

January 06, 2023

**Via electronic mail only**Daniel Goldner, Chair  
New Hampshire Public Utilities Commission  
21 South Fruit Street, Suite 10  
Concord, NH 03301-2429RE: Docket No. DE 18-162  
Public Service Company of New Hampshire d/b/a Eversource Energy  
Annual Report – 2022 meter testing program results

Chair Goldner:

On December 5, 2018, the Commission approved a request of Public Service Company of New Hampshire d/b/a Eversource Energy (“Eversource”) for a waiver of Puc 305.03 pertaining to the periodic testing of its meters. More specifically, the Commission authorized Eversource to shift to a calendar year testing period and to use the sampling criteria methodology and volumes as outlined within ANSI/ASQ Z1.9-2003 for testing all self-contained single and polyphase meters within its sample testing program. Eversource was also permitted to include meters removed through the course of normal business as part of the sample testing lots outlined within ANSI/ASQ Z1.9-2003.

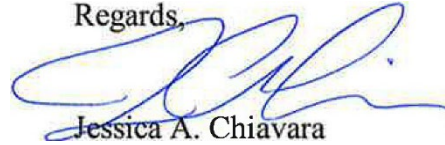
These changes were brought about because Eversource executed a mass exchange of meters in New Hampshire from electromechanical meters to more accurate digital AMR meters. In 2017, Eversource requested and the Commission approved in Docket No. DE 17-127 to reduce periodic meter testing requirements due to the mass meter upgrade. The Commission then required Eversource in 2018 to demonstrate that a reduced sampling would not affect meter accuracy and, if proven successful, could begin using the new sampling methodology on January 1, 2019. The results of the new sampling methodology were positive, and the Commission granted Eversource the waiver referenced above which allowed the following changes:

1. A shift to a calendar year testing period;
2. New sampling criteria methodology for annual meter testing (the results of which were previously reported on form E-3); and
3. Incorporating self-contained single and polyphase meters into the annual testing report (previously reported on form E-3A).

These changes were combined into a new annual report which was first filed in this docket in 2020 for the 2019 test year. Enclosed with this letter is the annual report of the results of Eversource’s meter testing program for calendar year 2022. This report is arranged in the manner described in Attachment A to Eversource’s October 17, 2018 petition in the instant docket.

If you have any questions, please do not hesitate to contact me. Thank you for your assistance with this matter.

Regards,



Jessica A. Chiavara

Senior Counsel, Eversource Energy

cc: DE 18-162 Service List

# Sample Testing Program Summary – 2022

12/16/2022

This summary report shows the results of Eversource NH’s statistical analysis following ANSI/ASQ Z1.3-2003 for the 2022 sample testing program. Eversource selected and tested slightly more meters than were required for some sample lots to ensure the minimum test quantities were met.

As indicated by the ANSI analysis reports, all sample lots were found to be within acceptable tolerance limits. Only one sample lot (Lot # 6) showed a standard deviation value greater than 0.1 (0.4618) for the 10 meters tested). These results are still well within established tolerances, but they do highlight the accuracy performance differences between the older electromechanical meters included within Lot #6 and the solid-state meters within the other lot groupings.

The test results confirm Eversource’s expectation that the general population of in-service meters, most of which are relatively new solid-state meters, have a weighted accuracy performance that is well within the tolerances defined in Rule 305.03 (d) (1).

| This analysis follows the example shown in ANSI Z1.9-2003, Example B-3, page 40, for determining pass/fail status of a lot using a double specification limit, variability unknown, standard deviation method, using one AQL value for both upper and lower |  |                     |                     |              |                   |                    |   |
|---|--|---------------------|---------------------|--------------|-------------------|--------------------|---|
| Updated 12/05/22  |  |                     |                     |              |                   |                    |   |
| Parameter   | Eversource NH 2022 Sample Testing Plan           |                     |                     |              |                   |                    | Comments  |
|   | Total Sample Tested Meters                       |                     |                     |              |                   |                    |   |
| AQL (%)   | 1  | 1                   | 1                   | 1            | 1                 | 1                  | Assumed, based on prior PUC ruling              |
| Upper Spec. Limit   | 101  | 101                 | 101                 | 101          | 101               | 102                | Based on existing PUC limits                    |
| Lower Spec. Limit   | 98   | 98                  | 98                  | 98           | 98                | 98                 | Based on existing PUC limits                    |
| Lot Number  | 1  | 2                   | 3                   | 4            | 5                 | 6                  | Lot identifier                                  |
| Lot Size  | 477015   | 56718               | 15427               | 21267        | 833               | 112                | Number of installed meters in the lot           |
| Sample Size Code  | P  | N                   | M                   | M            | J                 | F                  | From Z1.9 table A-2                             |
| Sample Size (n)   | 200  | 150                 | 100                 | 100          | 35                | 10                 | From Z1.9 table B-3.                            |
| Sample Size NHPUC required  | 200  | 150                 | 100                 | 100          | 35                | 10                 | Total of test code 11 & 91 meters to be tested. |
| Actual qty. tested (total)  | 204  | 154                 | 102                 | 103          | 39                | 13                 | This value used in calculations below as "n".   |
| Sum of Measurements   | 20397.32   | 15409.03            | 10200.44            | 10289.63     | 3900.50           | 1298.97            | $\Sigma X =$ Sum of measured WA % Registrations |
| Sum of Measurements ^2  | 2039465.57                                       | 1541807.09          | 1020088.48          | 1027927.71   | 390100.16         | 129796.64          | $\Sigma X^2$                                    |
| Correction Factor (CF)  | 2039464.04                                       | 1541806.53          | 1020088.00          | 1027927.04   | 390100.01         | 129794.08          | $CF = (\Sigma X)^2/n$                           |
| Corrected Sum of Squares (SS)   | 1.5298   | 0.5642              | 0.4731              | 0.6697       | 0.1490            | 2.5587             | $SS = \Sigma X^2 - CF$                          |
| Variance (V)  | 0.0075   | 0.0037              | 0.0047              | 0.0066       | 0.0039            | 0.2132             | $V = SS/(n-1)$                                  |
| Estimate of Lot Std. Dev. (s)   | 0.0868   | 0.0607              | 0.0684              | 0.0810       | 0.0626            | 0.4618             | $s = \text{sqrt}(V)$                            |
| Sample Mean (Xbar)  | 99.987   | 100.059             | 100.004             | 99.899       | 100.013           | 99.921             | $\text{Xbar} = \Sigma X/n$                      |
| Upper Spec. Limit (U)   | 101  | 101                 | 101                 | 101          | 101               | 102                | U = row 5 values shown above                    |
| Lower Spec. Limit (L)   | 98   | 98                  | 98                  | 98           | 98                | 98                 | L = row 6 values shown above                    |
| Quality Index (Q <sub>u</sub> )   | 11.67  | 15.50               | 14.55               | 13.58        | 15.77             | 4.50               | $Q_u = (U - \text{Xbar})/s$                     |
| Quality Index (Q <sub>l</sub> )   | 22.89  | 33.90               | 29.29               | 23.44        | 32.15             | 4.16               | $Q_l = (\text{Xbar} - L)/s$                     |
| Est. of Lot Percent Ncf. above U (P <sub>u</sub> )  | 0  | 0                   | 0                   | 0            | 0                 | 0                  | From Z1.9 table B-5                             |
| Est. of Lot Percent Ncf. above U (P <sub>l</sub> )  | 0  | 0                   | 0                   | 0            | 0                 | 0                  | From Z1.9 table B-5                             |
| Total Est. Percent Ncf. In Lot (P)  | 0  | 0                   | 0                   | 0            | 0                 | 0                  | $P = P_u + P_l$                                 |
| Max. Allowable Percent Ncf. (M)   | 2.04   | 2.05                | 2.18                | 2.18         | 2.66              | 3.27               | From Z1.9 table B-3                             |
| Acceptability Criterion (Pass or Fail)  | Pass   | Pass                | Pass                | Pass         | Pass              | Pass               | If P < M, Pass, else Fail                       |
| <b>The Lot sizes are based on the installed meter count for each Lot as of 2022, when the samples lots were selected.</b>   |  |                     |                     |              |                   |                    |   |
|   | Summary Statistics for Weighted Average Accuracy |                     |                     |              |                   |                    |   |
| Lot #   | 1  | 2                   | 3                   | 4            | 5                 | 6                  |   |
| Lot Description   | Centron  | Centron Bridge (1P) | Centron Bridge (3P) | GE I-210(+C) | Other Solid State | Electro-Mechanical |   |
| Minimum   | 99.59  | 99.94               | 99.84               | 99.6         | 99.92             | 99.03              |   |
| Maximum   | 100.29   | 100.3               | 100.14              | 100.07       | 100.27            | 100.72             |   |
| Average   | 99.99  | 100.06              | 100.00              | 99.90        | 100.01            | 99.92              |   |
| Standard Deviation  | 0.0868   | 0.0607              | 0.0684              | 0.0810       | 0.0626            | 0.4618             |   |
| 3 Sigma   | 0.26   | 0.18                | 0.21                | 0.24         | 0.19              | 1.39               |   |