\ \ B\ \ Estimate$$
$$\alpha = Weighting\ \ factor$$

12 Coincident Peak -- Three Samples Equal / Weighting:

$$12\hat{C}P=\left(\frac{1}{24}\right)\left(\sum_{m=1}^{l}\hat{Y}_{mA}+\sum_{m=1}^{12}\hat{Y}_{mB}+\sum_{m=l+1}^{12}\hat{Y}_{mC}\right)$$

Where,

Sample A is in place for the first l months, sample B is in place for all 12 months and sample C is in place for the last $12 - l$ months.

$$\hat{Y}_{mA}=Sample\ A\ Estimate\ for\ Month\ m$$
$$\hat{Y}_{mB}=Sample\ B\ Estimate\ for\ Month\ m$$
$$\hat{Y}_{mC}=Sample\ C\ Estimate\ for\ Month\ m$$

Variance of 12 Coincident Peak:

$$VAR(12\hat{C}P)=\left(\frac{1}{24}\right)^2\{\sum_{m=1}^{l}\hat{V}(\hat{Y}_{rcmA})+2\sum_{m=1}^{l}\sum_{k<m}\hat{C}(\hat{Y}_{rcmA},\hat{Y}_{rckA})\}$$
$$+\left(\frac{1}{24}\right)^2\{\sum_{m=1}^{12}\hat{V}(\hat{Y}_{rcmB})+2(\sum_{m=1}^{12}\sum_{k<m}\hat{C}(\hat{Y}_{rcmB},\hat{Y}_{rckB})\}$$
$$+\left(\frac{1}{24}\right)^2\{\sum_{m=l+1}^{12}\hat{V}(\hat{Y}_{rcmC})+2\sum_{m=l+1}^{12}\sum_{k<m}\hat{C}(\hat{Y}_{rcmC},\hat{Y}_{rckC})\}$$