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Comments and Recommendations on the IPUC Temporary Stray Voltage Rules

Overview:
Idaho Power Company recommends changes to the Stray Voltage Rules based on field experience applying the temporary rules. The intent of these recommended changes is to:

1. Provide increased flexibility in scheduling the individual tests,
2. Reduce the overall time necessary to complete the required tests, and
3. In cases where the Preventive Action Level (PAL) is exceeded, reduce the time required to determine the off-farm contribution to the cow-contact voltage and identify likely sources so that appropriate mitigation can begin sooner.

Discussion of recommended changes:
The existing rules require two initial tests, the cow-contact test and the forty-eight hour test, to determine if the PAL is being exceeded. Depending on the results of the first two tests, four additional tests may be required. These additional tests are used to help determine the sources of the cow-contact voltage. Rule 071.01 requires that the tests be conducted in a specific order, which may be interpreted to require that the 48-hour test must be completed before tests three through six can begin. In a typical investigation, the 48-hour test will not begin until near the end of the first day of the investigation. Rule 071.01 would require that no further testing be conducted for two days, until the 48-hour test is complete.

In determining the off-farm contribution to cow contact voltage, the data used from the 48-hour test is the highest recorded steady-state cow-contact voltage, (Vcc) and the primary neutral-to-earth voltage (Vp) recorded at the same time. This data is combined with data from the load box test to calculate the off-farm contribution to that maximum-recorded steady-state cow-contact voltage.

In some cases, the investigator may know that the PAL is being exceeded before beginning the 48-hour test based on the results of the cow-contact test. In other cases, cow-contact voltages in excess of the PAL may be recorded early in the 48-hour test. In either case, the question of whether or not the PAL is being exceeded will have been answered well before the 48-hour recording has been completed. Also, the primary profile test, and often the secondary neutral voltage drop test, load box test, and signature test may be conducted at times when they will have little or no impact on the dairy operation and without affecting the results of the 48-hour test.

Recommendation 1:
Idaho Power recommends changing Rule 071 to give investigators the flexibility to conduct tests 3, 4, 5, and 6 in any order, and to allow these tests to be conducted immediately prior to, during, or following the 48-hour test. To facilitate this, Idaho power recommends allowing the 48-hour recording to be interrupted so that data may be downloaded periodically for review and analysis, and so that sampling rates can be adjusted if desired. For example, sampling rates of 1 second rather than 10-seconds are sometimes used to provide better resolution of the signature test data.

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This change to rule 071 would facilitate faster completion of the on-farm tests and could contribute to faster resolution of a stray voltage problem if one exists. If this change were adopted, it may be possible to determine that a utility is required to conduct remediation under rule 71.02.d during the first day of an investigation rather than after the third or fourth day of an investigation.

Recommendation 2:
Idaho Power recommends that if a utility, using the results of the cow-contact test, any portion of a 48-hour test, and a load box test, determines that it is required to conduct remediation under rule 71.02.d, the utility may reduce the duration of the 48-hour test to a minimum of 24-hours. Idaho Power is only proposing a shorter recording if enough data has already been collected to determine that utility mitigation is required, and under these circumstances Idaho Power recommends a minimum recording of 24 hours.

Recommendation 3:
Idaho Power recommends adding a provision to the rules that would allow for a limited stray voltage investigation, or for the suspension of a stray voltage investigation prior to the completion of all required tests, if both the utility and the dairy agree to limit or suspend the investigation. This recommendation has two purposes. First, it allows the investigation to be intentionally limited. For example, a dairy customer may ask the utility to check contact voltages in a specific area following nearby electrical changes. Similarly, the utility may want to make measurements on its own initiative as part of its normal system maintenance. Second, this change would allow a normal stray voltage investigation to be suspended before completion. For example, it may be immediately apparent to both the investigator and the diary customer that the cow-contact voltage at a particular location is largely the result of some specific on-farm electrical condition. In such a case, it is normally more productive to correct this on-farm electrical condition before proceeding with the rest of the investigation.

Recommendation 4:
For the Primary Profile test, Idaho Power recommends that rule 075.02 be changed to require the primary profile to extend along the primary distribution line to which the dairy is connected for a distance of at least 1/2 mile in each direction from the dairy's connection point, or to the end of the primary distribution line if that is less than 1/2 mile from the dairy's connection to the primary distribution line. Idaho Power also recommends that the requirement in rule 075.02.a, to check all branch lines encountered within the specified distance, be removed. This change reduces the number of individual locations where measurements are required for the primary profile test, but does not preclude the investigator from extending the primary profile further along the main distribution line, or along any branch lines encountered, if the investigator believes this will aid in the identification of an off-farm issue that is contributing to the stray voltage on the dairy being investigated. Reducing the extent of the primary profile reduces the investigation time in cases where it may be immediately clear from the data collected on or near the dairy that a more extensive primary profile is not required.

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To aid in the incorporation of these recommendations if they are adopted, specific changes to the pertinent sections of the rules are included as a markup below.

Rule 071

071. STRAY CURRENT OR VOLTAGE TESTS (Rule 71).
Subject to Subsection 071.02 of this rule, there are six (6) tests used to detect and measure stray current or voltage.

01. Scheduling ~~Order~~ of Stray Voltage Tests. ~~The tests shall be performed in the order listed below.~~ Efforts shall be made to perform the tests under conditions substantially similar to those conditions existing at the time(s) the dairy producer believes stray voltage to be a problem.

(List omitted)

02. Testing Sequence. Tests 1 ~~and 2~~ shall be performed first. Tests 1 and 2 are used to determine the presence and level of stray voltage and must be performed in all investigations, subject to the provisions of subsection 071.02.e. Tests 3, 4, 5, and 6 may be performed in any order and may be performed without first determining that these tests are required under subsection 071.02.b. Tests 3, 4, 5, and 6 may be performed prior to starting the recording for test 2 or while test 2 is in progress. ~~to determine the presence and level of stray voltage.~~ Test 2 may be interrupted as necessary to conduct tests 4, 5, and 6, or for review and analysis of the data recorded up to that point.

a. If the results from Tests 1 and 2 indicate that stray voltage does not exceed the preventive action level (PAL), the utility has no further testing or remediation obligations under these rules during this test cycle.

b. If the PAL is exceeded, the utility shall perform the remaining four (4) tests subject to the provisions of subsection 071.02.e. The utility shall also perform analysis to determine whether the portion of the stray current or voltage attributable to an off-farm source exceeds fifty percent (50%) of the PAL.

c. If the PAL is exceeded, and the portion of the stray current or voltage attributable to an off-farm source does not exceed fifty percent (50%) of the PAL, the utility has no further testing or remediation obligations.

d. If the PAL is exceeded, and the portion of the stray current or voltage attributable to an off-farm source exceeds fifty percent (50%) of the PAL, the utility shall conduct remediation pursuant to Section 091. Under this condition, the 48-hour recording of test 2 may be reduced to no fewer than 24 hours.

e. With the agreement of both the utility and the dairy customer, a stray voltage investigation may be suspended at any point in the investigation. Also with the agreement of both the utility and the dairy customer, the utility may employ a limited set of tests or measurements on a dairy as part of an intentionally limited evaluation.

~~e.~~f. For all testing conducted under these rules, the utility shall have a qualified analyst prepare a report pursuant to Section 082.

Rule 074

074. TEST 2 – FORTY-EIGHT (48) HOUR TEST (Rule 74).

01. Purpose. The purpose of this test is to determine whether stray current or voltage exceeds the preventive action level (PAL) at selected location(s) over a forty-eight (48) hour period, subject to rule 071.02.d and subsection 074.06. The test also demonstrates whether the primary or secondary sides of the system have a specific impact on the recorded current or voltage at specific times of day.

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<New subsection 074.06>

06. Reduced Recording Period. If a qualified analyst concludes that mitigation by the utility is required under rule 071.02.d prior to the completion of a 48-hour recording period, the recording period may be reduced to no fewer than 24 hours.

Rule 075.02

02. Conducting the Test. The primary profile test requires concurrent measurement of the ground electrode resistance and current at all primary system ground points within at least one half (1/2) ~~three quarters (3/4)~~ of a mile on either side of all primary service points serving the dairy, or to the end of the line if less than one half (1/2) ~~three quarters (3/4)~~ of a mile. Alternatively, the voltage between a remote grounding rod and the primary ground point being tested may be measured.

a. To the extent practical, ~~T~~this test shall be conducted starting at one end of the distribution system and working toward the other end along the main primary distribution system ~~, end while checking all branch lines encountered within the specified distance~~. Figure 4 below illustrates the procedure.

<Subsections 075.02.(a)(i) and 075.02(a)(ii) would be deleted.>

Idaho Power believes that these recommended changes, if incorporated in the Stray Voltage rules, would benefit both dairy customers and utilities. These changes could significantly reduce the time required to determine that utility mitigation is required if that is the case, and could reduce the overall time required to complete a stray voltage investigation that meets the requirements of the rules.

Please feel free to contact Idaho Power if there are questions regarding any of these comments and recommendations.

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