

DECISION MEMORANDUM

TO: COMMISSIONER KJELLANDER
COMMISSIONER SMITH
COMMISSIONER HANSEN
COMMISSION SECRETARY
COMMISSION STAFF

FROM: DON HOWELL

DATE: OCTOBER 19, 2005

SUBJECT: PROPOSED STRAY VOLTAGE RULES,
DOCKET NO. 31-6101-0501

In March 2005, the Idaho Legislature passed and the Governor signed the Stray Current and Voltage Remediation Act codified at *Idaho Code* §§ 61-801 *et seq.* Section 61-803 requires that the Commission promulgate temporary and proposed rules establishing uniform procedures for the measurement of stray current or voltage. Following negotiated rulemaking, the Commission issued a Notice of Temporary and Proposed Rulemaking which was published in the Administrative Bulletin on September 7, 2005. The temporary rules became effective on September 14, 2005. The Commission's Notice required that interested persons submit comments regarding the proposed rules no later than September 27, 2005.

THE COMMENTS

The Commission received three comments. In a letter dated August 23, 2005, the Legislative Services Office indicated that the Senate and House Subcommittees for review of administrative rules have examined the proposed rules. The letter stated that no "meeting will be held, and we are pleased to report that no objections will be filed [to the proposed rules]."

Idaho Power also submitted comments recommending that the Commission make four changes to the Temporary and Proposed Rules. Idaho Power's comments are attached. The four changes proposed by Idaho Power affect Rules 71, 74 and 75. First, Subsection 71.01 of the Temporary and Proposed Rules requires that the six stray voltage tests be performed in sequence. Idaho Power is recommending that 71.01 be modified to allow the utility to conduct the tests in any order. Staff and the Dairymen/Milk Producers concur with this proposed change. Ken McClure's letter from the Dairymen/Milk Producers is also attached.

The second change would allow a utility to reduce the duration of the 48-hour test (Test 2) in instances where it is clearly determined that the utility must conduct remediation for stray voltage or current. In such instances, the Company is recommending that the 48-hour test be abbreviated to a minimum of at least 24 hours. Staff and the Dairymen/Milk Producers agree with this proposed change.

Third, the Company is proposing an addition to Rule 71 to allow the stray voltage investigation to be suspended or limited in instances where the utility and the dairy producer agree in writing. As Idaho Power explains in its comments, "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." The Commission Staff does not object to this change. The Dairymen/Milk Producers also agree but proposed an additional sentence for clarification. Staff agrees with the clarifying sentence.

Finally, the Company recommends changes to the primary profile test (Test 3). Currently, Temporary and Proposed Rule 75 requires that the utility conduct stray voltage measurements within 3/4 of mile on either side of all primary service points and "all branch lines encountered within this specified distance." Rule 75.02.a. While the Staff and the Dairymen/Milk Producers do not object to the deletion of checking branch lines, Staff and the Dairymen/Milk Producers recommend that the Commission reject the distance reduction from 3/4 of a mile to a half-mile. Staff believes that the greater distance is the appropriate testing distance. The Dairymen/Milk Producers also object to adding the phrase "to the extent practical . . . to Rule 75.02.a. Staff agrees.

COMMISSION DECISION

Does the Commission wish to adopt any of Idaho Power's suggested changes to the Temporary or Proposed Rules? Does the Commission wish to add the Dairymen/Milk Producers clarifying sentence? With the changes (if any), does the Commission wish to adopt the proposed Stray Voltage Rules as pending rules? I have attached a draft of the agreed upon changes. Does the Commission wish to issue a Notice of Pending Rule and a change to the Temporary Rules to be published in the Administrative Bulletin on December 7, 2005?



Don Howell

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, (V_{cc}) and the primary neutral-to-earth voltage (V_p) 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.

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 dairy 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.

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, 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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October 21, 2005

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Re: Comments on Stray Voltage Rules
Docket No. 31-6101-0501

Dear Don:

Thank you for distributing the comments Idaho Power filed with you concerning the proposed stray voltage rules. We appreciate the opportunity to review and respond to them. For your record, the only comments we have seen from Idaho Power are from Paul E. Ortmann, P.E. (undated) which you forwarded to interested parties on October 15, 2005. Further for the record, we have reviewed the Staff's proposed changes which were distributed yesterday. Finally, by way of preliminary matters, this letter is submitted on behalf of the Idaho Dairymens' Association and the Milk Producers of Idaho.

Addressing Mr. Ortmann's comments first, we have no issues with the recommendations he has identified as Recommendations 1 and 2 or with the suggested rule changes associated with those recommendations. They appear to be appropriate modifications to the proposed rules.

Recommendation 3 also appears to be appropriate although we believe the rule change associated with it (Rule 071.02.e) would benefit from clarification. First, we believe that a limited evaluation should be conducted only with the consent of the dairy. That consent should be evidenced in writing both to avoid confusion and to clarify that the utility will not conduct testing on the dairy premises without the prior consent of the dairy. The language proposed by Staff for that provision incorporates the requirement of written consent in an appropriate fashion. We would also suggest that the writing contain

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an explanation of the reasons for conducting a limited evaluation so the dairy may be fully informed of the reasons the utility believes a full evaluation is not necessary. The following language for Rule 071.03 (as numbered in the Staff's draft) would satisfactorily address our concerns:

03 Suspended or Limited Testing. With the written agreement of both the utility and the dairy producer, a stray voltage investigation may be suspended at any point in the investigation. With the written agreement of both the utility and the dairy producer, the utility may employ a limited set of tests or measurements on a dairy as part of an intentionally limited evaluation. If the utility proposes to suspend a stray voltage investigation or to conduct a limited evaluation, its reasons for doing so shall be set forth in the written agreement between the utility and the dairy producer.

We do not agree with that portion of Recommendation 4 which would reduce the primary profile test from three quarters to one half mile. We believe the requirement for testing within three quarters of a mile from the primary service point for the dairy is appropriate to ensure that issues on the distribution line close to the dairy are identified and appropriately remedied. We are not sure what would make it "impractical" to "test starting at one end of the the distribution system and working toward the other end..." and therefore are concerned about the proposed addition to Rule 075.02.a of the phrase "To the extent practical..." Unless there is substantiation in the rulemaking record for this modification we would suggest that it not be included.

Other than the proposed modification to Rule 071.03 set forth above we have no comments on the Staff's proposals you emailed yesterday other than to say that they are satisfactory and appropriate. We thank you for the opportunity to submit these comments to you for your consideration.

Sincerely,



Kenneth R. McClure

cc: Brent Olmstead
Bob Naerebout
Rex Blackburn

**THE IDAHO PUBLIC UTILITIES COMMISSION--AGENCY 31
TITLE 61
CHAPTER 1**

**RULES FOR THE MEASUREMENT OF
STRAY CURRENT OR VOLTAGE
(THE STRAY VOLTAGE RULES)**

IDAPA 31.61.01.000

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. (9-14-05)T

01. Order Scheduling 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. (9-14-05)(12-7-05)T

- a. Test 1 – Cow Contact Test; (9-14-05)T
- b. Test 2 – Forty-Eight (48) Hour Test; (9-14-05)T
- c. Test 3 – Primary Profile Test; (9-14-05)T
- d. Test 4 – Secondary Neutral Voltage Drop Test; (9-14-05)T
- e. Test 5 – Load Box Test; and (9-14-05)T
- f. Test 6 – Signature Test. (9-14-05)T

02. Testing Sequence. Tests 1 and 2 shall be performed first to determine the presence and level of stray voltage. Tests 1 and 2 are used to determine the presence and level of stray voltage and shall be performed in all investigations, subject to the provisions of Subsection 071.03. 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 071.03. Tests 3, 4, 5, and 6 may be performed prior to starting the recording for Test 2 or while Test 2 is in progress. 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. (9-14-05)(12-7-05)T

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. (9-14-05)T

b. If the PAL is exceeded, the utility shall perform the remaining four (4) tests except as provided in Subsection 071.03. 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. (9-14-05)(12-7-05)T

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. (9-14-05)T

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 forty-eight (48) hour recording of Test 2 may be reduced to no fewer than twenty-four (24) hours. (9-14-05)(12-7-05)T

e. For all testing conducted under these rules, the utility shall have a qualified analyst prepare a report pursuant to Section 082. (9-14-05)T

03. Suspended or Limited Testing. With the written agreement of both the utility and the dairy producer, a stray voltage investigation may be suspended at any point in the investigation. With the written agreement of both the utility and the dairy producer, the utility may employ a limited set of tests or measurements on a dairy as part of an intentionally limited evaluation. If the utility proposes to suspend a stray voltage investigation or to conduct a limited evaluation, its reasons for doing so shall be set forth in the written agreement between the utility and the dairy producer. (12-7-05)T

(BREAK IN CONTINUITY OF SECTIONS)

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 Subsections 071.03 and 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. (9-14-05)(12-7-05)T

02. Setup. A digitizing data recorder with averaging capability and capable of detecting and recording transient deviations of one-tenth (0.1) second or less in duration shall be used to record the following: (9-14-05)T

a. Voltage from primary neutral at the transformer to remote reference ground, Vp. (9-14-05)T

b. Voltage from secondary neutral in the service panel serving the area of the cow contact to remote reference ground, Vs. (9-14-05)T

c. Voltage drops (Vps) from primary neutral at the location of connection for Vp to secondary neutral at the location of the connection for Vs. (9-14-05)T

d. Cow contact current through (Icc) or voltage across a five hundred (500) ohm resistor at the high voltage point(s) found in Test 1, Vcc. (9-14-05)T

03. Measurement Interval. The results of the forty-eight (48) hour test may be highly indicative of the presence of stray voltage. A recording interval as high as ten (10) seconds may be used provided that transient deviations of voltage or current of one-tenth (0.1) second or less in duration of voltage or current are recorded to the maximum ability of the instrument. (9-14-05)T

04. Measurement at the Cow Contact Point(s). Measurements to the earth or concrete surface shall be to a metal plate as described in Paragraph 073.03.c. when making measurements to metal objects, corrosion shall be removed to obtain a low resistance connection. (9-14-05)T

05. Recording the Data. All of the data gathered by the recording equipment during the forty-eight (48) hour test including transients shall be downloaded and retained with the records of the investigation. In addition, the steady-state data shall be summarized in the investigation report. The recorded data shall be made available to the dairy producer or utility upon request. The person conducting this test shall record the location of, and measured values at, each test point. The identification of the cow contact point shall be recorded on the form in Appendix 2. Transient deviations shall be recorded on the supplemental data form, page 3 of 3 in Appendix 2. A plot of the voltage versus time may be substituted for the recording of measured values in Appendix 2. (9-14-05)T

06. Reduced Recording Period. If a qualified analyst concludes that mitigation by the utility is required under Subsection 071.03 prior to the completion of a forty-eight (48) hour recording period, the recording period may be reduced to no fewer than twenty-four (24) hours. (12-7-05)T

075. TEST 3 – PRIMARY PROFILE TEST (Rule 75).

01. Purpose. The purpose of this test is to measure or calculate neutral-to-earth voltage (NEV) for a multi-grounded distribution system. (9-14-05)T

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 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 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. (9-14-05)T

a. 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 ~~while checking all branch lines encountered within the specified distance.~~ Figure 4 below illustrates the procedure. (9-14-05)(12-7-05)T

i. Where the dairy is served by a dedicated tap of less than one half (1/2) mile in length from a distribution line, the neutral-to-earth voltage shall be measured at each primary ground along the tap and along the distribution line to a distance of three quarters (3/4) of a mile in each direction from the point of the tap; or (9-14-05)T

ii. Where a dairy is served by a dedicated tap that extends more than one half (1/2) mile from the distribution line, the neutral-to-earth voltage shall be measured at each primary grounding electrode along the tap and along the distribution line to a distance of one half (1/2) mile in each direction from the point of the tap. (9-14-05)T

03. Recording the Data. The person conducting this test shall record the location of, and measured values at, each test point. Data and calculation results for these test points shall be recorded on the form in Appendix 3. (9-14-05)T