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January 4, 2011



Darrell Nitschke
Public Utilities Division
ND Public Service Commission
600 E Boulevard, Dept. 408
Bismarck, ND 58505

Re: Otter Tail Power Company's 2010 Sample Meter Test Performance Report

Dear Mr. Nitschke:

Pursuant to North Dakota Rule 69-06-02-28(3), enclosed are results from the 2010 single-phase kWh sample meter test program for Otter Tail Power Company. There were seven groups of meters selected for the 2010 sample test. Criterion for selecting the groups, as set forth in the tariff, was based on the time period the meters were purchased, manufacturer and model of meters. The meters were grouped as follows:

1. GE and SI meters purchased from 2000 to present.
2. GE, model I70S meters purchased from 1969 to 2000.
3. SI model J4S, J5S meters purchased from 1969 to 2000.
4. LG model MS, MX meters purchased from 1969 to 2000.
5. ABB model D4S meters purchased from 1969 to 1974.
6. ABB model D4S meters purchased from 1975 to 1982.
7. GE model I50S meters.

The results of the sample test this year indicates that two groups of meters failed the sample test. One group is ABB meters manufactured from 1969 to 1974. There are approximately 8,200 of these meters in service. The other group is ABB meters manufactured from 1975 through 1982. There are approximately 11,300 of these meters in service. These meters will be removed from service within the next five years. The other groups passed the test and are performing satisfactorily.

In 2009, ABB meters manufactured from 1990 to 1998 failed the sample test. In 2008, the ABB Model AB1 meters failed the sample test. These meters are being removed from service. In 2011, a second larger sample of these meters will be taken.

Mr. Darrell Nitschke

January 4, 2011

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An electronic copy of this filing is being sent to you at dnitschk@nd.gov and to ndpsc@nd.gov. These items are filed for your information. If you have any questions, please contact me at 218-739-8395 or jfyhrie@otpc.com.

Very truly yours,

/s/ JESSICA FYHRIE

Jessica Fyhrie

Tariff Specialist, Tariff Application and Compliance

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Enclosures

By electronic filing

SAMPLE METER TEST CALCULATION FORM

METERS IN SERVICE AT OTTER TAIL POWER CO.

REFERENCE - TABLES A-2, B-3, B-4, B-5, AND EXAMPLE B-3 OF MIL-STD-414.

TYPE OF METERS IN THIS SAMPLE: 2010 Sample #1

LOT SIZE 200 SAMPLE SIZE 134 AQL 2.5

FL BAR X 99.860 **FL SIGMA** 0.250
LL BAR X 99.570 **LL SIGMA** 0.614

ESTIMATE OF LOT ABOVE 102.0%

$$FL\ QU = \frac{102 - FL\ BAR\ X}{FL\ SIGMA} = \frac{102 - 99.86}{0.25} = \frac{2.140}{0.250} = 8.56$$

$$LL\ QU = \frac{102 - LL\ BAR\ X}{LL\ SIGMA} = \frac{102 - 99.57}{0.614} = \frac{2.430}{0.614} = 3.96$$

From Table B-5 = 0 % PU FL above 102.0%

0 % PU LL above 102.0 %

ESTIMATE OF LOT BELOW 98.0%

$$FL\ QL = \frac{FL\ BAR\ X - 98}{FL\ SIGMA} = \frac{99.86 - 98}{0.25} = \frac{1.860}{0.250} = 7.44$$

$$LL\ QL = \frac{LL\ BAR\ X - 98}{LL\ SIGMA} = \frac{99.57 - 98}{0.614} = \frac{1.570}{0.614} = 2.56$$

From table B-5 = 0 % PL FL below 98.0 %

0.496 % PL LL below 98.0 %

TOTAL PERCENT DEFECTIVE

Full Load P = PU FL + PL FL 0 + 0 = 0.000

Light Load P = PU LL + PL LL 0 + 0.496 = 0.496

ALLOWABLE PERCENT DEFECTIVE: TABLE B-3 4.4

OUTLIERS

UFL = FL BAR X + (4 x FL Sigma) 99.860 + 1 UFL = 100.86

LFL = FL BAR X - (4 x FL Sigma) 99.860 - 1 LFL = 98.86

ULL = LL BAR X + (4 x LL Sigma) 99.570 + 2.456 ULL = 102.026

LLL = LL BAR X - (4 x LL Sigma) 99.570 - 2.456 LLL = 97.114

Lot is acceptable x Lot is unacceptable

Tested & Reported by: Steve Ness 12-27-10

Approved: Wes Evavold 12-28-10

**SAMPLE METER TEST CALCULATION FORM
METERS IN SERVICE AT OTTER TAIL POWER CO.**

REFERENCE - TABLES A-2, B-3, B-4, B-5, AND EXAMPLE B-3 OF MIL-STD-414.

TYPE OF METERS IN THIS SAMPLE: 2010 Sample #2

LOT SIZE 100 SAMPLE SIZE 95 AQL 2.5
FL BAR X 100.019 **FL SIGMA** 0.233
LL BAR X 99.723 **LL SIGMA** 0.531

ESTIMATE OF LOT ABOVE 102.0%

$$FL\ QU = \frac{102 - FL\ BAR\ X}{FL\ SIGMA} = \frac{102 - 100.019}{0.233} = \frac{1.981}{0.233} = 8.50$$

$$LL\ QU = \frac{102 - LL\ BAR\ X}{LL\ SIGMA} = \frac{102 - 99.723}{0.531} = \frac{2.277}{0.531} = 4.29$$

From Table B-5 = 0 % PU FL above 102.0%
0 % PU LL above 102.0 %

ESTIMATE OF LOT BELOW 98.0%

$$FL\ QL = \frac{FL\ BAR\ X - 98}{FL\ SIGMA} = \frac{100.019 - 98}{0.233} = \frac{2.019}{0.233} = 8.67$$

$$LL\ QL = \frac{LL\ BAR\ X - 98}{LL\ SIGMA} = \frac{99.723 - 98}{0.531} = \frac{1.723}{0.531} = 3.24$$

From table B-5 = 0 % PL FL below 98.0 %
0.044 % PL LL below 98.0 %

TOTAL PERCENT DEFECTIVE

Full Load P = PU FL + PL FL 0 + 0 = 0.000
 Light Load P = PU LL + PL LL 0 + 0.044 = 0.044
 ALLOWABLE PERCENT DEFECTIVE: TABLE B-3 4.69

OUTLIERS

UFL = FL BAR X + (4 x FL Sigma) 100.019 + 0.932 UFL = 100.951
 LFL = FL BAR X - (4 x FL Sigma) 100.019 - 0.932 LFL = 99.087
 ULL = LL BAR X + (4 x LL Sigma) 99.723 + 2.124 ULL = 101.847
 LLL = LL BAR X - (4 x LL Sigma) 99.723 - 2.124 LLL = 97.599

Lot is acceptable x Lot is unacceptable _____

Tested & Reported by: Steve Ness 12-27-10 Approved: Wes Evavold 12-28-10

**SAMPLE METER TEST CALCULATION FORM
METERS IN SERVICE AT OTTER TAIL POWER CO.**

REFERENCE - TABLES A-2, B-3, B-4, B-5, AND EXAMPLE B-3 OF MIL-STD-414.

TYPE OF METERS IN THIS SAMPLE: 2010 Sample #3

LOT SIZE 100 SAMPLE SIZE 101 AQL 2.5

FL BAR X 99.835 **FL SIGMA** 0.289
LL BAR X 99.638 **LL SIGMA** 0.465

ESTIMATE OF LOT ABOVE 102.0%

$$FL\ QU = \frac{102 - FL\ BAR\ X}{FL\ SIGMA} = \frac{102 - 99.835}{0.289} = \frac{2.165}{0.289} = 7.49$$

$$LL\ QU = \frac{102 - LL\ BAR\ X}{LL\ SIGMA} = \frac{102 - 99.638}{0.465} = \frac{2.362}{0.465} = 5.08$$

From Table B-5 = 0 % PU FL above 102.0%
0 % PU LL above 102.0 %

ESTIMATE OF LOT BELOW 98.0%

$$FL\ QL = \frac{FL\ BAR\ X - 98}{FL\ SIGMA} = \frac{99.835 - 98}{0.289} = \frac{1.835}{0.289} = 6.35$$

$$LL\ QL = \frac{LL\ BAR\ X - 98}{LL\ SIGMA} = \frac{99.638 - 98}{0.465} = \frac{1.638}{0.465} = 3.52$$

From table B-5 = 0 % PL FL below 98.0 %
0.014 % PL LL below 98.0 %

TOTAL PERCENT DEFECTIVE

Full Load P = PU FL + PL FL 0 + 0 = 0.000
 Light Load P = PU LL + PL LL 0 + 0.014 = 0.014

ALLOWABLE PERCENT DEFECTIVE: TABLE B-3 4.69

OUTLIERS

UFL = FL BAR X + (4 x FL Sigma) 99.835 + 1.156 UFL = 100.991
 LFL = FL BAR X - (4 x FL Sigma) 99.835 - 1.156 LFL = 98.679

ULL = LL BAR X + (4 x LL Sigma) 99.638 + 1.86 ULL = 101.498
 LLL = LL BAR X - (4 x LL Sigma) 99.638 - 1.86 LLL = 97.778

Lot is acceptable x Lot is unacceptable _____

Tested & Reported by: Steve Ness 12-27-10 Approved: Wes Evavold 12-28-10

**SAMPLE METER TEST CALCULATION FORM
METERS IN SERVICE AT OTTER TAIL POWER CO.**

REFERENCE - TABLES A-2, B-3, B-4, B-5, AND EXAMPLE B-3 OF MIL-STD-414.

TYPE OF METERS IN THIS SAMPLE: 2010 Sample #4

LOT SIZE 100 SAMPLE SIZE 58 AQL 2.5

FL BAR X 100.017 **FL SIGMA** 0.278
LL BAR X 99.683 **LL SIGMA** 0.567

ESTIMATE OF LOT ABOVE 102.0%

$$FL\ QU = \frac{102 - FL\ BAR\ X}{FL\ SIGMA} = \frac{102 - 100.017}{0.278} = \frac{1.983}{0.278} = 7.13$$

$$LL\ QU = \frac{102 - LL\ BAR\ X}{LL\ SIGMA} = \frac{102 - 99.683}{0.567} = \frac{2.317}{0.567} = 4.09$$

From Table B-5 = 0 % PU FL above 102.0%
0 % PU LL above 102.0 %

ESTIMATE OF LOT BELOW 98.0%

$$FL\ QL = \frac{FL\ BAR\ X - 98}{FL\ SIGMA} = \frac{100.017 - 98}{0.278} = \frac{2.017}{0.278} = 7.26$$

$$LL\ QL = \frac{LL\ BAR\ X - 98}{LL\ SIGMA} = \frac{99.683 - 98}{0.567} = \frac{1.683}{0.567} = 2.97$$

From table B-5 = 0 % PL FL below 98.0 %
0.121 % PL LL below 98.0 %

TOTAL PERCENT DEFECTIVE

Full Load P = PU FL + PL FL 0 + 0 = 0.000
 Light Load P = PU LL + PL LL 0 + 0.121 = 0.121

ALLOWABLE PERCENT DEFECTIVE: TABLE B-3 4.69

OUTLIERS

UFL = FL BAR X + (4 x FL Sigma) 100.017 + 1.112 UFL = 101.129
 LFL = FL BAR X - (4 x FL Sigma) 100.017 - 1.112 LFL = 98.905

ULL = LL BAR X + (4 x LL Sigma) 99.683 + 2.268 ULL = 101.951
 LLL = LL BAR X - (4 x LL Sigma) 99.683 - 2.268 LLL = 97.415

Lot is acceptable x Lot is unacceptable _____

Tested & Reported by: Steve Ness 12-27-10 Approved: Wes Evavold 12-28-10

SAMPLE METER TEST CALCULATION FORM

METERS IN SERVICE AT OTTER TAIL POWER CO.

REFERENCE - TABLES A-2, B-3, B-4, B-5, AND EXAMPLE B-3 OF MIL-STD-414.

TYPE OF METERS IN THIS SAMPLE: 2010 Sample #5_1

LOT SIZE 100 SAMPLE SIZE 94 AQL 2.5

FL BAR X 99.961 **FL SIGMA** 0.289

LL BAR X 99.718 **LL SIGMA** 0.984

ESTIMATE OF LOT ABOVE 102.0%

$$FL\ QU = \frac{102 - FL\ BAR\ X}{FL\ SIGMA} = \frac{102 - 99.961}{0.289} = \frac{2.039}{0.289} = 7.06$$

$$LL\ QU = \frac{102 - LL\ BAR\ X}{LL\ SIGMA} = \frac{102 - 99.718}{0.984} = \frac{2.282}{0.984} = 2.32$$

From Table B-5 = 0 % PU FL above 102.0%

0.947 % PU LL above 102.0 %

ESTIMATE OF LOT BELOW 98.0%

$$FL\ QL = \frac{FL\ BAR\ X - 98}{FL\ SIGMA} = \frac{99.961 - 98}{0.289} = \frac{1.961}{0.289} = 6.79$$

$$LL\ QL = \frac{LL\ BAR\ X - 98}{LL\ SIGMA} = \frac{99.718 - 98}{0.984} = \frac{1.718}{0.984} = 1.75$$

From table B-5 = 0 % PL FL below 98.0 %

3.93 % PL LL below 98.0 %

TOTAL PERCENT DEFECTIVE

Full Load P = PU FL + PL FL 0 + 0 = 0.000

Light Load P = PU LL + PL LL 0.947 + 3.93 = 4.877

ALLOWABLE PERCENT DEFECTIVE: TABLE B-3 4.69

OUTLIERS

UFL = FL BAR X + (4 x FL Sigma) 99.961 + 1.156 UFL = 101.117

LFL = FL BAR X - (4 x FL Sigma) 99.961 - 1.156 LFL = 98.805

ULL = LL BAR X + (4 x LL Sigma) 99.718 + 3.936 ULL = 103.654

LLL = LL BAR X - (4 x LL Sigma) 99.718 - 3.936 LLL = 95.782

Lot is acceptable _____

Lot is unacceptable **X**

Tested & Reported by: Steve Ness 12-27-10

Approved: Wes Evavold 12-28-10

**SAMPLE METER TEST CALCULATION FORM
METERS IN SERVICE AT OTTER TAIL POWER CO.**

REFERENCE - TABLES A-2, B-3, B-4, B-5, AND EXAMPLE B-3 OF MIL-STD-414.

TYPE OF METERS IN THIS SAMPLE: 2010 Sample #6_1

LOT SIZE _____ SAMPLE SIZE 86 AQL 2.5

FL BAR X 99.946 **FL SIGMA** 0.399
LL BAR X 99.602 **LL SIGMA** 1.097

ESTIMATE OF LOT ABOVE 102.0%

$$FL\ QU = \frac{102 - FL\ BAR\ X}{FL\ SIGMA} = \frac{102 - 99.946}{0.399} = \frac{2.054}{0.399} = \underline{5.15}$$

$$LL\ QU = \frac{102 - LL\ BAR\ X}{LL\ SIGMA} = \frac{102 - 99.602}{1.097} = \frac{2.398}{1.097} = \underline{2.19}$$

From Table B-5 = 0 % PU FL above 102.0%
1.35 % PU LL above 102.0 %

ESTIMATE OF LOT BELOW 98.0%

$$FL\ QL = \frac{FL\ BAR\ X - 98}{FL\ SIGMA} = \frac{99.946 - 98}{0.399} = \frac{1.946}{0.399} = \underline{4.88}$$

$$LL\ QL = \frac{LL\ BAR\ X - 98}{LL\ SIGMA} = \frac{99.602 - 98}{1.097} = \frac{1.602}{1.097} = \underline{1.46}$$

From table B-5 = 0 % PL FL below 98.0 %
7.16 % PL LL below 98.0 %

TOTAL PERCENT DEFECTIVE

Full Load P = PU FL + PL FL 0 + 0 = 0.000

Light Load P = PU LL + PL LL 1.35 + 7.16 = 8.510

ALLOWABLE PERCENT DEFECTIVE: TABLE B-3 4.69

OUTLIERS

UFL = FL BAR X + (4 x FL Sigma) 99.946 + 1.596 UFL = 101.542

LFL = FL BAR X - (4 x FL Sigma) 99.946 - 1.596 LFL = 98.35

ULL = LL BAR X + (4 x LL Sigma) 99.602 + 4.388 ULL = 103.99

LLL = LL BAR X - (4 x LL Sigma) 99.602 - 4.388 LLL = 95.214

Lot is acceptable _____ Lot is unacceptable **X**

Tested & Reported by: Steve Ness 12-27-10

Approved: Wes Evavold 12-28-10

**SAMPLE METER TEST CALCULATION FORM
METERS IN SERVICE AT OTTER TAIL POWER CO.**

REFERENCE - TABLES A-2, B-3, B-4, B-5, AND EXAMPLE B-3 OF MIL-STD-414.

TYPE OF METERS IN THIS SAMPLE:	<u>2010 Sample #7</u>		
LOT SIZE <u>100</u>	SAMPLE SIZE <u>95</u>	AQL <u>2.5</u>	
FL BAR X <u>99.972</u>	FL SIGMA <u>0.539</u>		
LL BAR X <u>99.915</u>	LL SIGMA <u>0.765</u>		

ESTIMATE OF LOT ABOVE 102.0%

$$FL\ QU = \frac{102 - FL\ BAR\ X}{FL\ SIGMA} = \frac{102 - 99.972}{0.539} = \frac{2.028}{0.539} = \underline{3.76}$$

$$LL\ QU = \frac{102 - LL\ BAR\ X}{LL\ SIGMA} = \frac{102 - 99.915}{0.765} = \frac{2.085}{0.765} = \underline{2.73}$$

From Table B-5 = 0.005 % PU FL above 102.0%

0.274 % PU LL above 102.0 %

ESTIMATE OF LOT BELOW 98.0%

$$FL\ QL = \frac{FL\ BAR\ X - 98}{FL\ SIGMA} = \frac{99.972 - 98}{0.539} = \frac{1.972}{0.539} = \underline{3.66}$$

$$LL\ QL = \frac{LL\ BAR\ X - 98}{LL\ SIGMA} = \frac{99.915 - 98}{0.765} = \frac{1.915}{0.765} = \underline{2.50}$$

From table B-5 = 0.008 % PL FL below 98.0 %

0.563 % PL LL below 98.0 %

TOTAL PERCENT DEFECTIVE

Full Load P = PU FL + PL FL 0.005 + 0.008 = 0.013

Light Load P = PU LL + PL LL 0.274 + 0.563 = 0.837

ALLOWABLE PERCENT DEFECTIVE: TABLE B-3 4.69

OUTLIERS

UFL = FL BAR X + (4 x FL Sigma) 99.972 + 2.156 UFL = 102.128

LFL = FL BAR X - (4 x FL Sigma) 99.972 - 2.156 LFL = 97.816

ULL = LL BAR X + (4 x LL Sigma) 99.915 + 3.06 ULL = 102.975

LLL = LL BAR X - (4 x LL Sigma) 99.915 - 3.06 LLL = 96.855

Lot is acceptable X Lot is unacceptable _____

Tested & Reported by: Steve Ness 12-27-10

Approved: Wes Evavold 12-28-10