



STATE OF NEW JERSEY

Board of Public Utilities

44 South Clinton Avenue, 3rd Floor, Suite 314

Post Office Box 350

Trenton, New Jersey 08625-0350

www.nj.gov/bpu/

RELIABILITY & SECURITY

IN THE MATTER OF THE VERIFIED PETITION OF)	DECISION AND ORDER
JERSEY CENTRAL POWER & LIGHT COMPANY FOR)	
AUTHORIZATION TO REVISE: THE STATISTICAL)	
SAMPLING ASPECTS OF ITS ELECTRIC METER)	
TESTING PROGRAM PURSUANT TO N.J.A.C. 14:5-4.2,)	
AND THE FORM OF QUARTERLY REPORTING OF)	
METER TEST RESULTS PURSUANT TO N.J.A.C. 14:3-)	
4.7)	DOCKET NO. EO18101187

Party of Record:

Michael J. Connolly, Esq., Jersey Central Power & Light

BY THE BOARD:

The New Jersey Board of Public Utilities ("Board") has jurisdiction to oversee the electric meter sampling program pursuant to N.J.A.C. 14:5-4.2, Periodic Testing of Electric Meters. The primary purpose of this rule is to establish meter sampling techniques to ensure electric meter accuracy. The four (4) regulated electric distribution companies in the State of New Jersey are Public Service Electric and Gas Company, Atlantic City Electric, Jersey Central Power & Light ("JCP&L") and Rockland Electric Company, ("EDCs"). The role of Board Staff ("Staff") is to monitor the EDCs meter testing programs.

N.J.A.C. 14:5-4.2 Periodic Testing of Electric Meters, requires electric meters to be tested on different intervals depending on kilowatt rating or if it is a self-contained single-phase meter and three-wire network meters (most residential electric meters fall into this category), at least once in eight years or by a variable interval or statistical sampling technique approved by the Board. For any meter tested, results must be within the adjustment limits of no more than two percent as per N.J.A.C. 14:3-4.6 (a), Adjustment of charges for meter error.

Currently each EDC has a sampling plan approved by the Board. These plans were approved by the Board at various times and lacked uniformity. Staff initiated a process to review meter sampling data to evaluate current meter sampling programs. Staff reviewed six (6) years of data from each EDC's meter sampling program. Following the evaluation, Staff was able to draw several conclusions. First and foremost, a uniform sampling technique is not utilized by the EDCs across the industry to evaluate electric meter accuracy results. Specifically, the

percent of meters tested by each of the EDCs varies. Staff further determined that a national standard consistent with the American National Standards Institute ("ANSI") guidelines should be adopted. Staff held multiple meetings with the EDCs to discuss updating the sampling techniques, to agree upon a uniform methodology that would be consistent with national guidelines, and to come to a consensus on a single plan which would benefit the public. Staff and the EDCs came to a consensus on an appropriate sampling plan based on inspection by variables. The correct protocol would utilize the ANSI Z1.9¹ guidelines.

Following the meetings with staff, on October 24th, 2018 JCP&L filed a petition seeking Board approval of an updated meter sampling program applying the ANSI Z1.9 standard.

By letter dated February 22, 2019, Rate Counsel indicated that it did not object to the plan so long as no special rate treatment will be accorded to JCP&L.

DISCUSSION AND FINDINGS

The Board's rules at N.J.A.C. 14:5-4.2 provide that self-contained single-phase meter and three-wire network meters (most residential electric meters fall into this category), at least once in eight years or by a variable interval or statistical sampling technique approved by the Board. By and through this Petition, JCP&L seeks Board approval of an updated meter sampling program.

The Board notes that the ANSI Z1.9 guidelines, and the agreed upon protocol with the EDCs would create a comprehensive sampling program with clear guidelines which can be referenced and monitored, allowing for more precise and consistent reports. ANSI Z1.9 is a statistical sampling program published by The Statistics Subcommittee of the Accredited Standards Committee Z1 on Quality Environment, Dependability and Statistics. This publication is peer reviewed, and utilizes current statistical models. The utilization of this program by all of the EDCs will provide uniformity and certainty higher level of confidence with regard to the testing of meters as required by the Board's regulations. Additionally, updated reports and forms will provide staff with appropriate information to continue to review and monitor JCP&L's meter sampling.

The Board **FINDS** that, based on the record in this matter, Staff has generated quarterly data reporting forms and concise instructions derived from ANSI Z1.9. The Board also **FINDS** that the newly adopted standard will hold meter accuracy to a stricter, nationally recognized standard that is peer reviewed and accredited and groups of nonconforming meters will more easily be identified and repaired or replaced. As a result, the EDCs Meter Sampling Program will produce statistically sound results which are not only uniform throughout the EDCs, but also provide a positive benefit in serving the public interest.

Accordingly, the Board **HEREBY ORDERS** that the JCP&L shall use the techniques outlined in the attached instructions which are consistent with ANSI Z1.9 and the forms and instructions derived by Staff to report quarterly meter testing results. The quarterly reporting forms are attached to this Order as Exhibit A and shall be used as guidelines for the approved electric meter sampling program.

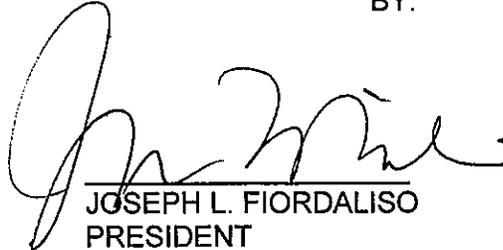
¹ The Statistics Subcommittee of the Accredited Standards Committee Z1 on Quality, Environment, Dependability and Statistics (2013, October) ANSI/ASQ Z1.9-2003 (R2013) Sampling Procedures And Tables For Inspection By Variables For Percent Nonconforming.

After consideration of the matters, the Board **FURTHER FINDS** these revisions to be reasonable and in the public interest and **HEREBY ACCEPTS** these revisions. The revised meter sampling program shall be implemented on January 1, 2020, to allow the industry time to update their meter sampling programs.

This Order shall be effective on April 8, 2019.

DATED: 3/29/19

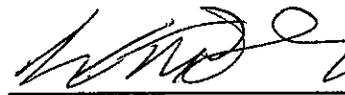
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BY:

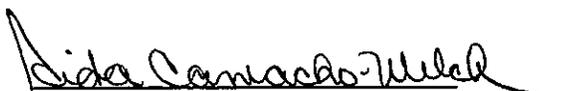

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AIDA CAMACHO-WELCH
SECRETARY

I HEREBY CERTIFY that the within
document is a true copy of the original
in the files of the Board of Public Utilities.

**IN THE MATTER OF THE VERIFIED PETITION OF JERSEY CENTRAL POWER & LIGHT
COMPANY FOR AUTHORIZATION TO REVISE: THE STATISTICAL SAMPLING ASPECTS
OF ITS ELECTRIC METER TESTING PROGRAM PURSUANT TO N.J.A.C. 14:5-4.2, AND
THE FORM OF QUARTERLY REPORTING OF METER TEST RESULTS PURSUANT TO
N.J.A.C. 14:3-4.7**

DOCKET NO. EO18101187

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**New Jersey Board of Public Utilities
44 South Clinton Avenue
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Trenton, NJ 08625**

**ELECTRIC METER SAMPLING RETURN COVER SHEET
IN CONJUNCTION WITH ANSI Z1.9**

**INSTRUCTIONS: THIS COVER SHEET SHALL BE FILLED OUT AND RETURNED WITH THE
GAS METER TEST RESULTS**

**FROM: COMPANY:
RESPONSIBLE PERSON:
ADDRESS:
ADDRESS:
ADDRESS:**

TESTING PERIOD:

**TO: THE NEW JERSEY BOARD OF PUBLIC UTILITIES
44 SOUTH CLINTON AVE.
P.O. Box 350
TRENTON, NJ 08625**

PLEASE FILL IN THE APPROPRIATE INFORMATION BELOW.

**I,
Position/Title:
Company:**

**Do hereby certify that the within report consisting of this sheet and supplementary
sheets have been prepared under my direction, that I have examined the said
report and to the best of my knowledge and belief, the information contained herein
is a correct report of all meter tests made by the Company during the
period stated.**

Signature:

Date:



STATE OF NEW JERSEY
BOARD OF PUBLIC UTILITIES
44 SOUTH CLINTON AVE.
P.O. BOX 350
TRENTON, NJ 08625-0350

TABLE III
TALLY OF METERS TESTS DUE TO "CUSTOMER COMPLAINTS" AND "OTHER REASONS"
COMPANY: _____
YEAR/QUARTER: _____

	1ST QUARTER	2ND QUARTER	3RD QUARTER	4TH QUARTER	YTD TOTAL	COMMENTS
	# METER TESTS PERFORMED					
CUSTOMER COMPLAINTS TO OTHER REASONS						



STATE OF NEW JERSEY
BOARD OF PUBLIC UTILITIES
44 SOUTH CLINTON AVENUE
P.O. BOX 350
TRENTON, NJ 08625-0350

ELECTRIC METER REPORTING INSTRUCTIONS IN CONJUNCTION WITH ANZI 1.9

A. REGULATIONS

The following regulations shall be adhered to:

- N.J.A.C. 14:3-4.4* Testing of Utility Meter Testing Equipment
- N.J.A.C. 14:5-4.1* Testing of Electric Meters
- N.J.A.C. 14:5-4.2* Periodic Testing of Electric Meters
- N.J.A.C. 14:5-4.3* Determination of Electric Meter Accuracy
- N.J.A.C. 14:5-4.5* Readjustment of Electric Meters
- N.J.A.C. 14:3-4.7* Meter test reports and records

B. DATA SHEETS

The attached data spread sheets shall be used to report electric meter tests results to the New Jersey Board of Public Utilities. The five spread sheets are:

1. Cover Sheet
2. Table I – Statistical Sampling Data Sheet
3. Table II – Periodic Meters Data Sheet
4. Table III – Customer Complaints and “Other Reasons”
5. Table IV Rejected Meter Removal Data Sheet

The meter testing information shall be entered correctly and submitted to NJBPU in a timely fashion (see section K below) to satisfy *N.J.A.C. 14:3-4.7*.

C. REQUIRED ANSI Z1.9 PROTOCOL

The reference text **ANSI/ASQ Z1.9-2003(R2013)**, Sampling Procedure and Tables for Inspection by Variables for Percent Non-conforming is used to analyze meter test data results. The ANSI Z1.9 protocol requires a series of calculations done in a specific order. Values are calculated and it is determined by comparison to a pre-determined constant if a lot passes.

The specific protocol: "Double Specification Limit, Variability Unknown-Standard Deviation Method" requires the maximum and minimum allowable values to be part of the calculation sequence. Hence, if it is decided to make the test more stringent due to changing electric meter technology, one can adjust the maximum and minimum values, as well as the Assurance Quality Limit (AQL) and Inspection Level. This protocol can be found on pp 38 -54. An example of this ANSI Z1.9 protocol can be found in section G.

D. TESTING PROCEDURES CONSTANT PARAMETERS

PHASE ONE METERS: NEWLY PURCHASED METERS

1. Assurance Quality Limit (AQL): kept constant at 10.0, or increased stringency.
2. Inspection Level: kept constant at Level II, or increased stringency.
3. All refurbished and rebuilt meters shall be tested before being placed back into service.

PHASE TWO METERS: AT FIVE YEARS OF SERVICE

1. Assurance Quality Limit (AQL): kept constant at 10.0, or increased stringency.
2. Inspection Level: kept constant at Level II, or increased stringency.

PHASE THREE METERS: AT TEN YEARS OF SERVICE

1. Assurance Quality Limit (AQL): kept constant at 10.0, or increased stringency.
2. Inspection Level: Level II, or increased stringency.

The above parameters shall not be changed.

E. DETERMINATION OF SAMPLE SIZE AND M VALUE

1. Determine the sample size code letter from Table A-2, Sample Size Code Letters.
2. Go to Table B-3. Use the Sample Size Code Letter and AQL to determine the sample size and M value. The M value is the percentage of meters allowed to be non-conforming and will be used in the latter end of the calculations. Note that for normal and tightened inspections the same table is used.

The number of required meter tests for the year can be distributed over four quarters. The final conclusion as to whether or not a type passes does not have to be concluded until December 31 of the test year. If it is apparent that a group will fail, all remaining tests still must be completed by the end of the year.

F. EXPLANATION OF CALCULATIONS

The first section gives a brief description of sequence of calculations. Section G cites an example from ANSI Z1.9.

1. Determine sample size.
2. Total the meter readouts.
3. Total the square of the meter readouts.
4. Calculate a correction factor: follow the calculations in the example below.
5. Correct the sum of the squares: follow the calculations in the example below.
6. Calculate the variance: follow the calculations in the example below.
7. Estimate the standard deviation: follow the calculations in the example below.
8. Calculate the sample mean: follow the calculations in the example below.
9. State the Upper Specification Limit, U: 102
10. State the Lower Specification Limit, L: 98
11. Calculate the upper Quality Index Q_U .
12. Calculate the lower Quality Index Q_L .
13. Estimation of percent non-conforming above U, the upper specification limit. This is equal to P_U .
14. Estimation of percent non-conforming below U, the lower specification limit. This is equal to P_L .
15. Calculate the total estimated percent non-conforming, this is equal to P. $P = P_U + P_L$
16. Determine M, the maximum allowable percent non-conforming. The value is found in table B-3.
17. The acceptability Criterion: compare P with M. If P is less than M, the lot passes. Else, the lot fails.

G. EXAMPLE OF ANSI Z1.9 CALCULATIONS

The example is found on page 40 of the above noted ANSI manual, it is titled: "Example B-3, Example of Calculations, Double Specification Limit, Variability Unknown-Standard Deviation Method, One AQL Value for Both Upper and Lower Specification Limit Combined". The example illustrates the step by step procedure to assess meter testing results. In this specific example, the maximum and minimum limits being 209°F and 180°F, respectively. Inspection level II and the AQL = 1%.

EXAMPLE B-3

Example of Calculations

Double Specification Limit

Variability Unknown—Standard Deviation Method

One AQL Value for Both Upper and Lower Specification Limit Combined

Example: The minimum temperature of operation for a certain device is specified as 180°F. The maximum temperature is 209°F. A lot of 40 items is submitted for inspection. Inspection Level II, normal inspection, with AQL = 1% is to be used. From Tables A-2 and B-3 it is seen that a sample of size 5 is required. Suppose the measurements obtained are as follows: 197°, 188°, 184°, 205°, and 201°; and compliance with the acceptability criterion is to be determined.

Line	Information Needed	Value Obtained	Explanation
1	Sample Size: n	5	
2	Sum of Measurements: ΣX	975	
3	Sum of Squared Measurements: ΣX^2	190,435	
4	Correction Factor (CF): $(\Sigma X)^2/n$	190,125	$(975)^2/5$
5	Corrected Sum of Squares (SS): $\Sigma X^2 - CF$	310	$190,435 - 190,125$
6	Variance (V): $SS/(n - 1)$	77.5	$310/4$
7	Estimate of Lot Standard Deviation s: V	8.80	77.5
8	Sample Mean \bar{X} : $\Sigma X/n$	195	$975/5$
9	Upper Specification Limit: U	209	
10	Lower Specification Limit: L	180	
11	Quality Index: $QU = (U - \bar{X})/s$	1.59	$(209 - 195)/8.80$
12	Quality Index: $QL = (\bar{X} - L)/s$	1.70	$(195 - 180)/8.80$
13	Est. of Lot Percent Ncf. above U: pU	2.19%	See Table B-5
14	Est. of Lot Percent Ncf. below L: pL	0.66%	See Table B-5
15	Total Est. Percent Ncf. in Lot: $p = pU + pL$	2.85%	$2.19\% + 0.66\%$
16	Max. Allowable Percent Ncf.: M	3.33%	See Table B-3
17	Acceptability Criterion: Compare $p = pU + pL$ with M	$2.85\% < 3.33\%$	See Para. B12.1.2(7)

The lot meets the acceptability criterion, since $p = pU + pL$ is less than M. This calculation cannot be performed until all meters are tested.

H. TEST RESULTS

The categories for test results are:

- 1) Slow = <98% accurate
- 2) Accurate = 98%-102% accurate
- 3) Fast = > 102% accurate
- 4) indeterminate accuracy
- 5) Does not register (DNR)

I. TESTING SCHEMES

Scheme 1: A type is tested using the normal testing procedure and is accepted. Testing is continued under the normal inspection protocol the following calendar year.

Scheme 2: A type is tested using the normal testing procedure and is not accepted. Testing is continued for the rest of the year. The following year the type is tested using the tightened protocol. See 2A, 2B and 2C below.

Scheme 2A: Utilizing the tightened protocol: if five consecutive lots (five consecutive calendar years) are accepted, the type is returned to the normal protocol.

Scheme 2B: Utilizing the tightened protocol: if two consecutive lots fail, the type is rejected. The entire type is replaced in four years. See item J below.

Scheme 2C: Utilizing the tightened protocol: if two of five consecutive lots fail, the type is rejected. The entire type is replaced in four years. See item J below.

J. FIVE YEAR REPLACEMENT PROTOCOL FOR REJECTED TYPES

A rejected type shall have all meters replaced by the end of five years. All data shall be recorded in Table IV of this document.

K. DUE DATES

Pursuant to *N.J.A.C. 14:3-4.7*: "Each utility shall provide the Board with summaries of all meter tests. Each utility have 500 or more meters shall report quarterly. Utilities having less than 500 meters shall report annually."

The quarterly reports are due:

- 1st Quarter: May 31
- 2nd Quarter: August 31
- 3rd Quarter: November 30
- 4th Quarter: March 31

L. ANNUAL REPORT: N.J.A.C. 14:3-4.4(b)

There are two methods to satisfy the above regulation a or b below.

a. Pursuant to *N.J.A.C. 14:3-4.4 (b)* to comply with *N.J.A.C. 14:3-4.4* a utility "must have its meter testing equipment tested and sealed by NJ Weights and Measures"

or

b. Both of the following requirements must be met:

1. "Have its meter testing equipment tested and certified by a laboratory approved and recognized by National Institute of Standards and Technology (NIST) with testing equipment traceable to NIST."

Supporting documents shall be supplied to NJBPU staff each year. Attach to a quarterly report on a cyclic yearly basis.

2. "Prior to utilizing the equipment for compliance with this subchapter, submit to the Board a written approval, issued by the Superintendent of NJ Weights and Measures, accepting the laboratory that performed the certification for purposes of compliance with this subchapter."

To be done once, unless there is a change in the laboratory doing the certification.

M. RETENTION OF DATA

Manufacturers' test data shall be retained for the in-service life span of all meters plus 6 years.

The last meter test data results shall be retained.

N. PERIODIC METER TESTING

Periodic meters shall be tested by the end of the year tests are due. If a meter cannot be tested the reason must be noted for each meter.

TABLE I: ELECTRICAL STATISTICAL SAMPLING DATA

Meter Population Grouping and Sub-Groups

Meter populations are grouped by: Group Designation I (Column A) and Group Designation II (Column B). Grouping entails using "like" significant characteristics or similar characteristics of operation.

Large group designations may be subdivided into smaller groups for testing based on significant like characteristic(s) or similar characteristic(s) of operation. In addition it may be necessary to create a subgroup when an error is identified. This change in group must be clearly noted in the report for the period in which the change occurred.

When a group's population becomes too low to reasonably sample, it may be necessary to combine two or more groups with significant like characteristics or similar characteristics of operation. This change in group must be clearly noted in the report for the period in which the change occurred.

An example of meters with "like" characteristics: a utility purchased a model AC250 meter over a several year period. It was set in 1995 in three locations, A, B and C. The number of meters set in each location is 7062, 4473 and 9825, respectively. In addition, 675 were set in 2004 and 38 were set in 1956, each in a different location. Each group may be independent of each other.

The chart would resemble such:

<u>AC250 Group</u>	<u># METERS IN SERVICE (see item B below)</u>
AC250-A	7062
AC250-B	4473
AC250-C	9825
AC250-2004	675
AC250-1956	38

Each is referred to as a "line item". It is satisfactory to use the term families, but families do not exist with respect to determining the number of meters to be tested.

COLUMN A: GROUP DESIGNATION I

Designate a characteristic for each group. If additional characteristics are required, use Column B.

COLUMN B: GROUP DESIGNATION II

List any additional characteristics for the Group in Column A.

Note: Column A and Column B are where the groups are clearly broken into populations for random sampling. These groups shall not change unless clearly noted in the report for the period in which the change occurred.

COLUMN C: # IN SERVICE

Column C requires a tally of the total number of meters in service per Group.

Each meter in service must satisfy the two parameters below:

1. Stationed on customers' premises, in use, recording customer usage.
2. Generates revenue for the utility.

COLUMN D: NORMAL OR TIGHTENED (N/T)

Enter N or T depending upon whether or not the normal or tightened protocol is used, respectively.

COLUMN E: # TESTS DUE

Enter the number of meter tests due per each line item

COLUMNS F THRU I: THE NUMBER OF METERS TESTED FOR EACH QUARTER

This is the number of meters tested for each quarter for each "line item". At the end of the fourth quarter, the year-to-date total number of meters tested shall be equal to the number of meter tests required for the entire year.

COLUMN J # METERS TESTED (YTD)

Enter the number of meters tested year-to-date. Hence, this value changes every quarter.

COLUMN K: # SLOW METERS FOR THE QUARTER

Enter the number of slow meters, i.e. have an accuracy of <98% for the quarter.

COLUMN L: # ACCURATE METER FOR THE QUARTER

Enter the number of meters that are accurate, i.e. have an accuracy of 98-102% for the quarter.

COLUMN M: # FAST METERS FOR THE QUARTER

Enter the number of meters that are fast, i.e. have an accuracy of >102% for the quarter.

COLUMN N: #FAULTY METERS FOR THE QUARTER

Faulty meter(s) are meters that DNPG, DNR or are IND.

COLUMN O: ACCEPTED (AC) OR REJECTED (RE)

Do not fill in this information until the required number of meters are tested.

Once testing is complete, i.e. all of the required number of meters are tested, determine if the type is accepted (AC) or rejected (RE). Enter the appropriate conclusion.

COLUMN P: COMMENTS

Enter any pertinent comment(s).

TABLE II: PERIODIC METERS TEST DATA

Table II is used to tally periodic meters test results. That the meters are periodic, 100% of the meters with tests due shall be tested by the end of the cycle year.

COLUMN A: GROUP DESIGNATION I

Designate a characteristic for each group.

COLUMN B: GROUP DESIGNATION II

List any additional characteristics for the Group in Column A.

COLUMN C: NUMBER IN SERVICE FIRST OF YEAR

List the number of meters in service first of the year for each group.

Each meter in service must satisfy the two parameters below:

1. Stationed on customers' premises, in use, recording customer usage.
2. Concurrently generates revenue for the utility.

COLUMN D: TOTAL NUMBER OF METERS DUE FOR TESTING FOR THE YEAR

Tally the number of meters required to be tested for each group.

COLUMN E: METER TESTING CYCLE: PER N.J.A.C. 14:6-4.2

Enter the appropriate cycle (in years) for the meter model.

COLUMN F THRU I: NUMBER OF METERS TESTED (FOR EACH QUARTER)

This is the total of meters tested for each quarter. When entering the data for the fourth quarter, the year-to-date information shall be equal to the number of meters tested for the entire year.

COLUMN J: YTD # METERS TESTED

Enter the total of meters tested year-to-date, i.e. cumulative. Hence the value will change with every quarter.

COLUMN K: # METERS THAT ARE SLOW (YTD)

Enter the total of meters that are slow.

COLUMN L: # METERS THAT ARE ACCURATE (YTD)

Enter the total of meters that are accurate.

COLUMN M: # METERS THAT ARE FAST (YTD)

Enter the total of meters that are fast.

COLUMN N: FAULTY/DNR/DNPG METERS (YTD)

Enter the total of meters that DNPG, DNR or are faulty.

COLUMN O: COMMENTS

Enter any pertinent comments.

TABLE III

TALLY OF TESTS PERFORMED DUE TO CUSTOMER COMPLAINTS AND "OTHER REASONS"
(COMBINED)

Table III is used to tally all meter test results that are conducted due to "customer complaints" and "other reasons". Each quarter combine both totals for each category and enter in the table.

TABLE IV – REJECTED METERS

Table IV chronologically tallies the removal of rejected meters. A rejected meter is a meter removed from “in-service” due to individual or type accuracy flaws. Meters are logged into the table when they are first rejected, noting the reason for the rejection. Every quarter post-rejection, for four years, the meters are added to the tally to highlight how many meters are removed and how many meters are remaining “in-service”. All meters to be removed within years.

COLUMN A: TYPES

List the meter type.

COLUMN B: REJECTION DATE

List the month and year of rejection. A utility may have identical meter types with different rejection dates, and hence shall be independently listed.

COLUMN C: # TOTAL NUMBER OF REJECTED METERS

This is the number of in-service meters that are rejected, i.e. the entire number of meters in the rejected group.

COLUMN D: # METERS REPLACED

This is the number of rejected meters replaced at year 0, reported quarterly.

COLUMN E: # METERS IN SERVICE AT THE END OF YEAR 0.

This is number of rejected meters remaining at the end of each quarter for year 0.

COLUMNS F: # METERS REPLACED DURING YEAR 1

This is the number of meters in the rejected group that are removed during year 1, one year post rejection.

COLUMN G: # METERS IN SERVICE AT THE END OF YEAR 1

After meters are removed one year post rejection, this is the number of meters remaining.

COLUMN H: # METERS REPLACED DURING YEAR 2

This is the number of meters in the rejected group that are removed two years post rejection.

COLUMN I: # METERS IN SERVICE AT THE END OF YEAR 2

This is the number of meters remaining at the end of year two after meter removal.

COLUMN J: # METERS REPLACED DURING YEAR 3

This is the number of meters in the rejected group that are removed three years post rejection.

COLUMN K: # METERS IN SERVICE AT THE END OF YEAR 3

This is the number of meters remaining at the end of year three after meter removal.

COLUMN L: METERS REPLACED DURING YEAR 4

This is the number of meters in the rejected group that are removed four years post rejection.

COLUMN M: METERS IN-SERVICE AT THE END OF YEAR 4

This is the number of meters remaining at the end of year four after meter removal. All rejected meters shall be removed.

COLUMN N: COMMENTS

Note why the meter type was rejected. This shall be entered Year 0.

IV. PROPOSED REVISION TO ELECTRIC METER TESTING PROGRAM

A. Proposed Revision to Company Electric Meter Testing Program

11. JCP&L requests authorization under N.J.A.C. 14:5-4.2(c)² to revise its statistical sampling meter testing plan with respect to the method used to select certain self-contained meters for testing as follows:

a. The standard for acceptable electric meter accuracy shall be in accordance with (i) ANSI C12.1, Section 5.1.2.2 (*Acceptable Performance*), which provides that “[t]he performance of all watthour meters is considered to be acceptable when the percent registration is not less than 98% or more than 102%,” and (ii) N.J.A.C. 14:5-4.3(a) (*Determination of electric meter accuracy*), which provides that “[n]o meter that has an error in registration of more than plus or minus two percent shall be placed in service or allowed to remain in service without adjustment.”

b. All self-contained single phase and three-wire network electric meters, as well as self-contained three-phase meters,⁴ shall be eligible for inclusion in the statistical sampling meter testing program (as an alternative to the Company’s periodic testing program as required by N.J.A.C. 14:5-4.2(c)).

c. The Company’s statistical sampling meter testing program shall be in accordance with ANSI Z1.9, following the Figure 1 Flow Chart for use of ANSI Z1.9, specifically, Section B (*Variability Unknown – Standard Deviation Method*), Part II (*Double Specification Limit*), Table B-3 (*Variability Unknown – Standard Deviation Method for Double Specification Limit*) at General Inspection Level II (See ANSI Z1.9, Section A (*General Description of Sampling Plans*), Section A7 (*Sample Selection*), subsection

⁴ As discussed at the collaborative meeting between Board Staff and the EDCs on March 13, 2017.

A7.1 (*Determination of Sample Size*) and Table A-2 (*Sample Size Code Letters*)), copies of which are attached hereto as Exhibit A.

d. The population of electric meters included in the statistical sampling meter testing program shall be divided into homogeneous groups (also referred to as lots), such as manufacturer and manufacturer's type/model. The groups/lots may be further divided into subdivisions/subgroups within the manufacturer's type/model by major design modifications or other attributes such as the ANSI form number or the year of manufacture/purchase.

i. JCP&L's groupings, as proposed, are currently comprised of homogenous sample groups/lots. Each lot consists of meters of a type manufactured under essentially the same conditions and design. See ANSI C12.1, Section 5 (*Standards for In-service performance*), subsection 5.1.4.3 (*Test plans*) and subsection 5.1.4.3.3 (*Statistical sampling plan*)), a copy of which is attached as Exhibit B-1 hereto, and ANSI Z1.9, Section A5.1.1 (*Formation of Lots*), a copy of which is attached as Exhibit B-2 hereto.

ii. The groupings shall be identified by the Company and submitted to Board Staff as part of the Company's quarterly meter test report submitted pursuant to N.J.A.C. 14:3-4.7 (which reporting is discussed further herein).

iii. Once established, the groupings shall remain consistent, except that (1) new groups/lots may be added as needed as a result of new meter purchases and manufacturer design changes; and (2) the consolidation of existing groupings shall be reported to the Board Staff in the quarterly report.

e. Annual selection of meters for testing shall be on a random basis where each meter within each group/lot has an equal chance of being selected.

f. The Acceptance Quality Limit (“AQL”) for acceptance or rejection of a group/lot shall be 10 percent (10%) nonconforming.⁵

i. According to ANSI Z1.9, Section A, subsection A.2.1 (see Exhibit A hereto) the “AQL is the quality level that is the worst tolerable product average when a continuing series of lots is submitted for acceptance sampling.” A copy of ANSI Z1.9, subsection A.4 (*Acceptance Quality Limit*) is attached hereto as Exhibit C.

g. The AQL shall be applied to the upper and lower limits using the double specification limit methodology.

i. JCP&L’s “Process Flow” for its statistical sampling meter testing plan follows: ANSI Z1.9, Section B (*Variability Unknown – Standard Deviation Method*), Part II (*Double Specification Limit*), Section B12 (*Acceptability Criterion and Summary for Operation of Sampling Plans*), subsection B12.1 (*One AQL value for both Upper and Lower Specification Limit Combined*) as summarized in subsection B12.1.2 (*Summary for Operation of Sampling Plan*), a copy of which is attached hereto as Exhibit D.

ii. The Process Flow calculations will follow ANSI Z1.9, Section B, Part II, Example B-3 (*Example of Calculations*), a copy of which is attached hereto as Exhibit E.

1. For each Lot, when test results have been determined, the average weighted accuracy (*Bar X*) and Sigma are calculated from the test results. Upper Specification Limit will be 102 and the Lower Specification Limit will be 98 for all groups. The quality indices (*QU and QL*) are then calculated. The estimated lot percent nonconforming for pU and pL are then determined from ANSI Z1.9, Section B, Table B-5 (*Table for Estimating the Lot Percent Nonconforming Using Standard Deviation Method*), a copy of which is attached hereto as Exhibit F.

⁵ The AQL of 10% was provided by Board Staff at the March 13, 2017 collaborative meeting, and confirmed at the October 3, 2018 collaborative meeting, as a consistent limit to be used by the EDCs in each of their respective revised statistical sampling meter test plans.

2. The Total Estimated Percent Non-conforming is calculated according to the formula $p = pU + pL$. If p is equal to or less than the maximum allowable percent nonconforming M , the lot meets acceptability criterion. If p is greater than M or if either QU or QL or both are negative, the lot does not meet acceptability criterion.

h. A group/lot exceeding the specified AQL shall be rejected. The determination that a group has exceeded the specified AQL and should be rejected would follow the tightened inspection procedures set forth in ANSI Z1.9 (as shown in Exhibit E and Exhibit F hereto) with the AQL held constant at 10%, and in the case of a tightened inspection, using an Inspection Level of III.

i. Upon rejection of a group/lot, JCP&L shall take corrective action, which may consist of a second sampling to determine the meter accuracy performance acceptability of the individual subgroups, which may result in:

1. acceptance;
2. a selective (*i.e.*, partial group/lot) meter removal program to improve the accuracy (*i.e.*, within acceptance quality limits) of the remaining group/lot; or
3. the removal of the entire group/lot or subgroup from service.
 - a. The rate of removal of a rejected meter group/lot or subgroup from service shall be such that the required removal is completed within five years from the date such meter group/lot or subgroup was reported as not meeting the applicable performance standards as a group/lot or subgroup.

B. Reporting of Meter Test Results

12. The Board's metering regulations also require that "[e]ach utility shall provide the Board with summaries of all meter tests. Each utility having 500 or more meters shall report quarterly." N.J.A.C. 14:3-4.7(a)

13. JCP&L's quarterly reports during each year shall be submitted to the Board no later than the last day of the month following the close of the quarter; except that the fourth quarter, year-end closing report, shall be submitted to the Board no later than the last day of March of the following calendar year.

14. Quarterly reports, including the year-end closing report, shall be submitted consistent with the formatted template set forth in Exhibit G to this Verified Petition,⁶ which is comprised of a cover sheet, template instructions and the following four spread sheets:

Table I – Electric Statistical Sampling Data Sheet

Table II – Electric Periodic Meters Data Sheet

Table III – Electric Meters Customer Complaint and Other Reasons Data Sheet

Table IV - Rejected Electric Meter Data Sheet

15. The reporting process shall be consistent with and follow the provisions of ANSI Z1.9 and shall be consistent with the requirements of N.J.A.C. 14:3-4.7, and the approved revised reporting format shall thereafter constitute the reporting form referred to in N.J.A.C. 14:3-4.7(a).

16. The Board's metering regulations also require that "the utility shall include in its annual report a copy of the letter required under N.J.A.C. 14:3-4.4(b)2." N.J.A.C. 14:3-4.7(b). Accordingly, a copy of the applicable letter from the Superintendent of the New Jersey Office of Weights and Measures ("*NJW&M*") as, and to the extent, required under N.J.A.C. 14:3-4.4(b)2.ii., accepting the laboratory (other than NJW&M) that performed the certification of the Company's meter testing equipment, shall be included in the Company's fourth quarter, year-end closing report, which, as indicated above, will be due March 31 of the following calendar year.

⁶ A draft of a revised quarterly reporting format was provided to the EDCs by Board Staff and discussed at the March 13, 2017 collaborative meeting.

a. A copy of the Company's currently applicable NJW&M letter issued February 13, 2017, which was submitted to the Board on or around March 8, 2017, is attached hereto as **Exhibit H**.

C. **Benefits of Revision to Company Electric Meter Statistical Sampling Testing Program**

17. The Company believes that the above-described revised statistical sampling meter testing protocol following ANSI Z1.9 will effectively and efficiently produce meter test accuracy results demonstrating that (i) the Company's meters are accurately functioning within the Board's guidelines; and (ii) the Company has a process to address meter groups/lots whose accuracy does not meet applicable performance standards, and therefore, will continue to satisfy the Board's objective of protecting the public interest in verifying the accuracy of electric meters in service.

V. **SUPPORTING EXHIBITS**

18. The following exhibits are provided in support of this Verified Petition:

- a. **Exhibit A** - A copy of Figure 1 Flow Chart for use of ANSI Z1.9, ANSI Z1.9, Section B (*Variability Unknown – Standard Deviation Method*), Part II (*Double Specification Limit*), Table B-3 (*Variability Unknown – Standard Deviation Method for Double Specification Limit*), ANSI Z1.9, Section A (*General Description of Sampling Plans*), Section A7 (*Sample Selection*), subsection A7.1 (*Determination of Sample Size*) and Table A-2 (*Sample Size Code Letters*);
- b. **Exhibit B-1** - A copy of ANSI C12.1, at pp. 55-56 containing subsection 5.1.4.3 (*Test plans*) and subsection 5.1.4.3.3 (*Statistical sampling plan*);
- c. **Exhibit B-2** - A copy of ANSI Z1.9, at p. 3 containing Section A5.1.1 (*Formation of Lots*);
- d. **Exhibit C** - A copy of ANSI Z1.9, at p. 2 containing subsection A.4 (*Acceptance Quality Limit*);

- e. **Exhibit D** - A copy of ANSI Z1.9, at p. 39 containing subsection B12.1.2 (*Summary for Operation of Sampling Plan*);
- f. **Exhibit E** - A copy of ANSI Z1.9, at p. 40 containing Example B-3 (*Example of Calculations*) from ANSI Z1.9, Section B, Part II;
- g. **Exhibit F** - A copy of ANSI Z1.9, at pp. 44-52 containing Table B-5 (*Table for Estimating the Lot Percent Nonconforming Using Standard Deviation Method*);
- h. **Exhibit G** - A copy of the Proposed Revised Quarterly and Annual Reporting Format for Reporting Meter Test Results; and
- i. **Exhibit H** - A copy of the currently applicable NJW&M Letter dated February 13, 2017.

VI. **REQUESTED APPROVALS**

19. The Company respectfully seeks Board approval of JCP&L's revised statistical sampling meter testing program as set forth herein pursuant to N.J.S.A. 48:2-25 and N.J.A.C. N.J.A.C. 14:5-4.2(c)2.

20. The Company respectfully requests the Board to approve the proposed revised format for quarterly and annual reporting of meter test results to the Board under N.J.A.C. 14:3-4.7(a), as set forth in **Exhibit G** hereto.

21. The Company also respectfully requests that in the Board's approval of JCP&L's revised statistical sampling meter testing program as set forth herein, that the Board permit the Company to implement the revised program as early as the effective date of the Board's Order (as determined in accordance with N.J.S.A. 48:2-40), but by no later than March 1, 2019.

VII. **UNCONTESTED CASE AND EXPEDITED PROCEEDING**

22. This Verified Petition involves an administrative change in the parameters and methods for meter test statistical sampling and the reporting of meter test results to the Board,

which was arrived at through a collaborative process between Board Staff and the EDCs collectively, and each EDC individually. Therefore, the Company believes that the request for Board approval in this Verified Petition does not require or necessitate a hearing to adjudicate the rights, duties, obligations, privileges, benefits or other legal relations of specific parties and does not address rates or ratemaking and should be considered to be an uncontested case proceeding, which can be addressed on an expedited basis by issuance of an appropriate Board order without hearing.

VIII. SERVICE OF PETITION

23. Copies of this Verified Petition and of the attached Exhibits thereto have been or will be duly served by hand-delivery, or by overnight express delivery at the time of the filing hereof upon the Director, Division of Rate Counsel, 140 East Front Street 4th Floor, P.O. Box 003, Trenton, N.J. 0862531, and upon the Department of Law & Public Safety, Division of Law, 124 Halsey Street, 5th Floor, P.O. Box 45029, Newark, New Jersey 07101.

IX. CONCLUSION

WHEREFORE, the Petitioner, Jersey Central Power & Light Company, respectfully requests that the Board issue a final decision and order:

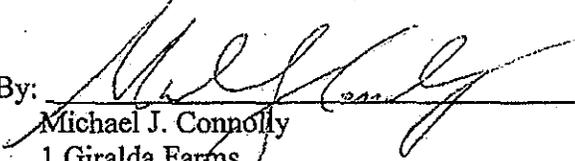
- (1) approving JCP&L's revised statistical sampling meter testing program as set forth herein;
- (2) approving the proposed revised format for quarterly and annual reporting of meter test results to the Board as set forth herein;

- (3) approving implementation of the revised statistical sampling meter testing program as early as the effective date of the Board's Order, but by no later than March 1, 2019; and
- (4) granting such other and further relief as the Board shall deem just, lawful and proper, including waivers of specific requirements of applicable regulations, if any, as the Board may deem necessary to effectuate its approval of the Company's proposal.

Respectfully submitted,

Dated: October 24, 2018

WINDELS MARX LANE & MITTENDORE, LLP
Attorneys for Petitioner,
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