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AVISTA UTILITIES
GAS METER
MEASUREMENT
PERFORMANCE REPORT
OREGON

2023 RESULTS

[April 2024]

GAS METER MEASUREMENT PERFORMANCE REPORT

GAS METER PERFORMANCE FOR THE PERIOD JANUARY 1 – DECEMBER 31, 2023

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1. SCOPE

This Gas Meter Measurement Performance Report (Report) covers the methodology, test results, and proceedings of the Avista Utilities (Avista or the Company) gas meter measurement performance testing program in Oregon, for in-service meters for the period from January 1, 2023 through December 31, 2023.

2. DEFINITIONS

Check Test – Meter proof test completed at approximately 20% of the meter rated capacity.

Installation Constant (IC) – A value stored in Avista’s Meter Data Management (MDM) system for each meter asset. This value along with pressure, temperature, elevation, and BTU factors is multiplied by the volume of gas measured by the meter to determine the actual volume of gas to be billed to the customer. The Installation Constant is set to a default of 1.0 but can be changed to adjust for metering variances. For example, if a meter is running fast at 102%, the installation constant can be set to 0.98 to correct this variance.¹

Meter Population – Often referred to as Meter Family, this term refers to a group of meters from the same manufacturer, same model, and manufactured in the same year. Temperature Compensation does not distinguish a new population (i.e. 1995 AC250TC is the same as 1995 AC250).

Open Test – Meter proof test completed at 100% of meter rated capacity or the maximum rated capacity of the test equipment.

PMC – Refers to Avista’s gas meter measurement performance program, commonly referred to as a Periodic Meter Change-out (PMC) program.

Report Year – Year following the Test Year. Typically, this PMC Report is issued the calendar year after the Test Year as it takes time to process the results.

Test Year – Year the meter testing has been performed in.

3. GENERAL

COMPLIANCE

Natural gas meter testing requirements for Avista are promulgated by Oregon Administrative Rules, Chapter 860, Division 023 “Service Standards”, Section 0015 (Testing Gas and Electric Meters). Avista’s approved natural gas tariff P.U.C. OR. No. 5, Rule No. 18, “Meter Tests and

¹ As noted later in this Report, the Installation Constant value is no longer valid in Oregon but is defined within the Report for purposes of process updates regarding the value’s use.

Adjustment of Bills for Meter Error”, complies with the requirements of OAR 860-023-0015 and prescribes the minimum inspection and testing requirements for the Company.

SIGNIFICANT UPDATES OR CHANGES

Due to supply chain issues, the number of meters pulled and evaluated for certain meter families in 2023 did not satisfy Avista’s standard PMC program sampling requirements. Therefore, the PMC analysis contained within this Report was performed by combining test data obtained in both 2022 and 2023 to account for an appropriate sample size.

In 2023 Avista’s natural gas tariff Rule No. 18 was updated to reflect the terms of the Settlement Stipulation agreed to in Docket No. UG 461, Order No. 23-384. Pursuant to section B.1. of the tariff, Avista will file with the Oregon Public Utility Commission (OPUC) its meter testing results for the prior year no later than April 30th of each year; this Report is intended to fulfill this provision. Test data for all three states in which Avista provides natural gas service (Washington, Idaho, and Oregon), is analyzed in a shared manner when performing the annual analysis, in addition to Oregon-specific data as provided.

The major changes made to Avista’s natural gas meter testing program as a result of the aforementioned Settlement Stipulation, and reflected in tariff changes effective January 1, 2024 where applicable, are as follows:

- The IC adjustment will no longer be utilized. Meters that currently utilize the IC adjustment must be replaced no later than December 2028.
- Testing under the random sampling program will start at 5 years of age instead of 10 years.
- Meter families in the random sampling program will fail after one year of non-conformance (removing the prior tightened sampling process).

METER CATEGORIES AND INSPECTION CYCLES

Meter populations exist within the following gas meter categories. Meter category inspection and testing requirements are summarized as follows for installed meters:

- ***Domestic (Diaphragm) Meters 1000 CFH and smaller*** – Random sampling and proof testing per ANSI Z1.9, testing to begin during the 5th test year after meter installation.
- ***Diaphragm Meters 1001 – 3000 CFH*** – Prescriptively inspected and proof evaluated every five (5) years or sooner.
- ***Diaphragm Meters >3000 CFH*** – Prescriptively inspected and proof evaluated every five (5) years or sooner.
- ***Rotary Meters*** – Prescriptively inspected and tested via differential testing every five (5) years or sooner.

- **Turbine Meters** – Prescriptively inspected and tested annually via a spin test and every ten (10) years via a calibration.

METER PERFORMANCE REQUIREMENTS

Random Sampling - Meter inspection performance for randomly tested meters is per ANSI Z1.9 with a tolerance of +/- 2%. The intent of the testing standard is to verify the following:

Overall Performance – Verify with approximately 90% certainty, that the portion of non-conforming meters does not exceed 10% of any installed meter population. For overall performance, equal weight is given to both the upper and lower specification limit (fast and slow reads are equally weighted and are averaged). The “standard deviation – double specification limit method with variability unknown” as detailed in the ANSI Z1.9 shall be used to determine the overall acceptability of a meter population. Acceptable Quality Limit (AQL) for analysis will equal 10.0.

Fast Direction Performance – Verify with approximately 90% certainty that the portion of non-conforming fast meters does not exceed 10% of any installed meter population. For testing equal weight is given to both the upper and lower specification limit (fast and slow reads are equally weighted and are averaged). The “standard deviation – single specification limit method with variability unknown” as detailed in the ANSI Z1.9 shall be used to determine the fast direction performance (disadvantageous to the consumer) acceptability of a meter population. Acceptable Quality Limit (AQL) for analysis will equal 10.0.

Prescriptive Testing – Meter inspection performance for diaphragm meters >1000 CFH, rotary, and turbine meters that are proof tested shall be 100% +/- 2%. Rotary meters that are differential tested shall determine that the meter is operating within 150% of the manufacturer’s differential pressure requirements at the metering pressure. Turbine meter spin tests shall exceed the manufacturer’s minimum prescribed spin duration annually.

ANSI Z1.9 TESTING REQUIREMENTS

A summary of the meter population performance requirements per ANSI Z1.9 are as follows:

- Meters included in the meter test population will be selected at random.
- All meters within the meter test population are eligible for testing except that individual meters tested within preceding five (5) years are excluded from random sample selection.
- Annual meter population sampling requirements will be as prescribed by the ANSI Z1.9 standard and in accordance with the appropriate meter testing category the family falls within.
- Meter Testing Categories:

- “Normal Inspection” – Default meter population sample category as detailed by the ANSI Z1.9. Meter population sampling shall be switched from “Normal” to “Reduced” as described below.
- “Reduced Inspection” – Decreased meter population sampling as detail by ANSI Z1.9. Meters with a satisfactory 5-year test history are eligible for reduced inspection requirements. Meter population sampling may be switched from “Normal” to “Reduced” when 5 annual tests have been found acceptable.
- Failure of a meter population – A meter population shall be deemed failed when:
 - An annual inspection of a population is not accepted based on AQL of 10.0 for overall performance (double specification limit), or

4. RANDOM SAMPLING METER PERFORMANCE

SUMMARY OF METERS 1000 CFH AND SMALLER

(For all three states unless noted otherwise)

In-Service Meters at Beginning of Test Year (2023)		
Total Number of Meters in Sampling Program (Status = Operating)		255,029
Total Number of Families, Including Families Not Eligible For Test	(a)	168
Number of Test Families \geq 10 years old	(b)	136
Number of Test Families Administratively Declared Failed	(c)	29
Failed Family By Performance	(d)	25
Number of Test Families with Installation Constant Adjustment		9
Meter Families That Were Scheduled For Normal Inspection		49
Meter Families That Were Scheduled For Reduced Inspection		58
Test Year - Meter Testing Results		
Number of Meters Tested		2,532
Number of Meters Passed, (within +/- 2%)		2,197
Number of Meters Failed, ($>$ +/- 2%, but \leq +/-10%)		332
Number of Meters, Uniquely Defective Test Result, ($>$ +/- 10%)		3
Plan For The Following Year’s Testing (Report Year, 2024)		
Total Number of Meters in Sampling Program (Status = Operating)		194,434
Total Number of Families, Including Families Not Eligible For Test	(a)	171
Number of Meter Families \geq 5 Years Old (Oregon specific)	(b)	146
Number of Meter Families Administratively Declared Failed (Oregon specific)	(c)	1
Number of Meter Families Failed By Performance (Oregon specific)	(d)	44
Number of Meter Families Scheduled For Normal Inspection (Oregon specific)		50
Number of Meter Families Scheduled For Reduced Inspection (Oregon specific)		16
Number of PMC Meters to be Tested		4,937

- (a) Total number of meter populations includes meter test families that are less than 10 years old and are not yet subject to test requirements.
- (b) Number of Meter Test Populations \geq 5 years old. The first year of required testing is calculated as the manufacturing year + 4 (i.e. 2024 test year would be 2020 and older)
- (c) Number of meter families that were declared failed for administrative reasons. These meters are not failed due to accuracy testing results but are chosen to be removed from the system due to their small populations of typically 25 meters or less.
- (d) Meters populations failed due to performance, per ANSI Z1.9. Note this number is higher for the 2023 analysis due to the change of status of the meters that were previously corrected by the installation constant.

OREGON FAILED METER FAMILIES

Count	Family	Number of Meters Failed for:	
		Performance	Administrative Reasons
1	AC250_1980	571	
2	AC250_1984	893	
3	AC250_1988	152	
4	AC250_1997 *	3256	
5	AC250_1998 *	3168	
6	AC250_1999 *	2973	
7	AC250_2002 *	2953	
8	AC250_2003 *	2961	
9	AC250_2004 *	2093	
10	AC250_2005 *	2394	
11	AC250_2006 *	3164	
12	AC250_2007 *	4030	
13	AC250_2008 *	3364	
14	AC250_2009 *	2284	
15	AC630_1998	38	
16	AC630_2003	35	
17	AC630_2004	39	
18	AC630_2005	76	
19	AC630_2006	64	
20	AC630_2007	1	
21	AC630_2008	4	
22	AL1000_1994	7	
23	AL1000_1997	12	
24	AL1000_1999	1	

25	AL1000_2004	5	
26	AL1000_2005	11	
27	AL1000_2007	32	
28	AL1000_2008	4	
29	AL1000_2009	26	
30	AL175_1967	12	
31	AL175_1968	25	
32	AL175_1970	344	
33	AL175_1980	107	
34	AL425_1973	1	
35	AL425_2003	13	
36	AL425_2004	14	
37	AL425_2005	25	
38	AL425_2006	78	
39	AL425_2007	52	
40	AL425_2008	1	
41	AL425_2009	16	
42	RA275_1994	1222	
43	RA275_1995	592	
44	RA275_1996	3400	
1	AL1000_2002		1
	Total	40,513	1

*Newly identified as “failed” due to no longer allowing the use of the Installation Constant Adjustment. **Without the IC Adjustment meters, the total failed meters is 7,873.**

5. OREGON PRESCRIPTIVE TESTING

LARGE DIAPHRAGM METERS

DIAPHRAGM METERS 1001 - 3000 CFH

5-Year Periodic Testing

Meter population ⁽¹⁾	156
Meters tested and adjusted ⁽²⁾	9
Meters failed ⁽²⁾	2

⁽¹⁾ At the beginning of test year

⁽²⁾ At the end of the test year (does not include those with test results > +/- 10%)

DIAPHRAGM METERS GREATER THAN 3000 CFH

5-Year Periodic Testing

Meter population ⁽¹⁾	0
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Meters tested and adjusted ⁽²⁾	0
<u>Meters failed ⁽²⁾</u>	<u>0</u>

⁽¹⁾ At the beginning of test year

⁽²⁾ At the end of the test year (does not include those with test results > +/- 10%)

ROTARY METERS

ROTARY METER RESULTS

5-Year Periodic Testing

Meter population ⁽¹⁾	763
Meters tested and adjusted ⁽²⁾	150
<u>Meters failed ⁽²⁾</u>	<u>0</u>

⁽¹⁾ At the beginning of test year

⁽²⁾ At the end of the test year (does not include those with test results > +/- 10%)

TURBINE METERS

TURBINE METER RESULTS

Annual Spin Testing

Meter population ⁽¹⁾	7
Meters tested ⁽²⁾	7
<u>Meters failed ⁽²⁾</u>	<u>0</u>

10 Yr. Proof Testing

Meters tested and adjusted ⁽²⁾	0
<u>Meters failed ⁽²⁾</u>	<u>0</u>

⁽¹⁾ At the beginning of test year

⁽²⁾ At the end of the test year (does not include those with test results > +/- 10%)

End of Report