Customer Name: _____ Date: _____

Tester Name: _____

Secondary Neutral Voltage Drop Test Form

(All farm loads must be off except the service being tested and only proxy load should be on or off)

		Site # 1	Site # 2	Site # 3	Site # 4	Site # 5	Units
A.	Site Description						
B.	Secondary Feed Neutral Wire Wire Gauge/Type (AL or CU)						AWG/
C.	Neutral Wire Length (in 100's ft.)						100 ft.
D.	Ohms (per 100 feet)						Ohms
E.	Total Ohms (C times D)						Ohms
F.	Measured Neutral Current (with Proxy Load On)						A
G.	Calculated Voltage Drop (E times F)						V
H.	Measured Voltage Drop						V
I.	Percent Difference ([(G-H)]/H*100)						%
Proxy Load OFF	Measured Vp						V
	Measured Vs						V
	Measured Vcc or Icc						V/A
Proxy Load ON	Measured Vp						V
	Measured Vs						V
	Measured Vcc or Icc						V/A

Proxy Load Used: _____

Notes: _____

Equipment Information

Meter 1 _____ Serial # _____

Meter 2 _____ Serial # _____

Meter 3 _____ Serial # _____

Form Instructions

1) The secondary neutral voltage drop test is set forth in ARSD 20:10:39:42 through ARSD 20:10:39:46.
2) The test shall be performed for all service entrances (referred to as sites in the data form).
3) A proxy load of known characteristics is required for the test. The proxy load must create a known and stable current and subsequent voltage drop for each neutral serving a main panel, sub-panel, or end-of-service area.
4) All service entrances not being tested must be turned off.
5) Take measurements and complete the form for each service entrance (site) as follows:
    1) Row A - provide a description of the site in (e.g. "barn," "home," "parlor," etc...);
    2) Row B - document the gauge and type of neutral wire;
    3) Row C - measure and record the length of the neutral wire;
    4) Row D - Using the resistance chart below, document the resistance of the neutral wire per 100 feet based on wire gauge and material;
    5) Row E - calculate the neutral wire's total resistance by multiplying row C by row D;
    6) Row F - measure and record the neutral wire current with the proxy load on;
    7) Row G - calculate the voltage drop by multiplying row E by row F;
    8) Row H - measure the voltage drop between both ends of the secondary neutral being tested;
    9) Row I - calculate the difference between the calculated voltage drop and measured voltage drop by subtracting row H from row G, then divide by row G and multiply by 100;
    10) Measure and record the cow contact voltage (Vcc) or cow contact current (Icc) at the same points used in the 48 hour test with the proxy load on and proxy load off;
    11) Measure and record the voltage from the primary neutral at the transformer to the remote reference electrode (Vp) with the proxy load on and proxy load off; and
    12) Measure and record the voltage from the secondary neutral in the service panel serving the area of the cow contact point to the remote reference electrode (Vs) with the proxy load on and proxy load off.

Resistance Chart (Ohms per 100ft)

Gauge	AL	CU	Gauge	AL	CU
14	0.42	0.26	**2**	0.027	0.016
12	0.26	0.16	**1/0**	0.017	0.01
10	0.17	0.1	**2\0**	0.013	0.008
8	0.11	0.064	**3\0**	0.011	0.006
6	0.067	0.041	**4\0**	0.008	0.005
4	0.039	0.026	**250 MCM**	0.0085	0.0052