CASCADE NATURAL GAS

CORPORATION

A Subsidiary of MDU Resources Group, Inc.

e-FILING REPORT COVER SHEET

COMPANY NAME: Cascade Natural Gas Corporation

DOES REPORT CONTAIN CONFIDENTIAL INFORMATION? ■ No ☐ Yes If yes, submit a redacted public version (or a cover letter) by email. Submit the confidential information as directed in OAR 860-001-0070 or the terms of an applicable protective order.

Select report type: ☐ RE (Electric) ■ RG (Gas) ☐ RW (Water) ☐ RT (Telecommunications)
☐ RO (Other, for example, industry safety information)

Did you previously file a similar report? ☐ No ■ Yes, report docket number: RG-65

Report is required by: ☐ OAR
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Is this report associated with a specific docket/case? ☐ No ■ Yes, docket number: UG-65

List Key Words for this report. We use these to improve search results.

2019 CNG Gas Meter Statistical Sampling Program

Send the completed Cover Sheet and the Report in an email addressed to PUC.FilingCenter@state.or.us

Send confidential information, voluminous reports, or energy utility Results of Operations Reports to PUC Filing Center, PO Box 1088, Salem, OR 97308-1088 or by delivery service to 201 High Street SE Suite 100, Salem, OR 97301.

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CASCADE NATURAL GAS CORPORATION
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March 2, 2020

Public Utility Commission of Oregon
Attn: Filing Center
P.O. Box 1088
Salem, OR 97308-1088

RE: RG-65(6), Cascade's Gas Meter Statistical Sampling Program, 2019 Results

Enclosed is Cascade Natural Gas Corporation's (Cascade's or Company's) Gas Meter Statistical Sampling Program for all residential and small commercial meters in service as of December 31, 2019. These meters fall within the scope of the Company's Statistical Sampling Program as established in Rule 8, Meter Testing in the Company's Tariff.

All larger meters were tested according to their required periodic schedule. The total number of meters Cascade had in service in Oregon at the end of 2019 was 78,627.

If you have any questions, please call me at (509) 734-4573.

Sincerely,

/s/ Brett Hudson

Brett Hudson
Manager, Measurement

CASCADE NATURAL GAS

GAS METER STATISTICAL SAMPLING PROGRAM

2019 RESULTS

GAS METER STATISTICAL SAMPLING PROGRAM

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SCOPE

This report covers the methodology, test results, and proceedings of Cascade Natural Gas Company gas meter statistical sampling program for residential and small commercial meters in the states of Washington and Oregon for the period of January 1, 2019 through December 31, 2019.

Sampling Summary

Meters in the program for the plan year	*297,089*
Meters in the program at the end of the plan year	*300,799*
Total meters removed during the year	*13,588*
Meters qualifying for analysis	*3,724*

GENERAL

COMPLIANCE

Gas meter testing requirements for Cascade Natural Gas are promulgated by the Washington Administrative Code (WAC), Chapter 480-90, Section 348 "Frequency of Periodic Meter Tests" and by the Oregon Administrative Rules (OAR), Chapter 860, Division 023 "Service Standards", Section 0015 (Testing Gas and Electric Meters). Cascade's sampling program complies with Part IV ('In Service Performance") of the 1992 version of ANSI standard B109.1 and B109.2 as specified in its Tariff Rule No. 7 filed in the state of Washington and Tariff Rule No. 8 filed in the state of Oregon. Cascade's plan also conforms to generally accepted statistical methods within the industry for predicting the sampling distribution of the proportion of a population with a 90% degree of confidence.

TESTING METHODOLOGY

Cascade Natural Gas current random meter measurement performance program is in accordance with its plan document entitled "Meter Testing" dated April, 18 2019 (appendix). Random sampling and testing is conducted for all domestic meters rated at 1000 CFH and smaller.

METER PERFORMANCE REQUIREMENTS

Random Sampling – Meters in this program are randomly selected for inspection by attribute per the plan document. Conforming meters are found to register accurately with a tolerance of ±2.0%. The intent of the testing standard is to verify the following parameter:

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 (i.e. check and open reads are equally weighted and are averaged).

DEFINITIONS

Meter Population (Meter Family) – Grouping of meters as defined by each company, may include reference to sub families as allowed ANSI/ASQ Z1.4, ANSI/ASQ Z1.9.

Open Test – Meter proof test completed between 80 and 100 % of meter rated capacity or the maximum rated capacity of the test equipment.

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

Size / Class – Grouping of meters, based on capacity, that display similar performance characteristics for all meters within the grouping. Size/Class may, at the company's discretion, include multiple-sized meters within the same size class as long as the meter performance testing of the individual meters is consistent with all meter in the size class.

Random Meters – Meters that are a selected at random to provide a statistically representative sample of a meter family.

RANDOM SAMPLING METER PERFORMANCE DATA

Random Sampling - Summary

Beginning of Report Year 2019, In-Service Meters on 1/1/19

Total Number of Meters For Random Sampling	***297,089***
Total Number of Test Families [a]	***154***
Number of Test Families ≥ 10 yrs old [b]	***94***

End of Report Year 2019 Meter Testing Quantities & Results

Number of Meters Tested	***3,724***
Number of Meters Passed, (+/-) 2%	***3,561***
Number of Meters Failed, (+/-) 2%	***163***
Meter Families With an Overall Fail Result	***0***
Meter Families With a Fast Fail Result	***0***
Meter Families Removed/Depleted During Report Year [c]	***8***

Transition to 2020 Test Year

Total Number of Meters For Random Sampling	**300,799**
Total Number of Test Families [a]	**156**
Number of Test Families ≥ 10 yrs old [b]	**96**

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 ≥ 10 years old (i.e. includes meters manufactured in the year 2009 and earlier for the 2019 test year).

c) Total number of meter families depleted during the report year including those removed for administrative purposes.

RANDOM SAMPLING METER PERFORMANCE DATA

Random Sampling Meter Families Statistical Results Summary

Lot Number	Lot Description	Group Text	Test Area	Test Group	Lot Size	Sample Size	Meters Tested	Meters Remaining	Percent Done	Lot Status
20190001	2019:CNG:SPRAG1:1:1	1980	CNG	SPRAG1	1	1	1	0	100.00%	Family Depleted
20190002	2019:CNG:ROCKW1:1:1	1982	CNG	ROCKW1	1	1	1	0	100.00%	Family Depleted
20190003	2019:CNG:ROCKW1:1:1	1984	CNG	ROCKW1	1	1	1	0	100.00%	Family Depleted
20190004	2019:CNG:SPRAG1:1:1	1985	CNG	SPRAG1	1	1	1	0	100.00%	Family Depleted
20190005	2019:CNG:ROCKW1:1:1	1986	CNG	ROCKW1	874	35	35	0	100.00%	Accepted
20190006	2019:CNG:SPRAG1:1:1	1986	CNG	SPRAG1	527	35	35	0	100.00%	Accepted
20190009	2019:CNG:SPRAG1:1:1	1987	CNG	SPRAG1	835	35	35	0	100.00%	Accepted
20190010	2019:CNG:AMERI1:1:1	1988	CNG	AMERI1	2908	50	50	0	100.00%	Accepted
20190012	2019:CNG:SPRAG1:1:1	1988	CNG	SPRAG1	1273	50	50	0	100.00%	Accepted
20190013	2019:CNG:AMERI1:1:1	1989	CNG	AMERI1	3028	50	50	0	100.00%	Accepted
20190014	2019:CNG:ROCKW1:1:1	1989	CNG	ROCKW1	4088	75	75	0	100.00%	Accepted
20190015	2019:CNG:SPRAG1:1:1	1989	CNG	SPRAG1	2245	50	50	0	100.00%	Accepted
20190018	2019:CNG:SPRAG1:2:1	1990	CNG	SPRAG1	1961	100	100	0	100.00%	Accepted
20190019	2019:CNG:AMERI1:1:1	1991	CNG	AMERI1	3668	75	75	0	100.00%	Accepted
20190021	2019:CNG:SPRAG1:1:1	1991	CNG	SPRAG1	1409	50	50	0	100.00%	Accepted
20190023	2019:CNG:ROCKW1:1:1	1992	CNG	ROCKW1	6335	75	75	0	100.00%	Accepted
20190024	2019:CNG:SPRAG1:1:1	1992	CNG	SPRAG1	1409	50	50	0	100.00%	Accepted

20190026	2019:CNG:ROCKW1:1:1	1993	CNG	ROCKW1	6197	75	75	0	100.00%	Accepted
20190027	2019:CNG:SPRAG1:1:1	1993	CNG	SPRAG1	3731	75	75	0	100.00%	Accepted
20190030	2019:CNG:SPRAG1:1:1	1994	CNG	SPRAG1	5515	75	75	0	100.00%	Accepted
20190032	2019:CNG:ROCKW1:1:1	1995	CNG	ROCKW1	2092	50	50	0	100.00%	Accepted
20190033	2019:CNG:SPRAG1:1:1	1995	CNG	SPRAG1	4249	75	75	0	100.00%	Accepted
20190034	2019:CNG:AMERI1:1:1	1996	CNG	AMERI1	149	10	10	0	100.00%	Accepted
20190036	2019:CNG:SPRAG1:1:1	1996	CNG	SPRAG1	5445	75	75	0	100.00%	Accepted
20190037	2019:CNG:AMERI1:1:1	1997	CNG	AMERI1	36	5	5	0	100.00%	Accepted
20190038	2019:CNG:ROCKW1:1:1	1997	CNG	ROCKW1	290	20	20	0	100.00%	Accepted
20190039	2019:CNG:SPRAG1:1:1	1997	CNG	SPRAG1	7235	75	75	0	100.00%	Accepted
20190040	2019:CNG:AMERI1:1:1	1998	CNG	AMERI1	179	15	15	0	100.00%	Accepted
20190041	2019:CNG:ROCKW1:1:1	1998	CNG	ROCKW1	4140	75	75	0	100.00%	Accepted
20190042	2019:CNG:SPRAG1:1:1	1998	CNG	SPRAG1	3180	50	50	0	100.00%	Accepted
20190043	2019:CNG:AMERI1:1:1	1999	CNG	AMERI1	4515	75	75	0	100.00%	Accepted
20190044	2019:CNG:ROCKW1:1:1	1999	CNG	ROCKW1	2546	50	50	0	100.00%	Accepted
20190045	2019:CNG:SPRAG1:1:1	1999	CNG	SPRAG1	338	20	20	0	100.00%	Accepted
20190047	2019:CNG:ROCKW1:1:1	2000	CNG	ROCKW1	526	35	35	0	100.00%	Accepted
20190048	2019:CNG:SPRAG1:1:1	2000	CNG	SPRAG1	99	10	10	0	100.00%	Accepted
20190050	2019:CNG:AMERI3:1:1	2001	CNG	AMERI3	6	3	3	0	100.00%	Accepted
20190051	2019:CNG:ROCKW1:1:1	2001	CNG	ROCKW1	143	10	10	0	100.00%	Accepted
20190052	2019:CNG:ROCKW2:1:1	2001	CNG	ROCKW2	5	3	3	0	100.00%	Accepted
20190053	2019:CNG:SPRAG1:1:1	2001	CNG	SPRAG1	789	35	35	0	100.00%	Accepted
20190055	2019:CNG:AMERI3:1:1	2002	CNG	AMERI3	3	3	3	0	100.00%	Family Depleted
20190058	2019:CNG:SPRAG1:1:1	2002	CNG	SPRAG1	352	20	20	0	100.00%	Accepted
20190059	2019:CNG:AMERI1:1:1	2003	CNG	AMERI1	2871	50	50	0	100.00%	Accepted
20190061	2019:CNG:ROCKW2:2:1	2003	CNG	ROCKW2	91	20	20	0	100.00%	Accepted
20190062	2019:CNG:SPRAG1:1:1	2003	CNG	SPRAG1	660	35	35	0	100.00%	Accepted
20190063	2019:CNG:AMERI1:1:1	2004	CNG	AMERI1	663	35	35	0	100.00%	Accepted
20190064	2019:CNG:AMERI3:1:1	2004	CNG	AMERI3	56	7	7	0	100.00%	Accepted
20190065	2019:CNG:ROCKW1:1:1	2004	CNG	ROCKW1	141	10	10	0	100.00%	Accepted
20190066	2019:CNG:ROCKW2:1:1	2004	CNG	ROCKW2	10	3	3	0	100.00%	Rejected

										2018
20190067	2019:CNG:SPRAG1:1:1	2004	CNG	SPRAG1	19	4	4	0	100.00%	Accepted
20190068	2019:CNG:AMERI1:1:1	2005	CNG	AMERI1	7645	75	75	0	100.00%	Accepted
20190070	2019:CNG:ROCKW1:1:1	2005	CNG	ROCKW1	77	7	7	0	100.00%	Accepted
20190071	2019:CNG:ROCKW2:1:1	2005	CNG	ROCKW2	1	1	1	0	100.00%	Family Depleted
20190072	2019:CNG:SPRAG1:1:1	2005	CNG	SPRAG1	107	10	10	0	100.00%	Accepted
20190073	2019:CNG:AMERI1:1:1	2006	CNG	AMERI1	9944	75	75	0	100.00%	Accepted
20190074	2019:CNG:AMERI3:1:1	2006	CNG	AMERI3	74	7	7	0	100.00%	Accepted
20190075	2019:CNG:ROCKW1:1:1	2006	CNG	ROCKW1	19	4	4	0	100.00%	Accepted
20190076	2019:CNG:ROCKW2:1:1	2006	CNG	ROCKW2	74	7	7	0	100.00%	Accepted
20190077	2019:CNG:SPRAG1:1:1	2006	CNG	SPRAG1	55	7	7	0	100.00%	Accepted
20190079	2019:CNG:AMERI3:1:1	2007	CNG	AMERI3	128	10	10	0	100.00%	Accepted
20190080	2019:CNG:ROCKW1:1:1	2007	CNG	ROCKW1	181	15	15	0	100.00%	Accepted
20190081	2019:CNG:ROCKW2:1:1	2007	CNG	ROCKW2	202	15	15	0	100.00%	Accepted
20190082	2019:CNG:SPRAG1:1:1	2007	CNG	SPRAG1	181	15	15	0	100.00%	Accepted
20190083	2019:CNG:AMERI1:1:1	2008	CNG	AMERI1	6601	75	75	0	100.00%	Accepted
20190084	2019:CNG:AMERI3:1:1	2008	CNG	AMERI3	380	20	20	0	100.00%	Accepted
20190085	2019:CNG:ROCKW1:1:1	2008	CNG	ROCKW1	215	15	15	0	100.00%	Accepted
20190086	2019:CNG:ROCKW2:1:1	2008	CNG	ROCKW2	344	20	20	0	100.00%	Accepted
20190087	2019:CNG:SPRAG1:1:1	2008	CNG	SPRAG1	52	7	7	0	100.00%	Accepted
20190088	2019:CNG:AMERI1:1:1	2009	CNG	AMERI1	5450	75	75	0	100.00%	Accepted
20190089	2019:CNG:AMERI3:1:1	2009	CNG	AMERI3	372	20	20	0	100.00%	Accepted
20190090	2019:CNG:ROCKW1:1:1	2009	CNG	ROCKW1	245	15	15	0	100.00%	Accepted
20190092	2019:CNG:SPRAG1:1:1	2009	CNG	SPRAG1	239	15	15	0	100.00%	Accepted
20190093	2019:CNG:SPRAG2:1:1	2009	CNG	SPRAG2	3	3	3	0	100.00%	Family Depleted
20190159	2019:CNG:AMERI3:1:1	2005	CNG	AMERI3	47	47	47	0	100.00%	Family Depleted
20190161	2019:CNG:ROCKW1:1:1	1987	CNG	ROCKW1	1696	50	50	0	100.00%	Accepted
20190162	2019:CNG:AMERI1:1:1	1990	CNG	AMERI1	3211	75	75	0	100.00%	Accepted
20190163	2019:CNG:ROCKW1:1:1	1990	CNG	ROCKW1	2644	50	50	0	100.00%	Accepted

20190164	2019:CNG:AMERI1:1:1	1992	CNG	AMERI1	2090	50	50	0	100.00%	Accepted
20190165	2019:CNG:AMERI1:1:1	1993	CNG	AMERI1	1722	50	50	0	100.00%	Accepted
20190166	2019:CNG:AMERI1:1:1	1994	CNG	AMERI1	2739	50	50	0	100.00%	Accepted
20190168	2019:CNG:AMERI1:1:1	1995	CNG	AMERI1	4730	75	75	0	100.00%	Accepted
20190169	2019:CNG:ROCKW1:1:1	1996	CNG	ROCKW1	1062	35	35	0	100.00%	Accepted
20190170	2019:CNG:AMERI1:1:1	2000	CNG	AMERI1	6889	75	75	0	100.00%	Accepted
20190171	2019:CNG:AMERI1:1:1	2001	CNG	AMERI1	6488	75	75	0	100.00%	Accepted
20190172	2019:CNG:AMERI1:1:1	2002	CNG	AMERI1	7298	75	75	0	100.00%	Accepted
20190173	2019:CNG:ROCKW1:1:1	2003	CNG	ROCKW1	474	25	25	0	100.00%	Accepted
20190174	2019:CNG:AMERI1:1:1	2007	CNG	AMERI1	7602	75	75	0	100.00%	Accepted
20190175	2019:CNG:ROCKW1:1:1	1994	CNG	ROCKW1	2853	50	50	0	100.00%	Accepted
20190177	2019:CNG:ROCKW1:1:1	1991	CNG	ROCKW1	4600	165	165	0	100.00%	Accepted
20190178	2019:CNG:ROCKW1:1:1	1991	CNG	ROCKW1	4600	75	75	0	100.00%	Accepted
20190180	2019:CNG:ROCKW2:1:1	2002	CNG	ROCKW2	87	7	7	0	100.00%	Accepted
20190182	2019:CNG:AMERI1:2:1	1987	CNG	AMERI1	1349	100	100	0	100.00%	Accepted
20190200	2019:CNG:ROCKW1:1:1	2002	CNG	ROCKW1	313	56	56	0	100.00%	Accepted
20190212	2019:CNG:ROCKW1:1:1	1988	CNG	ROCKW1	2067	146	146	0	100.00%	Accepted
20190221	2019:CNG:ROCKW2:1:1	2009	CNG	ROCKW2	360	44	44	0	100.00%	Accepted

RANDOM SAMPLING METER PERFORMANCE DATA

Notes for Random Sampling Meter Families Statistical Results Summary:

Lot Number: The number designation for the individual meter families.

Lot Description: Meter family description breakdown. Included in the description is the sampling program year, CNG, the family designation by meter name and meter size, how many pulls were created.

Group Text: The family year the meters in that family were installed.

Test Area: CNG = Cascade Natural Gas.

Test Group: The first five letters are the first five letters of the brand of meter in that family; American, Rockwell, Sprague. The number at the end is the meter class. Class 1 is 0-399 CFH, class 2 is 400-699 CFH, class 3 is 700-1000 CFH.

Lot Size: Number of meters in the test family at the start of the test year being reported.

Sample Size: Total number of meters required to be tested in the family for the current sample year.

Meters Tested: Total number of meters tested for the random sample families.

Meters Remaining: The number of meters still needing to be tested for the sample families.

Percent Done: The percentage of the random meters tested in each sample family.

Lot Status: Disposition of family.

RANDOM SAMPLING METER PERFORMANCE DATA

METER FAMILIES BELOW ACCEPTABLE THRESHOLD LIMITS

Zero meter families in service ten or more years were found below the acceptable threshold limits.

Meter Family	Disposition Status	Year Disposition Initiated	Year Disposition Completed

RANDOM SAMPLING METER PERFORMANCE DATA

STATUS OF METER FAMILIES PREVIOUSLY SCHEDULED FOR REMOVAL

Three meter families were previously scheduled for removal in 2019.

Meter Family	Disposition Status	Year Disposition Initiated	Year Disposition Completed
2004ROCKW2	**Recall Family**	**2019**	**2020**
2005AMERI3	**Recall Family**	**2019**	**2019**
2005ROCKW2	**Recall Family**	**2019**	**2019**

METER SAMPLE PROGRAM

Each meter in the Statistical Sample Program will be assigned to a meter group or "family" according to its manufacturer, meter class, and set year. At the option of the company, meters in any family may be further subdivided according to meter type, size, location, age, or other factors that may be disclosed by test data to influence the performance of the meters. Subsequently, meter families may be modified or combined as justified by the performance records.

The performance evaluation of each meter family will be based on an evaluation of test results from random sampling of the family. The random sample for each family will include meters which are removed from service on a routine basis, e.g. meters not in use, too large, too small, damaged index cover, service relocation or replacement, etc. If more meters are required for testing than have been removed from service for routine purposes, a random sample of meters within that family will be removed from service and included in the sample.

For purposes of evaluating the performance of each meter family, the analysis of the test results will exclude data on meters which are damaged, meters which do not register, meters which do not pass gas, and meters which measure either less than 90.0 percent accurate or more than 110.0 percent accurate.

Meters with capacities up to 3000 cfh that have been in service ten (10) or more years as established by last set date shall be tested within a prescribed sample size. Sample size and family disposition will be determined in accordance with ANSI/ASQ Z1.4, ANSI/ASQ Z1.9, or other generally accepted industry standard.

Corrective action shall consist of either a selective removal program to raise the accuracy performance of the group to acceptable standards or the removal of the entire group from service. The rate of removal will be such that the required corrective action is completed as soon as practicable but not to exceed a period of two years after the year testing was performed. However, with Commission approval, the period for removal may be extended an additional two years in any year which the total number of meters required for removal exceeds four percent of the number of meters in the Statistical Sample Program.

If meters tested in the fourth quarter of the plan year cause a family to require additional samples that leave insufficient time to obtain the additional number of meters required to complete the sample, the company may elect to aggressive sampling in the following plan year so that a follow up determination is made within the first six months of the new plan year.

The program year shall begin on January 1 and end on December 31 of the same year. Sample data collected during a given program year will be analyzed, and a decision regarding meter family disposition will be made in the first quarter of the following calendar year.