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*In the Community to Serve®*

February 16, 2021

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

**RE: RG-65(7), Cascade's Gas Meter Statistical Sampling Program, 2020 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, 2020. 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 2020 was 80,965.

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

Sincerely,

*/s/ Brett Hudson*

Brett Hudson  
Manager, Measurement

*In the Community to Serve®*

CASCADE NATURAL GAS

GAS METER  
STATISTICAL SAMPLING  
PROGRAM

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2020 RESULTS

# GAS METER STATISTICAL SAMPLING PROGRAM

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**GAS METER PERFORMANCE FOR THE PERIOD JANUARY 1, 2020 – DECEMBER 31, 2020**

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## SCOPE

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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, 2020 through December 31, 2020.

### Sampling Summary

Meters in the program for the plan year	<i>300,799</i>
Meters in the program at the end of the plan year	<i>307,266</i>
Total meters removed during the year	<i>9,160</i>
Meters qualifying for analysis	<i>3,630</i>

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## GENERAL

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### 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  $\pm 2.0\%$ . 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).

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## DEFINITIONS

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**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.

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## RANDOM SAMPLING METER PERFORMANCE DATA

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### Random Sampling - Summary

#### Beginning of Report Year 2020, In-Service Meters on 1/1/20

Total Number of Meters For Random Sampling	300,799
Total Number of Test Families <sup>(a)</sup>	163
Number of Test Families $\geq$ 10 yrs old <sup>(b)</sup>	96

#### End of Report Year 2020 Meter Testing Quantities & Results

Number of Meters Tested	3,630
Number of Meters Passed, (+/-) 2%	3,449
Number of Meters Failed, (+/-) 2%	181
Meter Families With an Overall Fail Result	0
Meter Families With a Fast Fail Result	0
Meter Families Removed/Depleted During Report Year <sup>(c)</sup>	6

#### Transition to 2021 Test Year

Total Number of Meters For Random Sampling	307,266
Total Number of Test Families <sup>(a)</sup>	162
Number of Test Families $\geq$ 10 yrs old <sup>(b)</sup>	94

- 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  $\geq$  10 years old (i.e. includes meters manufactured in the year 2010 and earlier for the 2020 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	Test Group Description	Lot Size	Meters Tested	Lot Status
1	20200082	2020:CNG:SPRAG1:1:1	1989	CNG	SPRAG1	Sprague 0-399	2022	50	ACCEPTED
2	20200083	2020:CNG:SPRAG1:1:1	1990	CNG	SPRAG1	Sprague 0-399	1759	50	ACCEPTED
3	20200087	2020:CNG:SPRAG1:1:1	1994	CNG	SPRAG1	Sprague 0-399	5147	75	ACCEPTED
4	20200165	2020:CNG:AMERI1:1:1	1998	CNG	AMERI1	American 0-399	176	15	ACCEPTED
5	20200389	2020:CNG:AMERI3:1:1	2002	CNG	AMERI3	American 700-1000	3	3	FAMILY DEPLETED
6	20200391	2020:CNG:AMERI3:1:1	2005	CNG	AMERI3	American 700-1000	36	5	ACCEPTED
7	20200393	2020:CNG:AMERI3:1:1	2007	CNG	AMERI3	American 700-1000	124	10	ACCEPTED
8	20200500	2020:CNG:ROCKW1:1:1	2005	CNG	ROCKW1	Rockwell 0-399	76	7	ACCEPTED
9	20200501	2020:CNG:ROCKW1:1:1	2006	CNG	ROCKW1	Rockwell 0-399	19	4	ACCEPTED
10	20200510	2020:CNG:ROCKW2:1:1	2005	CNG	ROCKW2	Rockwell 400-699	1	1	FAMILY DEPLETED
11	20200511	2020:CNG:ROCKW2:1:1	2006	CNG	ROCKW2	Rockwell 400-699	74	7	ACCEPTED
12	20200516	2020:CNG:SPRAG1:1:1	1980	CNG	SPRAG1	Sprague 0-399	1	1	FAMILY DEPLETED
13	20200532	2020:CNG:SPRAG1:1:1	2004	CNG	SPRAG1	Sprague 0-399	15	3	ACCEPTED
14	20200533	2020:CNG:SPRAG1:1:1	2005	CNG	SPRAG1	Sprague 0-399	100	10	ACCEPTED
15	20200534	2020:CNG:SPRAG1:1:1	2006	CNG	SPRAG1	Sprague 0-399	50	5	ACCEPTED
16	20200535	2020:CNG:SPRAG1:1:1	2007	CNG	SPRAG1	Sprague 0-399	150	10	ACCEPTED
17	20200536	2020:CNG:SPRAG1:1:1	2008	CNG	SPRAG1	Sprague 0-399	40	5	ACCEPTED
18	20200537	2020:CNG:SPRAG1:1:1	2009	CNG	SPRAG1	Sprague 0-399	215	15	ACCEPTED

19	20200539	2020:CNG:SPRAG2:1:1	2009	CNG	SPRAG2	Sprague400-699	2	2	FAMILY DEPLETED
20	20200540	2020:CNG:SPRAG2:1:1	2010	CNG	SPRAG2	Sprague400-699	14	7	ACCEPTED
21	20200660	2020:CNG:SPRAG1:1:1	1997	CNG	SPRAG1	Sprague 0-399	6761	75	ACCEPTED
22	20200661	2020:CNG:SPRAG1:1:1	1986	CNG	SPRAG1	Sprague 0-399	431	25	ACCEPTED
23	20200663	2020:CNG:ROCKW1:1:1	2004	CNG	ROCKW1	Rockwell 0-399	125	10	ACCEPTED
24	20200665	2020:CNG:SPRAG1:1:1	2000	CNG	SPRAG1	Sprague 0-399	79	7	ACCEPTED
25	20200666	2020:CNG:ROCKW2:1:1	2001	CNG	ROCKW2	Rockwell 400- 699	2	2	FAMILY DEPLETED
26	20200667	2020:CNG:AMERI3:1:1	2001	CNG	AMERI3	American 700- 1000	3	3	FAMILY DEPLETED
27	20200668	2020:CNG:AMERI1:1:1	1997	CNG	AMERI1	American 0-399	30	5	ACCEPTED
28	20200669	2020:CNG:SPRAG1:1:1	1991	CNG	SPRAG1	Sprague 0-399	1205	50	ACCEPTED
29	20200670	2020:CNG:AMERI1:1:1	1996	CNG	AMERI1	American 0-399	137	10	ACCEPTED
30	20200671	2020:CNG:AMERI3:1:1	2006	CNG	AMERI3	American 700- 1000	66	7	ACCEPTED
31	20200672	2020:CNG:ROCKW2:1:1	2009	CNG	ROCKW2	Rockwell 400- 699	342	20	ACCEPTED
32	20200674	2020:CNG:SPRAG1:1:1	1988	CNG	SPRAG1	Sprague 0-399	1128	35	ACCEPTED
33	20200675	2020:CNG:SPRAG1:1:1	1992	CNG	SPRAG1	Sprague 0-399	1193	35	ACCEPTED
34	20200676	2020:CNG:SPRAG1:1:1	1996	CNG	SPRAG1	Sprague 0-399	5112	75	ACCEPTED
35	20200677	2020:CNG:AMERI1:1:1	2006	CNG	AMERI1	American 0-399	9759	75	ACCEPTED
36	20200681	2020:CNG:SPRAG1:1:1	2010	CNG	SPRAG1	Sprague 0-399	310	20	ACCEPTED
37	20200682	2020:CNG:SPRAG1:1:1	1987	CNG	SPRAG1	Sprague 0-399	742	35	ACCEPTED
38	20200683	2020:CNG:SPRAG1:1:1	1993	CNG	SPRAG1	Sprague 0-399	3391	75	ACCEPTED
39	20200684	2020:CNG:AMERI3:1:1	2008	CNG	AMERI3	American 700- 1000	356	20	ACCEPTED
40	20200685	2020:CNG:ROCKW1:1:1	2007	CNG	ROCKW1	Rockwell 0-399	166	15	ACCEPTED
41	20200686	2020:CNG:ROCKW1:1:1	2008	CNG	ROCKW1	Rockwell 0-399	193	15	ACCEPTED
42	20200687	2020:CNG:ROCKW1:1:1	2009	CNG	ROCKW1	Rockwell 0-399	232	15	ACCEPTED
43	20200688	2020:CNG:ROCKW2:1:1	2004	CNG	ROCKW2	Rockwell 400- 699	7	3	ACCEPTED
44	20200691	2020:CNG:SPRAG1:1:1	1995	CNG	SPRAG1	Sprague 0-399	3998	75	ACCEPTED

45	20200695	2020:CNG:ROCKW1:1:1	1997	CNG	ROCKW1	Rockwell 0-399	271	15	ACCEPTED
46	20200697	2020:CNG:SPRAG1:1:1	1998	CNG	SPRAG1	Sprague 0-399	3039	50	ACCEPTED
47	20200699	2020:CNG:ROCKW1:1:1	1990	CNG	ROCKW1	Rockwell 0-399	2549	50	ACCEPTED
48	20200701	2020:CNG:ROCKW1:1:1	1993	CNG	ROCKW1	Rockwell 0-399	5992	75	ACCEPTED
49	20200707	2020:CNG:ROCKW1:1:1	1992	CNG	ROCKW1	Rockwell 0-399	6088	75	ACCEPTED
50	20200728	2020:CNG:AMERI1:1:1	2008	CNG	AMERI1	American 0-399	6449	75	ACCEPTED
51	20200829	2020:CNG:AMERI3:1:1	2010	CNG	AMERI3	American 700-1000	228	15	ACCEPTED
52	20200830	2020:CNG:AMERI1:1:1	2002	CNG	AMERI1	American 0-399	7158	75	ACCEPTED
53	20200831	2020:CNG:AMERI1:1:1	2005	CNG	AMERI1	American 0-399	7508	75	ACCEPTED
54	20200832	2020:CNG:AMERI1:1:1	2007	CNG	AMERI1	American 0-399	7483	75	ACCEPTED
55	20200833	2020:CNG:ROCKW2:2:1	2007	CNG	ROCKW2	Rockwell 400-699	189	15	ACCEPTED
56	20200835	2020:CNG:SPRAG1:1:1	2002	CNG	SPRAG1	Sprague 0-399	317	20	ACCEPTED
57	20200836	2020:CNG:ROCKW2:2:1	2010	CNG	ROCKW2	Rockwell 400-699	286	20	ACCEPTED
58	20200837	2020:CNG:ROCKW1:2:1	2003	CNG	ROCKW1	Rockwell 0-399	447	26	ACCEPTED
59	20200839	2020:CNG:SPRAG1:1:1	1999	CNG	SPRAG1	Sprague 0-399	298	20	ACCEPTED
60	20200840	2020:CNG:ROCKW1:1:1	1986	CNG	ROCKW1	Rockwell 0-399	813	35	ACCEPTED
61	20200841	2020:CNG:ROCKW2:2:1	2008	CNG	ROCKW2	Rockwell 400-699	320	21	ACCEPTED
62	20200842	2020:CNG:ROCKW1:1:1	2010	CNG	ROCKW1	Rockwell 0-399	424	25	ACCEPTED
63	20200843	2020:CNG:SPRAG1:1:1	2001	CNG	SPRAG1	Sprague 0-399	727	35	ACCEPTED
64	20200844	2020:CNG:ROCKW1:1:1	1988	CNG	ROCKW1	Rockwell 0-399	2012	50	ACCEPTED
65	20200845	2020:CNG:ROCKW1:1:1	1989	CNG	ROCKW1	Rockwell 0-399	3903	75	ACCEPTED
66	20200846	2020:CNG:AMERI1:1:1	1990	CNG	AMERI1	American 0-399	3139	50	ACCEPTED
67	20200847	2020:CNG:ROCKW1:1:1	1991	CNG	ROCKW1	Rockwell 0-399	4477	75	ACCEPTED
68	20200848	2020:CNG:ROCKW1:2:1	1996	CNG	ROCKW1	Rockwell 0-399	1015	36	ACCEPTED
69	20200850	2020:CNG:SPRAG1:1:1	2003	CNG	SPRAG1	Sprague 0-399	602	35	ACCEPTED
70	20200851	2020:CNG:ROCKW1:2:1	1987	CNG	ROCKW1	Rockwell 0-399	1632	58	ACCEPTED
71	20200852	2020:CNG:AMERI1:1:1	1988	CNG	AMERI1	American 0-399	2796	50	ACCEPTED
72	20200853	2020:CNG:AMERI1:1:1	1989	CNG	AMERI1	American 0-399	2934	50	ACCEPTED
73	20200854	2020:CNG:AMERI1:2:1	1987	CNG	AMERI1	American 0-399	1244	50	ACCEPTED

74	20200855	2020:CNG:AMERI1:2:1	1991	CNG	AMERI1	American 0-399	3499	75	ACCEPTED
75	20200856	2020:CNG:AMERI1:2:1	1992	CNG	AMERI1	American 0-399	2022	50	ACCEPTED
76	20200857	2020:CNG:AMERI1:2:1	1993	CNG	AMERI1	American 0-399	1668	50	ACCEPTED
77	20200858	2020:CNG:AMERI1:2:1	1994	CNG	AMERI1	American 0-399	2673	50	ACCEPTED
78	20200859	2020:CNG:AMERI1:1:1	1995	CNG	AMERI1	American 0-399	4617	75	ACCEPTED
79	20200861	2020:CNG:AMERI1:1:1	2000	CNG	AMERI1	American 0-399	6760	75	ACCEPTED
80	20200862	2020:CNG:AMERI1:1:1	2001	CNG	AMERI1	American 0-399	6354	75	ACCEPTED
81	20200864	2020:CNG:AMERI1:1:1	2004	CNG	AMERI1	American 0-399	614	35	ACCEPTED
82	20200865	2020:CNG:AMERI1:1:1	2009	CNG	AMERI1	American 0-399	5261	75	ACCEPTED
83	20200866	2020:CNG:AMERI1:1:1	2010	CNG	AMERI1	American 0-399	4144	75	ACCEPTED
84	20200867	2020:CNG:ROCKW1:1:1	1994	CNG	ROCKW1	Rockwell 0-399	2763	50	ACCEPTED
85	20200868	2020:CNG:ROCKW1:1:1	1995	CNG	ROCKW1	Rockwell 0-399	1957	50	ACCEPTED
86	20200869	2020:CNG:ROCKW1:1:1	1998	CNG	ROCKW1	Rockwell 0-399	4033	75	ACCEPTED
87	20200870	2020:CNG:ROCKW1:2:1	1999	CNG	ROCKW1	Rockwell 0-399	2469	50	ACCEPTED
88	20200943	2020:CNG:AMERI3:1:1	2004	CNG	AMERI3	American 700-1000	48	15	ACCEPTED
89	20200944	2020:CNG:ROCKW2:1:1	2003	CNG	ROCKW2	Rockwell 400-699	80	12	ACCEPTED
90	20200945	2020:CNG:ROCKW2:1:1	2002	CNG	ROCKW2	Rockwell 400-699	76	10	ACCEPTED
91	20200946	2020:CNG:ROCKW1:1:1	2001	CNG	ROCKW1	Rockwell 0-399	127	38	ACCEPTED
92	20200959	2020:CNG:ROCKW1:1:1	2000	CNG	ROCKW1	Rockwell 0-399	477	25	ACCEPTED
93	20200961	2020:CNG:ROCKW1:1:1	2002	CNG	ROCKW1	Rockwell 0-399	289	20	ACCEPTED
94	20200964	2020:CNG:AMERI3:1:1	2009	CNG	AMERI3	American 700-1000	302	55	ACCEPTED
95	20200965	2020:CNG:AMERI1:1:1	1999	CNG	AMERI1	American 0-399	4342	80	ACCEPTED
96	20200966	2020:CNG:AMERI1:2:1	2003	CNG	AMERI1	American 0-399	2678	197	INCONCLUSIVE

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## RANDOM SAMPLING METER PERFORMANCE DATA

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**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.

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**RANDOM SAMPLING METER PERFORMANCE DATA**

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**METER FAMILIES BELOW ACCEPTABLE THRESHOLD LIMITS**

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

<b>Meter Family</b>	<b>Disposition Status</b>	<b>Year Disposition Initiated</b>	<b>Year Disposition Completed</b>

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**RANDOM SAMPLING METER PERFORMANCE DATA**

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**METER FAMILIES WITH INSUFFICIENTLY SIZED SAMPLE**

*One meter family in service ten or more years were found to have an insufficient sized sample.*

<b>Meter Family</b>	<b>Disposition Status</b>	<b>Year Disposition Initiated</b>	<b>Year Disposition Completed</b>
<b>2003 AMERI1</b>	<b>INCONCLUSIVE</b>	<b>2020</b>	<b>2021</b>

We could not pull the max of 224 meters for that size family in time and will do a max pull in Q1 of 2021 to get an accepted or rejected disposition status for the 2003 AMERI1 family.

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**RANDOM SAMPLING METER PERFORMANCE DATA**

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**STATUS OF METER FAMILIES PREVIOUSLY SCHEDULED FOR REMOVAL**

*Zero meter families were previously scheduled for removal in 2020.*

<b>Meter Family</b>	<b>Disposition Status</b>	<b>Year Disposition Initiated</b>	<b>Year Disposition Completed</b>



## **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.