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## Farm Stray Voltage

### What is farm stray voltage?

Electrical systems are grounded to the earth to ensure safety and reliability. Stray voltage occurs when conductive surfaces such as concrete floors, metal stabling, milk pipelines, and water bowls pick up low-level voltages from nearby wires and equipment. These voltages are commonly referred to as 'stray voltage' or 'tingle voltage' and are typically sufficiently low such that they do not present harm.

Where the voltage level is high enough, it can affect livestock behaviour and health, and adversely affect the efficiency of a farming operation.

#### What causes stray voltage? -

Stray voltage can originate from a utility's electrical distribution system, or from the farm's electric system. There are both off-farm and on-farm sources to consider:

**On-farm sources:**

- Poor or faulty wiring
- Grounding and bonding issues
- Unbalanced electrical loading
- Overloaded circuits or panels
- Defective or faulty equipment
- Improperly installed electrical equipment
- Voltages from nearby utility systems including telephone lines and gas lines

**Off-farm sources:**

The electricity distribution system is the primary off-farm source, but frequently, voltage potentials at a given animal contact location are the combined result of two or more contributing factors.

#### What are the effects of stray voltage? +

Livestock will react to stray voltage issues in a variety of ways, including but not limited to:

- Lowered milk production
- Reduced water or feed intake
- Behavioural reactions ranging from discomfort to pain
- Difficulty moving or handling animals in exposure locations
- Nervous or aggressive behaviour
- Involuntary twitching or muscle contraction

Dairy farms are the most affected by the stray voltage due to the sensitivity of large animals to the current exposure, the opportunities for animal contact exposure in buildings where electricity is used, and typically wet conditions in confinement areas which facilitates exposure and enhances conductivity.

The [Ontario Ministry of Agriculture, Food, and Rural Affairs](#) offers more information on the effects of stray voltage.

### What to do if you suspect stray voltages are affecting your farm:

Alectra routinely performs measures to help prevent stray voltage, such as conducting patrols of neutral and grounding systems and balancing loads.

If stray voltages are occasionally still observed on livestock farms, Alectra has a Customer Response Procedure in place to assist in mitigating this issue.

#### Customer Response Procedure:

If you are an Alectra customer and suspect you have a stray voltage issue that is affecting the livestock on your farm, you are encouraged to contact Alectra according to the process steps laid out below.

##### 1. Submit complaint or inquiry +

Farmers are encouraged to document abnormal livestock behaviours and to provide Alectra with the following preliminary information at minimum:

- Livestock: the type and quantity impacted,
- Symptoms: the nature of stray voltage symptoms,
- Location: a general map of the farm with voltage problem areas highlighted,
- Timing: when symptoms began, and if symptoms are more prevalent in certain weather conditions or time of day,
- Electrical devices: confirmation of any electric devices in place (e.g., electric fence, electrified animal control devices),
- Independent test results (if an electrical contractor has performed tests), and
- Farm address.

This information can be sent to Alectra at [customer.solutions@alectrautilities.com](mailto:customer.solutions@alectrautilities.com). Please include as much information as possible.

##### 2. Alectra initiates an investigation +

Upon receipt of a complete complaint or inquiry in written format, Alectra will contact the customer within ten business days to schedule an initial site visit at a mutually agreed date and time.

##### 3. Testing and analysis +

The farm's electrical system will be analyzed by a qualified professional with experience in stray voltage mitigation, in accordance with Appendix H of the Distribution System Code.

**Phase 1 Testing – Farm Stray Voltage Level**

Alectra will test whether farm stray voltage is present at locations of the farm in which issues are suspected. A farm stray voltage testing device will be installed in resulting area(s) of greatest concern. The testing device will record the maximum voltage level over the course of several days. Alectra may need to visit the site multiple times during the testing phase.

Testing will reveal whether farm stray voltage levels on-site exceed acceptable threshold levels, as specified in the Distribution System Code, Section 4.7:

- Animal contact current (ACC) exceeds 2.0 milliamperes
- Animal contact voltage (ACV) exceeds 1.0 volt

**Phase 2 Testing – Distributor Contribution**

Alectra will perform further testing to determine whether and the extent to which Alectra's distribution system is contributing to high farm stray voltage levels. Alectra will determine whether its distribution system is contributing more than 1 milliamperes ACC or 0.5 volts ACV in stray voltage. Results will be documented and reviewed with the customer.

##### 4. Remediation +

Where indicated, Alectra will make efforts to remediate or bring down its stray voltage levels below 1 milliamperes ACC or 0.5 volts ACV as quickly as possible. The timeline will vary on a case-by-case basis with the complexity of the issue.

Where farm stray voltage exceeds acceptable threshold levels, but Alectra's distribution system is not found to be a contributing factor, it is the Customer's responsibility to conduct a further investigation of the farm's electrical system with a licenced electrical contractor.

##### 5. Verification +

Alectra will coordinate verification testing with the Customer after remediation work is complete to ensure and verify that farm stray voltage levels have been successfully brought down below an acceptable threshold.

##### 6. Conclusion +

Where testing has found that Alectra's distribution system is contributing unacceptable levels of stray voltage, the investigation will conclude after Alectra has brought down its ACC or ACV levels within the acceptable range and conducted verification testing.

Where testing has found that Alectra's distribution system is within acceptable thresholds, the investigation will be concluded.

### Additional Information

The Electrical Safety Authority has published an informative guide to help farmers identify and mitigate stray voltage issues on the farm: [Basic Troubleshooting of On Farm Stray Voltage](#).

For further information, or to obtain a copy of this information in an alternate format, please contact Alectra's Customer Solutions department at 1-416-814-9301.

[Click here to download a PDF of this information.](#)

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