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COMPANY NAME: Cascade Natural Gas Corporation

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2023 CNGC Gas Meter Statistical Sampling Program

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February 27, 2024

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

**RE: RG-65 Cascade's Gas Meter Statistical Sampling Program, 2023 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, 2023. These meters fall within the scope of the Company's Statistical Sampling Program as established in Rule 8, Meter Testing in the Company's natural gas 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 2023 was 84,752.

If you have any questions, please call me at (509) 379-3938.

Sincerely,

*/s/ Brett Hudson*

Brett Hudson  
Manager, Gas Measurement

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CASCADE NATURAL GAS

GAS METER  
STATISTICAL SAMPLING  
PROGRAM

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2023 RESULTS

# GAS METER STATISTICAL SAMPLING PROGRAM

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

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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, 2023, through December 31, 2023.

### Sampling Summary

Meters in the program for the plan year	<i>184,261</i>
Meters in the program at the end of the plan year	<i>179,900</i>
Total meters removed during the year	<i>4,361</i>
Meters qualifying for analysis	<i>3,735</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 are 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 meters 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 2023, In-Service Meters on 1/1/23**

Total Number of Meters for Random Sampling <sup>(a)</sup>	<i>184,261</i>
Total Number of Test Families <sup>(b)</sup>	<i>104</i>

**End of Report Year 2023 Meter Testing Quantities & Results**

Number of Meters Tested	<i>3,735</i>
Number of Meters Passed, (+/-) 2%	<i>3,616</i>
Number of Meters Failed, (+/-) 2%	<i>119</i>
Meter Families with an Overall Fail Result	<i>0</i>
Meter Families with a Fast Fail Result	<i>0</i>
Meter Families Removed/Depleted During Report Year <sup>(c)</sup>	<i>1</i>

- a) Total number of meters included in the test population, excluding recall meters and meters installed less than 10 years.
- b) Number of Meter Test Populations  $\geq$  10years old (i.e., includes meters installed in the year 2013 and earlier for the 2023 test year).
- c) Total number of meter families depleted during the report year including those removed for administrative purposes.



<b>Lot Number</b>	<b>Lot Description</b>	<b>Group Text</b>	<b>Test Area</b>	<b>Test Group</b>	<b>Lot Size</b>	<b>Meters Tested</b>	<b>Percent Done</b>	<b>Lot Status</b>
20230001	2023:CNG:AMERI1:4:1	1987	CNG	AMERI1 - American 0-399	1125	53	100.00%	Accepted
20230002	2023:CNG:AMERI1:3:1	1988	CNG	AMERI1 - American 0-399	2636	52	100.00%	Accepted
20230003	2023:CNG:AMERI1:3:1	1989	CNG	AMERI1 - American 0-399	2784	51	100.00%	Accepted
20230004	2023:CNG:AMERI1:3:1	1990	CNG	AMERI1 - American 0-399	2993	50	100.00%	Accepted
20230005	2023:CNG:AMERI1:3:1	1991	CNG	AMERI1 - American 0-399	3283	77	100.00%	Accepted
20230006	2023:CNG:AMERI1:3:1	1992	CNG	AMERI1 - American 0-399	1886	52	100.00%	Accepted
20230007	2023:CNG:AMERI1:5:1	1993	CNG	AMERI1 - American 0-399	1475	55	100.00%	Accepted
20230008	2023:CNG:AMERI1:4:1	1994	CNG	AMERI1 - American 0-399	2471	50	100.00%	Accepted
20230009	2023:CNG:AMERI1:3:1	1995	CNG	AMERI1 - American 0-399	4415	75	100.00%	Accepted
20230010	2023:CNG:AMERI1:4:1	1996	CNG	AMERI1 - American 0-399	109	10	100.00%	Accepted
20230011	2023:CNG:AMERI1:1:1	1997	CNG	AMERI1 - American 0-399	20	4	100.00%	Accepted
20230012	2023:CNG:AMERI1:1:1	1998	CNG	AMERI1 - American 0-399	128	10	100.00%	Accepted
20230013	2023:CNG:AMERI1:4:1	1999	CNG	AMERI1 - American 0-399	4078	75	100.00%	Accepted
20230014	2023:CNG:AMERI1:3:1	2000	CNG	AMERI1 - American 0-399	6513	79	100.00%	Accepted
20230015	2023:CNG:AMERI1:4:1	2001	CNG	AMERI1 - American 0-399	6146	76	100.00%	Accepted
20230016	2023:CNG:AMERI1:3:1	2002	CNG	AMERI1 - American 0-399	6929	76	100.00%	Accepted
20230017	2023:CNG:AMERI1:3:1	2003	CNG	AMERI1 - American 0-399	2195	50	100.00%	Accepted
20230018	2023:CNG:AMERI1:2:1	2004	CNG	AMERI1 - American 0-399	531	35	100.00%	Accepted
20230019	2023:CNG:AMERI1:4:1	2005	CNG	AMERI1 - American 0-399	7181	76	100.00%	Accepted
20230020	2023:CNG:AMERI1:3:1	2006	CNG	AMERI1 - American 0-399	9490	76	100.00%	Accepted
20230021	2023:CNG:AMERI1:3:1	2007	CNG	AMERI1 - American 0-399	7263	77	100.00%	Accepted
20230022	2023:CNG:AMERI1:3:1	2008	CNG	AMERI1 - American 0-399	6172	76	100.00%	Accepted
20230023	2023:CNG:AMERI1:3:1	2009	CNG	AMERI1 - American 0-399	5033	77	100.00%	Accepted
20230024	2023:CNG:AMERI1:5:1	2010	CNG	AMERI1 - American 0-399	3848	75	100.00%	Accepted
20230025	2023:CNG:AMERI1:4:1	2011	CNG	AMERI1 - American 0-399	4756	75	100.00%	Accepted
20230026	2023:CNG:AMERI1:3:1	2012	CNG	AMERI1 - American 0-399	4852	75	100.00%	Accepted
20230027	2023:CNG:AMERI1:3:1	2013	CNG	AMERI1 - American 0-399	5503	77	100.00%	Accepted
20230028	2023:CNG:AMERI2:1:1	2013	CNG	AMERI2 - American 400-699	1	1	100.00%	Depleted
20230029	2023:CNG:AMERI3:4:1	2005	CNG	AMERI3 - American 700-1000	7	2	100.00%	Accepted

20230030	2023:CNG:AMERI3:2:1	2006	CNG	AMERI3 - American 700-1000	33	5	100.00%	Accepted
20230031	2023:CNG:AMERI3:3:1	2007	CNG	AMERI3 - American 700-1000	63	7	100.00%	Accepted
20230032	2023:CNG:AMERI3:4:1	2008	CNG	AMERI3 - American 700-1000	245	18	100.00%	Accepted
20230033	2023:CNG:AMERI3:2:1	2009	CNG	AMERI3 - American 700-1000	247	16	100.00%	Accepted
20230034	2023:CNG:AMERI3:2:1	2010	CNG	AMERI3 - American 700-1000	188	15	100.00%	Accepted
20230035	2023:CNG:AMERI3:2:1	2011	CNG	AMERI3 - American 700-1000	205	16	100.00%	Accepted
20230036	2023:CNG:AMERI3:3:1	2012	CNG	AMERI3 - American 700-1000	331	20	100.00%	Accepted
20230037	2023:CNG:AMERI3:2:1	2013	CNG	AMERI3 - American 700-1000	217	15	100.00%	Accepted
20230038	2023:CNG:ROCKW1:3:1	1986	CNG	ROCKW1 - Rockwell 0-399	712	35	100.00%	Accepted
20230039	2023:CNG:ROCKW1:3:1	1987	CNG	ROCKW1 - Rockwell 0-399	1483	50	100.00%	Accepted
20230040	2023:CNG:ROCKW1:3:1	1988	CNG	ROCKW1 - Rockwell 0-399	1873	52	100.00%	Accepted
20230041	2023:CNG:ROCKW1:4:1	1989	CNG	ROCKW1 - Rockwell 0-399	3588	77	100.00%	Accepted
20230042	2023:CNG:ROCKW1:4:1	1990	CNG	ROCKW1 - Rockwell 0-399	2305	52	100.00%	Accepted
20230043	2023:CNG:ROCKW1:4:1	1991	CNG	ROCKW1 - Rockwell 0-399	4144	76	100.00%	Accepted
20230044	2023:CNG:ROCKW1:4:1	1992	CNG	ROCKW1 - Rockwell 0-399	5706	75	100.00%	Accepted
20230045	2023:CNG:ROCKW1:3:1	1993	CNG	ROCKW1 - Rockwell 0-399	5716	75	100.00%	Accepted
20230046	2023:CNG:ROCKW1:3:1	1994	CNG	ROCKW1 - Rockwell 0-399	2604	50	100.00%	Accepted
20230047	2023:CNG:ROCKW1:3:1	1995	CNG	ROCKW1 - Rockwell 0-399	1815	51	100.00%	Accepted
20230048	2023:CNG:ROCKW1:3:1	1996	CNG	ROCKW1 - Rockwell 0-399	898	40	100.00%	Accepted
20230049	2023:CNG:ROCKW1:2:1	1997	CNG	ROCKW1 - Rockwell 0-399	217	16	100.00%	Accepted
20230050	2023:CNG:ROCKW1:4:1	1998	CNG	ROCKW1 - Rockwell 0-399	3731	77	100.00%	Accepted
20230051	2023:CNG:ROCKW1:4:1	1999	CNG	ROCKW1 - Rockwell 0-399	2258	50	100.00%	Accepted
20230052	2023:CNG:ROCKW1:3:1	2000	CNG	ROCKW1 - Rockwell 0-399	413	26	100.00%	Accepted
20230053	2023:CNG:ROCKW1:1:1	2001	CNG	ROCKW1 - Rockwell 0-399	62	7	100.00%	Accepted
20230054	2023:CNG:ROCKW1:1:1	2002	CNG	ROCKW1 - Rockwell 0-399	246	15	100.00%	Accepted
20230055	2023:CNG:ROCKW1:2:1	2003	CNG	ROCKW1 - Rockwell 0-399	375	21	100.00%	Accepted
20230056	2023:CNG:ROCKW1:1:1	2004	CNG	ROCKW1 - Rockwell 0-399	100	10	100.00%	Accepted
20230057	2023:CNG:ROCKW1:2:1	2005	CNG	ROCKW1 - Rockwell 0-399	51	7	100.00%	Accepted
20230058	2023:CNG:ROCKW1:1:1	2006	CNG	ROCKW1 - Rockwell 0-399	7	3	100.00%	Accepted
20230059	2023:CNG:ROCKW1:3:1	2007	CNG	ROCKW1 - Rockwell 0-399	138	10	100.00%	Accepted
20230060	2023:CNG:ROCKW1:3:1	2008	CNG	ROCKW1 - Rockwell 0-399	155	17	100.00%	Accepted

20230061	2023:CNG:ROCKW1:3:1	2009	CNG	ROCKW1 - Rockwell 0-399	193	15	100.00%	Accepted
20230062	2023:CNG:ROCKW1:2:1	2010	CNG	ROCKW1 - Rockwell 0-399	370	21	100.00%	Accepted
20230063	2023:CNG:ROCKW1:1:1	2011	CNG	ROCKW1 - Rockwell 0-399	103	10	100.00%	Accepted
20230064	2023:CNG:ROCKW1:2:1	2012	CNG	ROCKW1 - Rockwell 0-399	280	15	100.00%	Accepted
20230065	2023:CNG:ROCKW1:3:1	2013	CNG	ROCKW1 - Rockwell 0-399	227	15	100.00%	Accepted
20230066	2023:CNG:ROCKW2:1:1	2002	CNG	ROCKW2 - Rockwell 400-699	34	5	100.00%	Accepted
20230067	2023:CNG:ROCKW2:2:1	2003	CNG	ROCKW2 - Rockwell 400-699	28	6	100.00%	Accepted
20230068	2023:CNG:ROCKW2:2:1	2006	CNG	ROCKW2 - Rockwell 400-699	47	5	100.00%	Accepted
20230069	2023:CNG:ROCKW2:4:1	2007	CNG	ROCKW2 - Rockwell 400-699	131	15	100.00%	Accepted
20230070	2023:CNG:ROCKW2:2:1	2008	CNG	ROCKW2 - Rockwell 400-699	263	15	100.00%	Accepted
20230071	2023:CNG:ROCKW2:4:1	2009	CNG	ROCKW2 - Rockwell 400-699	290	20	100.00%	Accepted
20230072	2023:CNG:ROCKW2:2:1	2010	CNG	ROCKW2 - Rockwell 400-699	233	15	100.00%	Accepted
20230073	2023:CNG:ROCKW2:3:1	2011	CNG	ROCKW2 - Rockwell 400-699	359	20	100.00%	Accepted
20230074	2023:CNG:ROCKW2:3:1	2012	CNG	ROCKW2 - Rockwell 400-699	406	25	100.00%	Accepted
20230075	2023:CNG:ROCKW2:3:1	2013	CNG	ROCKW2 - Rockwell 400-699	452	25	100.00%	Accepted
20230076	2023:CNG:SPRAG1:2:1	1986	CNG	SPRAG1 - Sprague 0-399	361	20	100.00%	Accepted
20230077	2023:CNG:SPRAG1:4:1	1987	CNG	SPRAG1 - Sprague 0-399	600	35	100.00%	Accepted
20230078	2023:CNG:SPRAG1:3:1	1988	CNG	SPRAG1 - Sprague 0-399	1003	35	100.00%	Accepted
20230079	2023:CNG:SPRAG1:4:1	1989	CNG	SPRAG1 - Sprague 0-399	1665	50	100.00%	Accepted
20230080	2023:CNG:SPRAG1:4:1	1990	CNG	SPRAG1 - Sprague 0-399	1407	51	100.00%	Accepted
20230081	2023:CNG:SPRAG1:5:1	1991	CNG	SPRAG1 - Sprague 0-399	1014	35	100.00%	Accepted
20230082	2023:CNG:SPRAG1:4:1	1992	CNG	SPRAG1 - Sprague 0-399	989	35	100.00%	Accepted
20230083	2023:CNG:SPRAG1:6:1	1993	CNG	SPRAG1 - Sprague 0-399	3056	52	100.00%	Accepted
20230084	2023:CNG:SPRAG1:5:1	1994	CNG	SPRAG1 - Sprague 0-399	4425	76	100.00%	Accepted
20230085	2023:CNG:SPRAG1:4:1	1995	CNG	SPRAG1 - Sprague 0-399	3654	76	100.00%	Accepted
20230086	2023:CNG:SPRAG1:4:1	1996	CNG	SPRAG1 - Sprague 0-399	4675	79	100.00%	Accepted
20230087	2023:CNG:SPRAG1:5:1	1997	CNG	SPRAG1 - Sprague 0-399	6229	77	100.00%	Accepted
20230088	2023:CNG:SPRAG1:5:1	1998	CNG	SPRAG1 - Sprague 0-399	2794	51	100.00%	Accepted
20230089	2023:CNG:SPRAG1:2:1	1999	CNG	SPRAG1 - Sprague 0-399	247	16	100.00%	Accepted
20230090	2023:CNG:SPRAG1:1:1	2000	CNG	SPRAG1 - Sprague 0-399	57	7	100.00%	Accepted
20230091	2023:CNG:SPRAG1:3:1	2001	CNG	SPRAG1 - Sprague 0-399	597	35	100.00%	Accepted

20230092	2023:CNG:SPRAG1:4:1	2002	CNG	SPRAG1 - Sprague 0-399	244	15	100.00%	Accepted
20230093	2023:CNG:SPRAG1:3:1	2003	CNG	SPRAG1 - Sprague 0-399	466	37	100.00%	Accepted
20230094	2023:CNG:SPRAG1:1:1	2004	CNG	SPRAG1 - Sprague 0-399	7	3	100.00%	Accepted
20230095	2023:CNG:SPRAG1:1:1	2005	CNG	SPRAG1 - Sprague 0-399	71	7	100.00%	Accepted
20230096	2023:CNG:SPRAG1:1:1	2006	CNG	SPRAG1 - Sprague 0-399	33	5	100.00%	Accepted
20230097	2023:CNG:SPRAG1:1:1	2007	CNG	SPRAG1 - Sprague 0-399	119	10	100.00%	Accepted
20230098	2023:CNG:SPRAG1:1:1	2008	CNG	SPRAG1 - Sprague 0-399	24	4	100.00%	Accepted
20230099	2023:CNG:SPRAG1:2:1	2009	CNG	SPRAG1 - Sprague 0-399	171	15	100.00%	Accepted
20230100	2023:CNG:SPRAG1:2:1	2010	CNG	SPRAG1 - Sprague 0-399	258	15	100.00%	Accepted
20230102	2023:CNG:SPRAG1:4:1	2012	CNG	SPRAG1 - Sprague 0-399	259	17	100.00%	Accepted
20230103	2023:CNG:SPRAG1:1:1	2013	CNG	SPRAG1 - Sprague 0-399	222	15	100.00%	Accepted
20230104	2023:CNG:SPRAG2:1:1	2013	CNG	SPRAG2 - Sprague400-699	16	4	100.00%	Accepted
20230665	2023:CNG:SPRAG1:1:1	2011	CNG	SPRAG1 - Sprague 0-399	149	10	100.00%	Accepted

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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.

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

**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**

*Zero meter families 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>

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**RANDOM SAMPLING METER PERFORMANCE DATA**

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**METER FAMILIES DEPLETED DURING THE YEAR**

*One meter family was depleted during the 2023 sample year.*

<b>Meter Family</b>	<b>Disposition Status</b>	<b>Year Disposition Initiated</b>	<b>Year Disposition Completed</b>
<b>2013 AMERI2</b>	<b>Depleted</b>	<b>2023</b>	<b>2023</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 1000 cfh capacity and below 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 practical 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.