Steven L. Beshear
Governor

Leonard K. Peters
Secretary
Energy and Environment Cabinet

Commonwealth of Kentucky
Public Service Commission
211 Sower Blvd.
P.O. Box 615
Frankfort, Kentucky 40602-0615
Telephone: (502) 564-3940
Fax: (502) 564-3460
psc.ky.gov

David L. Armstrong
Chairman

James W. Gardner
Vice Chairman

John W. Clay
Commissioner

May 8, 2009

PARTIES OF RECORD

Re: Case No. 2009-00103

Attached is a copy of the memorandum which is being filed in the record of the above-referenced case. If you have any comments you would like to make regarding the contents of the informal conference memorandum, please do so within five days of receipt of this letter. If you have any questions, please contact Elie Russell at 502/564-3940, Extension 422.

Sincerely,

Jeff Derouen
Executive Director

ER/me

Attachment

INTERAGENCY MEMORANDUM
PUBLIC SERVICE COMMISSION

TO: Case File

FROM: Elie Russell
Electric Branch
Engineering Division

DATE: May 8, 2009

SUBJECT: Case No. 2009-00103, Grayson RECC Deviation

Pursuant to a Commission Staff notice dated April 30, 2009, an informal conference was held at the Commission's office on May 5, 2009. A list of attendees is attached hereto.

The purpose of the conference was to discuss and hear an explanation from Grayson RECC regarding how its proposal for a single-phase sample meter plan will be implemented. Grayson RECC provided a handout which explained how the proposed plan will work. Staff explained the different sample meter plans used by utilities in Kentucky. At the conclusion of the informal conference, Grayson indicated that it will amend its application within three weeks from the date of the informal conference. The new filing will reflect changes to its sample testing plan that will be similar to other utilities' sample testing plan approved by this Commission.

There being no further discussion, the conference was adjourned.

Attachment 1 - List of Attendees
Attachment 2 - Handout provided by Grayson RECC
C: John Shupp, Manager
Electric Branch

GRAYSON RURAL ELECTRIC COOPERATIVE COOPERATION
CASE NUMBER 2009-00103
Informal Conference
May 5, 2009

Participant	Company
Eli Russell	PSC
STEVE KINGSOLVER	PSC
RANDY BLEVINS	GRAYSON RECC
Andrea McCleese	Grayson RECC
DON COMBS	"
Quang D Nguyen	PSC
Vicky Downes	PSC - FA

Sample Meter Testing Procedures

- Meters will be entered into a group when purchased based on Manufacturer and Type. (Page 3 of Sample Meter Test Program Request)

- Our Software Vendor has a program established to generate a random sampling of meter numbers based on Manufacturer and Type. At the first of each year, this program will be executed and a listing of meters will be sent to the Meter Department for change out and testing. (Exhibit A)

- Test results will be entered into a spreadsheet to determine if they pass the ANSI standard. (Exhibit B)

REQUEST TO ADOPT SAMPLE TESTING METHOD FOR GRAYSON RURAL ELECTRIC COOPERATIVE CORPORATION'S SINGLE-PHASE METERS

Grayson Rural Electric Cooperative Corporation
Grayson, Kentucky

Prepared by
James D. Bridges, P.E.
Distribution System Solutions, Inc.
Walton, Kentucky

February 6, 2009

PROPOSAL FOR SINGLE-PHASE SAMPLE METER TESTING

INTRODUCTION

Grayson Rural Electric Cooperative Corporation (GRECC) is an electric distribution cooperative located in northeastern Kentucky. GRECC is presently on schedule with its eight-year meter testing program. Since 2004, GRECC has been fully automated in single-phase meter reading. By adopting a sample meter testing program, GRECC will take another significant step towards maximizing efficiency in the single-phase meter reading and testing area of their operation. It is the purpose of this proposal to demonstrate the methods used and the cost savings achieved in sample testing.

RULES AND REGULATIONS

Kentucky Public Service Commission (PSC) rules and regulations outline the required method and techniques of sample meter testing. GRECC will comply with **PSC KAR 5.041E, Section 16** when implementing its sample meter testing program.

Section 16. Sample Testing of Single Phase Meters. *A utility desiring to adopt a scientific sample meter testing plan for single phase meters shall submit its application to the commission for approval. Upon approval the sample testing plan may be followed in lieu of the periodic test prescribed in Section 15(3) of this administrative regulation. The plan shall include the following:*

(1) Meters shall be divided into separate groups to recognize differences in operating characteristics due to changes in design, taking into consideration date of manufacture and serial number.

(2) The sampling procedure shall be based upon accepted statistical principles.

(3) The same sampling procedure shall be applied to each group.

(4) Each utility authorized to test meters by sample meter testing plan shall comply with the following conditions:

(a) The number of meters in addition to the sample shall be taken from those meters in each group longest in service since last test unless a particular meter type is known to be increasing the percentage of meters requiring test for the sample group. In such a case where a particular meter type is increasing the percentage of meters requiring test in any group, these meters may be selected first regardless of test date with any additional tests as required for that group coming from those in that group longest in service since last test. Each year the utility shall use the following table to determine the percentage of the total meters in each group to be tested.

Percentage of Meters Within Limits of 2% Fast or Slow (Indicated by Sample)		*Percentage of Meters to be Tested the Next Year*
99.0	*100.0*	*2*
98.0	*98.9*	*4*
97.0	*97.9*	*6*
96.0	*96.9*	*8*
95.0	*95.9*	*10*
93.0	*94.9*	*12*
91.0	*92.9*	*14*
Less than	*91.0*	*16*

(b) Provided, however, that no meter shall remain in service without periodic test for a period longer than twenty-five (25) years.

(5) Whenever a meter is found to be more than two (2) percent fast or slow, refunds or back billing shall be made for the period during which the meter error is known to have existed or if not known for one-half (1/2) the elapsed time since the last test but in no case to exceed three (3) years. This provision shall apply only when sample testing of single phase meters has been approved by the commission and utilized by the utility.

PROCEDURE

As shown in the table below, meters will be divided into various **test groups** based upon manufacturer and type. Similar meters may be further divided by serial number break points.

METER GROUPS

Group	Manufacturer	Type	Population	Sample
1	ABB	AB1	1,627	33
2	Schlumberger	C1S	4,452	89
3	GE	I210	100	2
4	Landis & Gyr	MX	9,068	181
5	Landis & Gyr	MS	45	1

The statistical meter sample testing will follow ***American National Standard ANSI/ASQC Z1.9-2003(Sampling Procedures and Tables for Inspection).***
Each test group will be randomly sampled by a computerized process. The GRECC billing computer system will be used for this process.

Part A7. Sample Selection, from the above standard, states that **Inspection Level II** shall be used for the discrimination level. Unless otherwise required by the PSC, this level will be in effect for the GRECC program.

The **Acceptance Quality Level** (AQL) is defined as the quality level that is the worst tolerable product average when a continuing series of lots is submitted for acceptance sampling.
Due to the $\pm$2% limits, the sample groups shall be tested using an AQL of 2.5. This value can be found in Table A-1.

Newly installed meters will be added to the proper group and will be eligible for sample testing the following year. New meters from a different manufacturer or with different characteristics/features will require the formation of a new group. As new meters are purchased in lots, a sample test group will be established just for the new meter testing. An AQL of 1.0 will apply to the new meter testing.

Table A-1
AQL Conversion Table

For specified AQL values falling within these ranges			Use this AQL value
	to	0.109	0.10
0.110	to	0.164	0.15
0.165	to	0.279	0.25
0.280	to	0.439	0.40
0.440	to	0.699	0.65
0.700	to	1.09	1.0
1.10	to	1.64	1.5
1.65	to	2.79	2.5
2.80	to	4.39	4.0
4.40	to	6.99	6.5
7.00	to	10.9	10.0

Table A-2[1]
Sample Size Code Letters[2]

Lot Size			Inspection Levels				
			Special		General		
			S3	S4	I	II	III
2	to	8	B	B	B	B	C
9	to	15	B	B	B	B	D
16	to	25	B	B	B	C	E
26	to	50	B	B	C	D	F
51	to	90	B	B	D	E	G
91	to	150	B	C	E	F	H
151	to	280	B	D	F	G	J
281	to	400	C	E	G	H	J
401	to	500	C	E	G	I	J
501	to	1,200	D	F	H	J	K
1,201	to	3,200	E	G	I	K	L
3,201	to	10,000	F	H	J	L	M
10,001	to	35,000	G	I	K	M	N
35,001	to	150,000	H	J	L	N	P
150,001	to	500,000	H	K	M	P	P
500,001	and	over	H	K	N	P	P

[1]The theory governing inspection by variables depends on the properties of the normal distribution and, therefore, this method of inspection is only applicable when there is reason to believe that the frequency distribution is normal.

[2]Sample size code letters given in body of table are applicable when the indicated inspection levels are to be used.

Randomly selected meters (lot) from each group will be sent the meter shop. All non-registering meters will be replaced by another random selection.
The meters will be tested under full load, light load and 50% power factor.

For each lot, calculations will be based on the Double Specification Limit Variability Unknown-Standard Deviation Method.
Full Load test results will be evaluated. **Example B-4** in ***ANSI/ASQC Z1.9-2003*** demonstrates this calculation method. **Table B-3** is included in this proposal.

The results from each group's test lot will be examined to determine meter accuracy. The results for the average load (using the 4% bandwidth guideline) will determine the percentage of meters to be sample tested the following year.

Table B-3 Standard Deviation Method

Master Table for Normal and Tightened Inspection for Plans Based on Variability Unknown
(Double Specification Limit and Form 2—Single Specification Limit)

Sample Size Code Letter	Sample Size	Acceptance Quality Limits (normal inspection)											
		T	.10	.15	.25	.40	.65	1.00	1.50	2.50	4.00	6.50	10.00
		M	M	M	M	M	M	M	M	M	M	M	M
B	3	↓	↓	↓	↓	↓	↓	↓	↓	7.59	18.86	26.94	33.69
C	4							1.49	5.46	10.88	16.41	22.84	29.43
D	5		↓	↓	↓	0.041	1.34	3.33	5.82	9.80	14.37	20.19	26.55
E	7	↓	0.605	0.087	0.421	1.05	2.13	3.54	5.34	8.40	12.19	17.34	23.30
F	10	0.077	0.179	0.349	0.714	1.27	2.14	3.27	4.72	7.26	10.53	15.17	20.75
G	15	0.186	0.311	0.491	0.839	1.33	2.09	3.06	4.32	6.55	9.48	13.74	18.97
H	20	0.228	0.356	0.531	0.864	1.33	2.03	2.93	4.10	6.18	8.95	13.01	18.07
I	25	0.250	0.378	0.551	0.874	1.32	2.00	2.86	3.97	5.98	8.65	12.60	17.55
J	35	0.253	0.373	0.534	0.833	1.24	1.87	2.66	3.70	5.58	8.11	11.89	16.67
K	50	0.243	0.355	0.503	0.778	1.16	1.73	2.47	3.44	5.21	7.61	11.23	15.87
L	75	0.225	0.326	0.461	0.711	1.06	1.59	2.27	3.17	4.83	7.10	10.58	15.07
M	100	0.218	0.315	0.444	0.684	1.02	1.52	2.18	3.06	4.67	6.88	10.29	14.71
N	150	0.202	0.292	0.412	0.636	0.936	1.42	2.05	2.88	4.42	6.56	9.86	14.18
P	200	0.204	0.294	0.414	0.637	0.945	1.42	2.04	2.86	4.39	6.52	9.80	14.11
		.10	.15	.25	.40	.65	1.00	1.50	2.50	4.00	6.50	10.00	
		Acceptance Quality Limits (tightened inspection)											

All AQL values are in percent nonconforming. T denotes plan used exclusively on tightened inspection and provides symbol for identification of appropriate OC curve.

↓ Use first sampling plan below arrow; that is, both sample size as well as k value. When sample size equals or exceeds lot size, every item in the lot must be inspected.

COST SAVINGS/CONCLUSION

A substantial reduction in cost will be achieved by implementing the sample meter test method. Once the program is established, only a small percentage of the present labor and testing efforts will be required. This reduction results in a cost savings without compromising single-phase revenue metering accuracy.

Cost Savings to Grayson RECC due to a change to Sample Metering

Assumptions:
Needing to test 300 sample meters annually
- this can be accomplished over one month
Current practice is to test approximately 5000 meters over three years
- this requires a full year to accomplish

Current Annual Costs

Labor	# units	Hours	Cost / hour	Benefits		
	2	2,080	$ 23.65	77.11%	$	174,247.90
Transportation	1	774	$ 21.91		$	16,958.34
					$	191,206.24
Costs for 3 years during the 8 year cycle					$	573,618.73

Potential Annual Costs

Labor	# units	Hours	Cost / hour	Benefits		
	2	173	$ 23.65	77.11%	$	14,520.66
Transportation	1	65	$ 21.91		$	1,413.20
					$	15,933.86
Costs during the 8 year cycle					$	127,470.83
Savings over the 8 year cycle					$	446,147.90

METER SAMPLE REPORT
FROM 01/01/50 TO 05/04/09

LOCATION	METERNO	MANUFCODE	TYPE	DESCRIPTION	LAST TEST DATE
631303014026	23009	2	3	A1K	051900
530000034035	98109624	2	3	TURLE ABB	112101
541000059005	98706446	2	3	TURTLE	061802
542205065037	98706281	2	3	TURTLE	061902
637000063010	98706539	2	3	TURTLE	070302
548405033250	98706205	2	3	TURTLE	081202
540103089030	98706229	2	3	TURTLE	011603
644101062015	93970075	2	3	TURTLE	013103
643000045015	93970163	2	3	TURTLE	020503
9990644101063022	98109941	2	3	TURTLE	020503
518000069033	95170688	2	3	TURTLE	040303
625203026009	95170689	2	3	TURTLE	061203
625205062022	98109639	2	3	TURTLE	082703
542306087058	95170570	2	3	TURTLE ABB	022004
530000064017	98706365	2	3	TURTLE	091404
619402058064	93970372	2	3	TURTLE	032005
625105069029	93970320	2	3	TURTLE	052405
542202048046	95170456	2	3	TURTLE	071405
547103028045	98109704	2	3	TURTLE	082305
548000012035	95170612	2	3	TURTLE	101205
536102015048	93970273	2	3	TURTLE	113005
530000024003	98109633	2	3	TURTLE	013106
541103033045	98109979	2	3	TURTLE	040406
631304044030	95170823	2	3	TURTLE	060506
619000013030	95170731	2	3	TURTLE	081106
535101039054	93970257	2	3	TURTLE	111006
542202047071	93970044	2	3	TURTLE	051107

Exhibit A
Page 1 of 2

LOCATION	METERNO	MANUFCODE	TYPE	DESCRIPTION	LAST TEST DATE
541000069028	98706330	2	3	TURTLE	083007
548405033047	98706161	2	3	TURTLE	032808
548405033053	98706166	2	3	TURTLE	073108
548405033021	98706139	2	3	TURTLE	101408
542305068001	98109587	2	3	TURTLE ABB	020909

TOTAL RECORDS 32

Exhibit B
page 2 of 2

Exhibit B

MANUFACTURER'S CODE 06			#OF METERS		342	
Sample Size					20	
Sum of Measurements					2001.06	
Sum of Squared Measurements					200215.272	
Correction Factor					200212.056	
Corrected Sum of Squares (SS)					3.21542	
Variance					0.16923263	
Estimate of Lot Standard Deviation					0.41137894	
Sample Mean					100.053	
Upper Specification Limit					102	
Lower Specification Limit					98	
Quality Index Q_u					4.73286261	
Quality Index Q_L					4.99053258	
Estimate of Lot Percent Ncf. Above U					0	
Estimate of Lot Percent Ncf. Below L					0	
Total Estimate of Percent Ncf. In Lot					0	
Maximum Allowable Percent Ncf.					6.18	*PASS*
1	100.13					
2	100.08					
3	100.13					
4	100.05					
5	100.16					
6	99.93					
7	100.19					
8	98.57					
9	100.18					
10	100.07					
11	100.18					
12	99.95					
13	100.92					
14	99.83					
15	100.16					
16	100.13					
17	100.29					
18	99.9					
19	100.18					
20	100.03					