**COMMONWEALTH OF KENTUCKY**

**BEFORE THE PUBLIC SERVICE COMMISSION OF KENTUCKY**

**In the Matter of:**

| | | |
|---|---|---|
| **ELECTRONIC APPLICATION OF TAYLOR COUNTY RURAL ELECTRIC COOPERATIVE CORPORATION FOR APPROVAL OF SAMPLE METER TESTING PROGRAM FOR SINGLE-PHASE METERS** | **)** **)** **)** **)** **)** | **CASE NO. 2021-00181** |

## APPLICATION

Taylor County Rural Electric Cooperative Corporation ("Taylor County RECC"), whose corporate address is 625 West Main Street, PO Box 100, Campbellsville, Kentucky, 41719-0100, acting by counsel, hereby applies for the Commission's approval of its proposed single-phase sample meter testing program. The applicant advises the Commission as follows:

1. Such proposed plan is set forth in the attached six-page presentation prepared by Power System Engineering Inc. on or about April 4, 2021.
2. The proposed procedure is offered in compliance with Section 16 - Sample Testing of Single-Phase Meters appearing at KY-PSC 807 KAR 5:041.
3. The statistical methods in American National Standard ANSI/ASQC Z1.9-2008 (Sample Procedures and Tables for Inspection) will be used to analyze the test results. Future testing levels will be determined from this methodology.

4. The sample meter test program will allow Taylor County RECC to reduce operational costs estimated at $691,707.00 over the eight-year cycle, with no sacrifice of meter testing accuracy or integrity.

WHEREFORE, Taylor County RECC prays the Commission's consideration and approval of the aforestated Meter Testing Program as submitted.

Dated this 23rd day of April, 2021.

Respectfully submitted,

/s/ Robert Spragens, Jr.____
Robert Spragens, Jr., Esq.
SPRAGENS & HIGDON, PSC
15 Court Square, P.O. Box 681
Lebanon, Kentucky 40033
(270) 692-3141
(270) 692-6693 (fax)
rspragens@spragenshigdonlaw.com
***Counsel for Taylor County Rural Electric Cooperative Corporation***

# Taylor County Rural Cooperative Corporation
# Proposed Plan to Implement
# Sample Meter Testing Program on
# Single-Phase 1S/2S

Prepared by
Ken Cooper
Power System Engineering Inc.
April 4, 2021

# Proposal for Single-Phase 1S/2S Sample Meter Testing Program

## Introduction:

Taylor County Rural Electric Cooperative Corporation (TCRECC) is an electric distribution cooperative located in central Kentucky. Serving 27,093 members in Adair, Casey, Cumberland, Green, Hart, Marion, Metcalfe, Russell and Taylor counties. TCRECC is presently using and on schedule with the eight-year meter testing program. Once adopting the sample meter testing program, TCRECC will make significant steps toward maximizing efficiency in their single-phase meter testing program. The purpose of this proposal is 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. TCRECC will comply with the PSC's requirements related to the sampling and testing of meters as provided in 807 KAR 5:006 and 5:041. TCRECC would like to implement the sample meter testing plan as submitted in this application.

## Procedures:

The table below illustrates that meters will be divided into separate homogeneous groups based on manufacturer and type. Due to the large number of meters purchased as TCRECC deployed their AMI system in 2007, this group of meters will be divided into smaller groups of approximately 1,000 meters by serial number.

| Manufacture | Type | Form | Inventory |
|---|---|---|---|
| Itron | Centron | 2S | 22,500 |
| Landis+Gyr | Focus | 2S | 2,500 |
| Aclara | I-210 | 2S | 1,000 |

TCRECC statistical meter sample testing will follow the ANSI/ASQC Z1.9-2008 standard (Sampling Procedures and Tables for Inspection). Each test group will be randomly sampled by a computerized process. TCRECC will use their customer information and billing system for this process.

The Acceptance Quality Level (AQL) is defined as the quality level that is the worst tolerable product average when a continuing series of lots are submitted for acceptance sampling.

## Procedures (cont.):

Due to the +/- 2% limits, the sample groups shall be tested using an AQL of 2.5. This value can be found in Table A-1. The upper and lower 2% limits require the use of the Double Specification Limit method as outlined in this ANSI Standard.

Newly purchased and/or 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 will require the formation of new groups or set of groups. The formation of any new group will adhere to the same maximum lot size of 1,000 and testing methodology outlined within this sample meter testing plan. Table A-2 provides the sample size code letters that are then to be referenced in Table B-3. The “Normal Inspection” portion of the Table B-3 is then used to determine the sample size for each test group.

TCRECC will sample test new meters using an Inspection Level 1 and an AQL 1.0.

Randomly selected meters from each lot will be tested by the meter shop personnel. If a selected meter is damaged or non-registering that are not a manufacturer’s defect or the meter was exposed to abnormal conditions, these meters will be replaced by another random selection.

The meters tested are under full load, light load and at 50 percent power factor at full load in accordance with 807 KAR 5:041 Section 17(1).

Watthour meters shall be retired when the error in registration exceeds 1% at either light load or full load.

Each lot, calculation will be based on Double Specification Limit Variability Unknown-Standard Deviation Method. Full load and light load test results will be evaluated based on ANSI/ASQC Z1.9-2008 standards.

Performance shall be deemed acceptable if the full load and light load performance of the meters is within the lot meet acceptability criteria of the ANSI standard. If a lot is classified as failed, TCRECC will test the entire lot of meters within 18 months from them failing the applicable governing standard.

No meter will remain in service without a periodic test for a period longer than twenty-five years.

An annual report (showing each lots performance) and a copy of manufacturer’s new meter test data will be available to the KY PSC.

If TCRECC should suffer an operational hardship due to this requirement, a request for deviations may be filed.

## Procedures (cont.):

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

Table A-1[2]
AQL Conversion Table

| For specified AOL 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 | 0.669 | 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[3]
Sample Size Code Letters

| 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 | I |
| 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 |

## Procedures (cont.):

Table B-3[4]
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 | ↓ | 0.005 | 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 | 20.73 |
| 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 | 0.946 | 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) | | | | | | | | | | | |

## Cost Savings/Conclusions:

A Substantial reduction in cost will be achieved by implementing the sample meter test program. Once the program is established, only a small percentage of the present labor and testing efforts will be required. This reduction results in cost savings without compromising single phase metering accuracy. The comparison below shows the cost for TCRECC when doing testing under both Periodic and Sample testing programs.

***Cost Savings to Taylor County RECC due to change to Meter Sample Testing program:***

**Assumptions:**

Current periodic testing would require testing of 4,000 meters annually. Where sample meter testing program will require 1,000 meters annually to be tested.

| **Annual Periodic Testing Program Cost** | | |
|---|---|---|
| Average Meters Tested Annually | Cost to Test | Annual Cost |
| 3847 | $30.37 | $116,833 |
| Cost of Testing over 8 year cycle | | $934,667 |

| **Proposed Sample Meter Program Testing Cost** | | |
|---|---|---|
| Meters to be Tested | Cost to Test | Annual Cost |
| 1000 | $30.37 | $30,370 |
| Cost of Testing over 8 year cycle | | $242,960 |

**Potential Savings over 8 years** **$691,707**