

Customer Name: _____
 Tester Name: _____
 Test Meter Type: _____
 Serial #: _____

Start Date: _____
 Start Time: _____
 Stop Date: _____
 Stop Time: _____

48 Hour Test Form

Form Instructions

- 1) The 48 hour test is set forth in ARSD 20:10:39:34 through ARSD 20:10:39:37.
- 2) A digitizing data recorder, with averaging capability and capable of detecting and recording transient deviations of one-tenth of a second or less in duration is used to record the following:
 - i) voltage from primary neutral at the transformer to the remote reference electrode (Vp);
 - ii) voltage from secondary neutral in the service panel serving the area of the cow contact point to the remote reference electrode (Vs);
 - iii) voltage from primary neutral at the transformer to secondary neutral at the service panel serving the area of cow contact (Vps);
 - iv) cow contact current (Icc) through or cow contact voltage (Vcc) across a shunt resistor at each high voltage point found in the cow contact test; and
 - v) the shunt resistor must be 500 ohms, plus or minus two percent.
- 3) A recording interval of not more than ten seconds may be used if the transient deviations of voltage or current are one-tenth of a second or less in duration and are recorded to the maximum ability of the instrument.
- 4) All of the data gathered by the recording equipment during the test, including transient deviations, shall be downloaded and retained with the records of the investigation.
- 5) Provide a description for the channels of each meter used. The description can be Vp, Vs, Vps, or cow contact number with the associated location and measurement used (Vcc or Icc).
- 6) Complete the reference electrode remoteness check.
- 7) For each cow contact location tested, calculate the source resistance (Rsource) by using the open circuit voltage (Voc), voltage across the shunt resistor (Vshunt), and shunt resistance (Rshunt). Compare the calculated Rsource to the measured Rsource.
- 8) The steady-state data shall be summarized in the investigation report. After analyzing the data required in step 2 (above), complete the steady state data on page 2 of this form.
- 9) The location of each test point and the values measured at each test point shall be recorded.
- 10) The identification of the cow contact point and transient deviations shall be recorded on this form. A transient deviation occurs when the recorded maximum Vcc or Icc in a recording interval exceeds 200% of the steady-state Vcc or Icc during the same recording interval.
- 11) A plot of voltage versus time may be substituted for the recording of measured values. If the measured values are recorded, complete the following tables:
 - i) Steady State Data Table (on page 3) - record the measured values for each hour of the test, which include: 1) the specific time that the highest steady state value of Vcc/Icc was recorded in that hour, 2) all corresponding data points recorded at that time (Vp, Vs, Vps, and Vcc/Icc), and the total time during the hour that the steady state Vcc or Icc exceeded the preventative action level (PAL) of 1.0 volts for Vcc or 2.0 milliamp for Icc; and
 - ii) Transient Deviations Data Table (on page 4) - for each hour of the test, record the following: 1) the specific time during the hour that the transient deviation in Vcc/Icc with the largest peak magnitude occurred, 2) the corresponding peak of Vcc/Icc, and 3) the total number of transient deviations exceeding 200% of the steady state Vcc/Icc.

Description of Channel

{Vp, Vs, Vps, or Cow Contact #, location, and (Icc/Vcc)}

Channel A _____
Channel B _____
Channel C _____
Channel D _____

Channel E _____
Channel F _____
Channel G _____
Channel H _____

Reference Electrode Remoteness Check

Ground	Vp or Vs (a)	Ipg or Isg (b)	Rpg or Rsg (c)	Calculated Volts (d) = (b x c)	% Difference ((d-a)/d*100)
Primary to Reference	V	A	Ω	V	%
Secondary to Reference	V	A	Ω	V	%

Note: Ipg = transformer ground current, Isg = service ground current, Rpg = transformer ground resistance, Rsg = service ground resistance, and percent difference required to be within 20%.

Rsource = [(Voc-Vshunt) x Rshunt] / Vshunt

CC #1 Rsource Measured Rshunt:

$$\frac{(Voc \quad - \quad Vshunt \quad) \times Rshunt \quad}{Vshunt \quad} = \quad \Omega$$

CC #2 Rsource Measured Rshunt:

$$\frac{(Voc \quad - \quad Vshunt \quad) \times Rshunt \quad}{Vshunt \quad} = \quad \Omega$$

CC #3 Rsource Measured Rshunt:

$$\frac{(Voc \quad - \quad Vshunt \quad) \times Rshunt \quad}{Vshunt \quad} = \quad \Omega$$

CC #4 Rsource Measured Rshunt:

$$\frac{(Voc \quad - \quad Vshunt \quad) \times Rshunt \quad}{Vshunt \quad} = \quad \Omega$$

CC #5 Rsource Measured Rshunt:

$$\frac{(Voc \quad - \quad Vshunt \quad) \times Rshunt \quad}{Vshunt \quad} = \quad \Omega$$

Steady State Summary

- CC #1. Voltage Level Steady State: exceeding 1.0v. RMS. _____ Volts Occurrences _____
- CC #2. Voltage Level Steady State: exceeding 1.0v. RMS. _____ Volts Occurrences _____
- CC #3. Voltage Level Steady State: exceeding 1.0v. RMS. _____ Volts Occurrences _____
- CC #4. Voltage Level Steady State: exceeding 1.0v. RMS. _____ Volts Occurrences _____
- CC #5. Voltage Level Steady State: exceeding 1.0v. RMS. _____ Volts Occurrences _____

Steady State Data Table

Hour	Highest Steady State Time of Occurrence (Hr, Min)	Rshunt Vcc or Icc	Vp	Vs	Vps	Duration Steady State Exceeded PAL in 1-hr Period
1						
2						
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Transient Deviation Data Table

Hour	Time of Highest Vcc/Icc Peak	Highest Vcc/Icc Value	No. of Transient Deviations Exceeding 200% of Steady State Vcc/Icc	Comment
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3				
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