Electrical Safety Authority

Electrical Distribution Safety

Utility Advisory Council Meeting

Minutes of Meeting
June 4, 2019
10:00am – 1:30pm

Centre for Health and Safety Innovation - 5110 Creekbank Road, Mississauga

Utility Advisory Council Members

ULDC/Owner-Operator	
Alectra Utilities	Vicky Khamar
Burlington Hydro	
Festival Hydro	Jeff Graham
Guelph Hydro	Manoj Rao Manjunath
Hydro One	Darren Desrosiers
Hydro One - Transmission	Ajay Garg
Hydro Ottawa	Edward Donkersteeg
Kitchener-Wilmot Hydro	Greig Cameron
London Hydro	
Newmarket-Tay Power Distribution Ltd.	Gaye-Donna Young
Orillia Power	Eric Lucier
Toronto Hydro	Hani Taki
Veridian	Peter Petriw (phone)
Government/Regulatory	
CSA Group	Tania Donovska
IHSA	Dean Dunn
Ministry of Energy	
Ministry of Labour	Vacant
Ontario Energy Board	Stephen Cain
General Interest	
Bell Canada/Telecom Industry	Tony Pereira
Consumer Advisory Council	Sandy Manners
Industry Advisory Council	Vacant
OACETT	
ORCGA/Excavating Industry	
Power Workers Union	Serge Laflamme

Other Attendees

Joan Egwuonwu (Ministry of Government and Consumer Services), Kathryn Farmer(EDA), Andrew Matchet (Peterborough Distribution), Mike Ploc (Peterborough Distribution)

ESA Attendees

Farrah Bourre, Normand Breton, Patience Cathcart, Earl Davison, Patrick Falzon, Nansy Hanna, Jason Hrycyshyn, Ted Olechna

Utility Advisory Council Meeting

Minutes of Meeting
June 4, 2019
10:00am – 1:30pm

1 Notice & Quorum

- The meeting had quorum

2 Minutes of UAC Meeting

The following motion was carried:
Motion: To accept the minutes of the October 10, 2018 meeting
Motioned by: Hani Taki
Second: Vicky Khamar
Motion carried.

The following motion was carried:
Motion: To accept the minutes of the February 14, 2019 meeting
Motioned by: Tony Pereira
Second: Dean Dunn
Motion carried.

3 Grounding at Farm Buildings (presentation) – Ted Olechna

- Central Metering (CM) Services on farms was reviewed
- ESA posed the question if a Local Distribution Company (LDC) would permit the connection of a customer owned bonding conductor to the X2 point of the LDC transformer
- Some LDCs have previously expressed interest in taking part in the discussion of CM services, pole mount and pad mount transformers and bonding/grounding during the review of the Ontario Electrical Safety Code (OESC) Section 75.
- If any other LDCs are interested in participating in the process please contact ESA

4 3-Phase 3-Wire Solidly-Grounded Wye Customer Services (presentation) – Jason Hrycyshyn

- ESA has received some, but not all quarterly updates
- ESA will be sending out reminders to LDCs that have not submitted their quarterly update

5 ESA's Severe Weather Response (presentation) – Earl Davison

- ESA has the ability to mobilize large numbers of inspectors during restoration of power and an inspector can support several 2 man LDC crews during restoration of power
- It is important to note that ESA is not a First Responder. ESA Inspectors are do not have the necessary equipment or training to act in the capacity of a First Responder.
- Questions were raised about coordination of all relevant bodies during an emergency, specifically about including telecommunications and gas in a coordinated emergency response

- The question was asked about whether the Climate change Adoption Phase II NRC-CSA CE Code CCA addressed the coordination of all relevant bodies

Climate Change Challenge:

- In response to the Canadian and global challenge of Climate Change, the National Research Council of Canada (NRC) engaged CSA Group to consider how Codes and Standards may be used to mitigate the impact of Climate Change. The purpose of this project was to assess the need for and subsequent development of, climate change adaptation solutions for electrical infrastructure impacted by flooding, permafrost, weather extremes, wildfires, and ice/snow loading within the scope of electrical systems covered by:

  1. The Canadian Electrical Code (CE Code), Part I - a model code adopted across Canada as regulation for the safe installation of electrical equipment;

  2. The CE Code, Part II - a series of equipment safety standards mandated by Part I and designed to protect people and property from shock and fire; and

  3. The CE Code, Part III - a series of standards used primarily by utilities and manufacturers to address electrical power distribution and transmission systems.

- The outcome of this review developed 35 Proposals for changing the CE Code Parts I, II, & III and other Standards. The proposals are being submitted to the respective Code or Standard committees.
    - 17 for Part I
    - 3 for Part II
    - 26 for Part III
    - 4 for Other Standards
- These proposals with impact assessment, represent some of the following changes:
    - Whole building Ground Fault protection
    - Backup power for sump pump
    - Vegetation management for controlling trees due to ice and wind events
    - Overhead transmission lines to accommodate higher ice loading
    - Wildfire management - Transmission/distribution line clearance of vegetation
    - Ensuring Back-up Power after Loss of Normal Power Supply for critical infrastructure
    - Guidance on Replacement or Refurbishment of Equipment after a fire or flood,
    - Adequate slack in underground conductor installations due to ground thawing,
    - Plus others
- There are 2 reports that were drafted in relation to the Climate change study:
    - CSA produced a report to NRC (266 pages) identifying the regional consultation findings and proposed changes to Codes and Standards
        - NRC - CSA Group Canadian Electrical Code (CE Code) Climate Change Adaptation Project

- CSA Public report on study findings (38 Pages)
    - Development of Climate Change Adaptation Solutions Within the Framework of the CSA Group Canadian Electrical Code Parts I, II and III
    - http://www.newswire.ca/en/releases/archive/March2019/12/c5506.html

6 Guideline for Energy Storage and Generation (presentation) – Jason Hrycyshyn

- ESA had committed to review this Guideline 1 year after it was published
- A clarification to the guideline was shown to the Council in regards to the verbiage used when something would be deemed a distribution asset. This change did not change the intent of the direction.
- The Council discussed publishing the updated Guideline and reviewing again in 5 years and it was decided that the Council would like to take the opportunity now to review the Guideline before it is republished.
- The Council also decided that this Guideline should be reviewed annually due to the speed of change and advancement in Energy Storage and Generation
- ESA asked the Council to have any suggested amendments to ESA by July 4, 2019

ACTION: ESA to distribute an amended draft version of the Guideline for Energy Storage and Generation v1.1 to the Council for review and comment. – Jason Hrycyshyn (Action Item # 2019-02-01)

ACTION: ESA will bring the revised Guideline for Energy Storage and Generation to the UAC for review 1 year from the date the updated version is published. – Jason Hrycyshyn (Action Item #2019-02-02)

7 Removal of Bulletins – Withdrawing Bulletins (presentation) – Jason Hrycyshyn

- ESA expected to withdraw some bulletins that are currently posted on the ESA Website and with the current review of Guidelines ESA anticipates more bulletins will be withdrawn as the information would be incorporated into an updated Guideline
- A number of options were suggested to the Council for withdrawing bulletins
- The Council liked the idea of showing bulletins and flash notices that have been withdrawn for a period of time then moving them to an online archive that is searchable
- The Council also liked the ability to filter the bulletins on the website
- The Council would also like to be notified when a bulletin has been withdrawn in the same way they are notified when a new bulletin is posted
- The Council would like to see the bulletin clearly marked as withdrawn and show when the bulletin was withdrawn to know what date it was effective to

8 Measurements Canada Drawings - Sections 7 & 8 -Regulation 22/04 (presentation) – Jason Hrycyshyn

- ESA has asked the Council how they use Measurements Canada Drawings and if they are used as is or if the LDC does additional work before their use
- Some of the LDC members indicated that the drawings from Measurements Canada lack specific information that is necessary for the installation of meters and that the drawings from Measurements Canada would not be sufficient to be used on their own
- The Council has asked ESA to contact the LDC that raised the issue and determine how this LDC is using the Measurements Canada drawings, and if using the drawings in this manner would meet the requirements of the Regulation
- The Council has asked ESA to contact Measurements Canada to determine if the person signing the drawings is a Professional Engineer in Canada

ACTION: ESA will contact the LDC that raised the issue of using Measurements Canada meter drawings and determine how this LDC is using the drawings, and if using the drawings in this manner would meet the requirements of the Regulation. – Jason Hrycyshyn (Action Item #2019-02-03)

ACTION: ESA will contact Measurements Canada to determine if the person signing the drawings is a Professional Engineer. – Jason Hrycyshyn (Action Item #2019-02-04)

9 ESA Corporate Strategy – Patience Cathcart

- An overview of the Draft Corporate Strategy was provided to the Council
- ESA will begin public consultations on the draft corporate strategy in July 2019

10 Serious Incidents (presentation) – Patrick Falzon

- Recent notable incidents were shared with the Council
- Questions were raised about the protection of LDC infrastructure, specifically pad mounted transformers, in active construction zones
- CSA standards only discuss barriers to protect from vehicles and maintenance equipment, not construction equipment.
- The Council asked ESA to put a bulletin together to help address the large number of incidents of construction equipment contacting LDC pad mount transformers

ACTION: ESA will put a draft bulletin together to help address the large number of incidents of construction equipment contacting LDC pad mount transformers. – Jason Hrycyshyn (Action Item #2019-02-05)

11 Powerline Safety Campaign (presentation) – Farrah Bourre

- Powerline statistics show that dump trucks are the #1 cause of powerline contacts in the construction sector
- The communication strategy for powerline safety includes
    - Prioritize awareness efforts against the occupational target group
    - Leverage strength of current creative platform
    - Encourage partners to be advocates for powerline safety within their industry
    - Measure, refine, optimize
- Current creatives have had an impact on safety so ESA will leverage this material through different channels to reach the target audience
- ESA has found that the unpaid media, such as T.V. interviews, have had a large impact on awareness with the public and ESA will look for more ways to leverage this type of exposure

12 OESC Requirements for ESS Installations (presentation) – Ted Olechna

- The OESC has requirements for Energy Storage System (ESS) before the Canadian Electrical Code
- ESSs can store very large amounts of energy, posing a potential fire or shock hazard when handled incorrectly
- These systems need to be evaluated, tested (self-contained) and installed to ensure safe operation
    - Self-contained energy storage equipment is required to be approved in accordance with the standard ANSI/CAN/UL 9540-16 “Energy storage systems and equipment.”
- New OESC subsection 64-900 has been added to address ESS installations that are not self contained
- Section 84 of the OESC addresses things like
    - Back feed to the distribution system
    - When an ESS installation can be run in parallel to the distribution system ESA will notify the LDC by way of a connection authorization

13 Ontario Building Code Requirements - EV Charging (presentation) – Ted Olechna

- 3.1.21 and 9.34.4 of the Ontario Building Code have been deleted

Motion: To adjourn the meeting

Motioned by: Jeff Graham

Second: Manoj Rao Manjunath

Motion carried.

Bulletin 10-23-3
Grounding & bonding in farms
Rules 10-210 d) and 10-700

Issued May 2019
Supersedes Bulletin 10-23-2

Scope

(1) Background
(2) Equipotential bonding in milking areas
(3) Grounding and bonding for farm buildings
    (a) Farm service
    (b) Central Metering System – grounding at individual buildings
    (c) Pole or pad mount Central Metering System – grounding at utility transformer

(1) Background

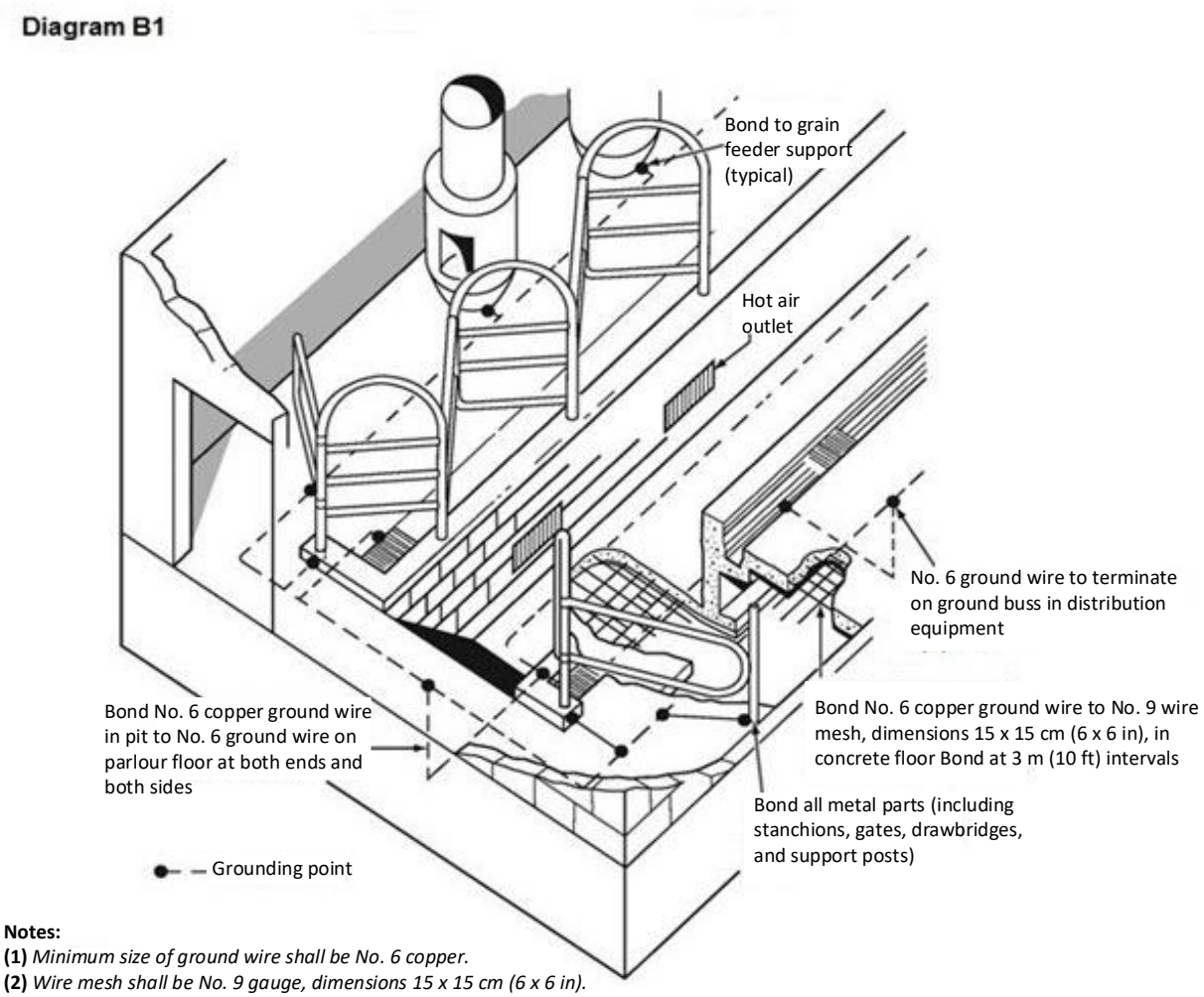
The Ontario Electrical Safety Code (OESC) provides *Equipotential bonding* requirements which may mitigate stray voltage effects in farms caused by the normal delivery and use of electricity. It should be noted the customer contribution to stray voltage can often be mitigated by design and preventative maintenance of the electrical system. For more information, please see ESA Guideline Basic Troubleshooting of On Farm Stray Voltage.

(2) Equipotential bonding in milking areas

Issue
Rule 10-700 e) requires the conductive metal parts of structures that livestock access be made equipotential with the non-current carrying conductive parts of electrical equipment (Bonded together) , in some cases, this has been found to be insufficient to mitigate the effects of stray voltage in milking areas of buildings housing livestock. In addition to the minimum requirements of Rule 10-700 e), ESA recommends the following;

(1) Livestock waterers, wire mesh, grates, metallic water pipes, stanchions, water bowls, vacuum lines, grain feeders, gates, support posts, and other metals shall be bonded together by a separate stranded copper conductor not smaller than No. 6 AWG.
(2) The metallic equipment bonded together as specified above shall be connected to the ground buss at the distribution panel by a separate copper conductor not smaller than No. 6 AWG. See Diagram B1.
(3) In milking parlours, concrete floors are recommended to have a No. 9 gauge wire mesh, dimensions 15 cm × 15 cm (6 in × 6 in), and bonding should comply with the above requirements. See Diagram B2.

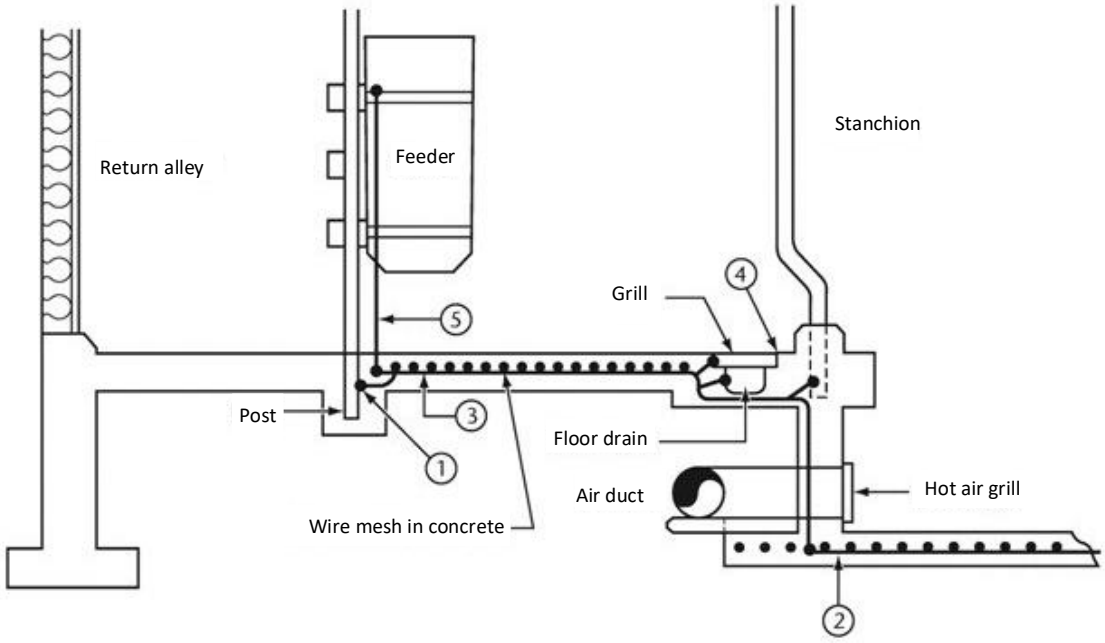
Diagram B1 – Equipotential bonding in milking areas



Notes:

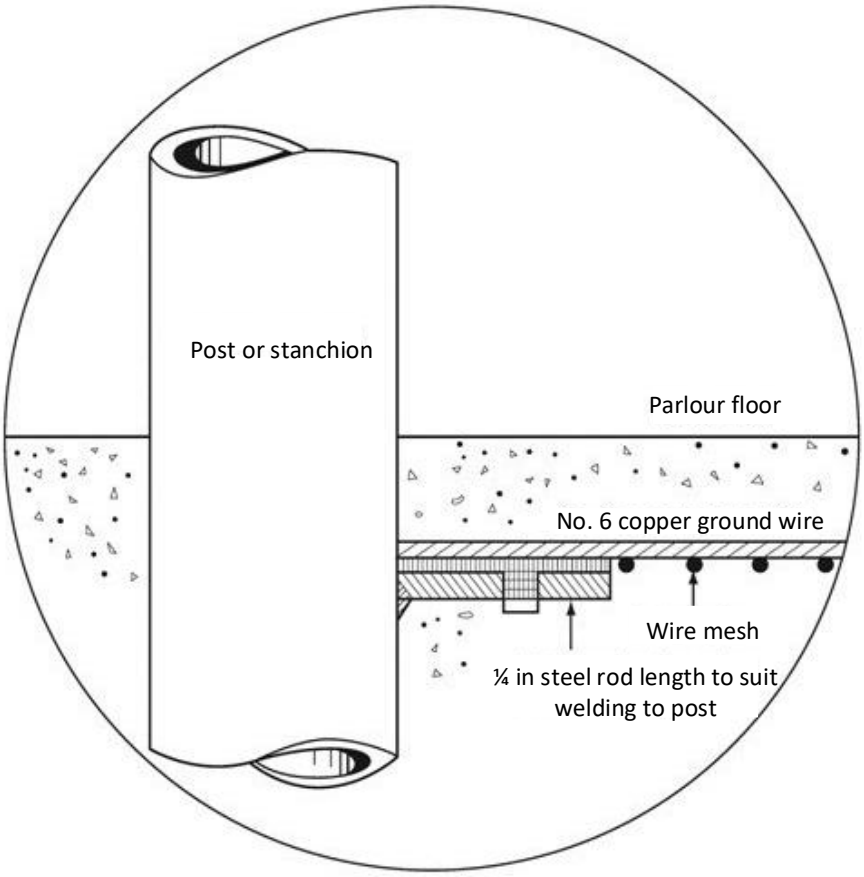
(1) *Minimum size of ground wire shall be No. 6 copper.*
(2) *Wire mesh shall be No. 9 gauge, dimensions 15 x 15 cm (6 x 6 in).*
(3) *Wire mesh shall be bonded to ground wire at maximum intervals of 3 m (10 ft).*
(4) *All steel posts, gate posts, support posts, feeder brackets, etc., shall be bonded to ground wire.*
(5) *Angle iron grate supports for floor drains shall be bonded at both ends of parlour and both sides of grate.*
(6) *Ground loop on floor of pit shall be connected to ground loop on floor parlour at both ends and both sides.*
(7) *Grounding conductor size is given in American wire gauge.*
(8) *For new and reconditioned existing parlours, wire mesh shall have concrete cover of 75 mm (3 in).*

Diagram B2- Wire mesh in concrete floors



Notes*:*
(1) *All metal parts shall be bonded (including stanchion gates, drawbridges, and support posts).*
(2) *No. 6 copper wire in parlour floor shall be bonded to No. 6 copper wire in pit at both ends and both sides.*
(3) *No. 6 copper ground wire shall be bonded to No. 9 wire mesh, dimensions 15 x 15 cm (6 x 6 in), in concrete floor at 3 m (10 ft) intervals.*
(4) *Angle iron grate supports for floor drains shall be bonded at both ends of parlour and both sides of grate.*
(5) *See Detail 1.*

Detail 1



Wire mesh, ground wire and ¼ in steel rod shall all be welded to ensure circuit continuity.

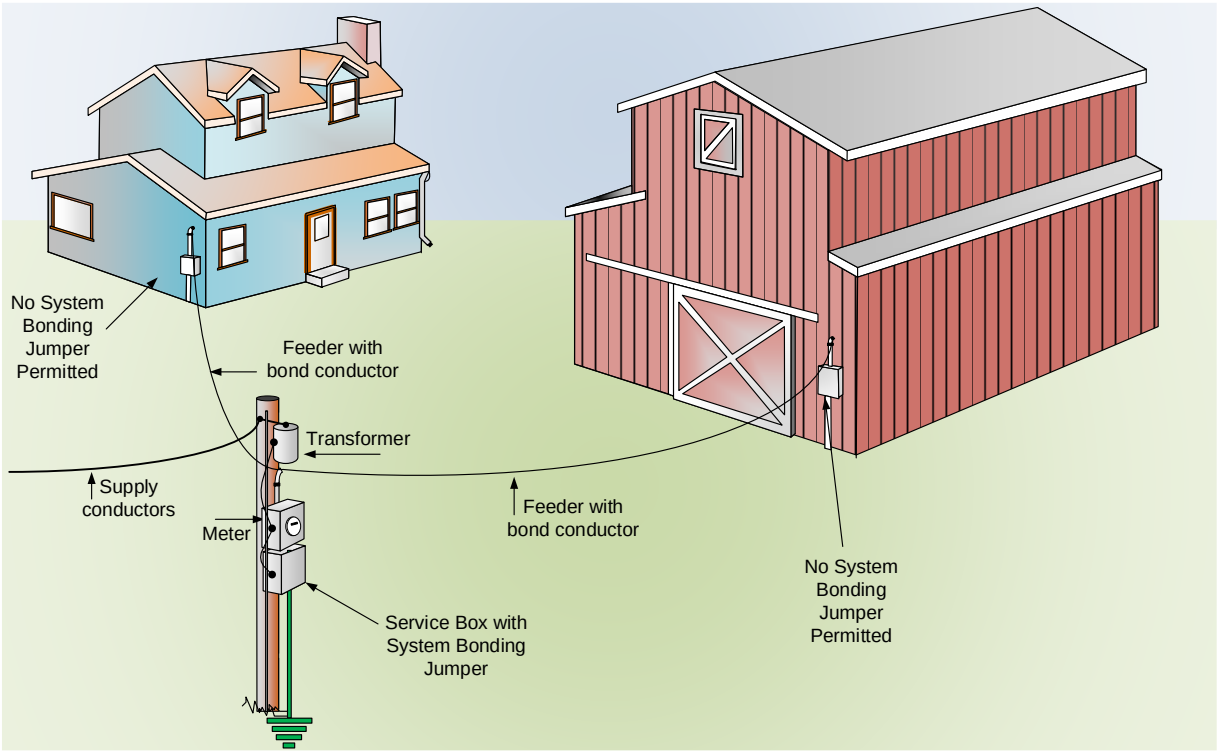
¼ in round steel rod shall be welded to feeder - down to mesh.

¼ in rod, mesh and No. 6 copper ground wire shall be welded together, 2 per side.

(3) Grounding & bonding for farm buildings
(a) Farm service

Rule 10-210 d) prohibits a connection between a *grounding conductor* and the *system neutral* after the *Service Box*. This means a bonding conductor must be installed with all feeders or branch circuits feeding any out building including buildings housing livestock when supplied from distribution equipment. (See Diagram B3)

Diagram B3 – Grounding & Bonding of Building supplied from Distribution Equipment (Farm Service)

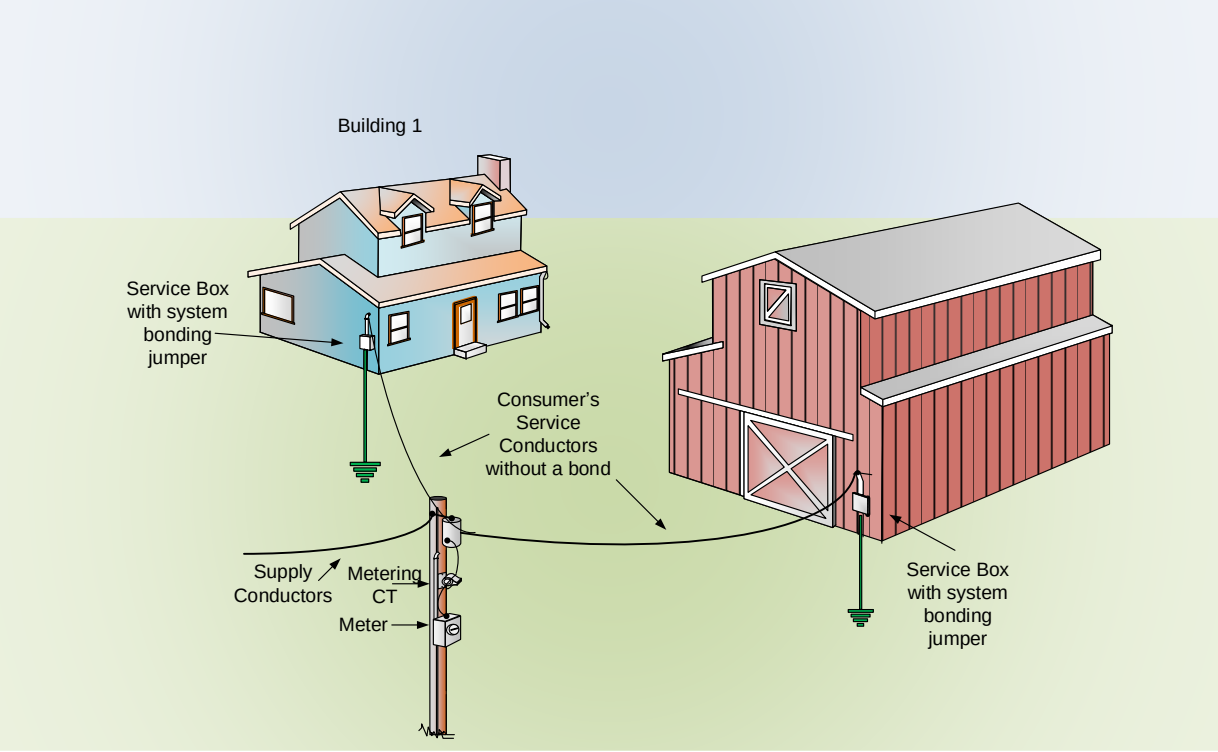


(b) Central metering system – grounding at individual buildings

The feeders from a Pole or Pad Mount Central Metering System (CMS) supplying buildings are considered *Consumer's Services*. Rules 6-200 requires each building supplied by a *Consumer's Service* to have a *Service Box*. Rule 10-210 requires a *System Bonding Jumper* at the *Consumer's Service* (See Diagram B4).

Note – More than one Consumer's Service connected to a single building will result in objectionable current over grounding and bonding conductors which is not permitted per Rules 10-100 and 10-500 (Objection current over grounding and bonding conductors) connection in accordance with the requirements of topic (c) below will mitigate stray currents.

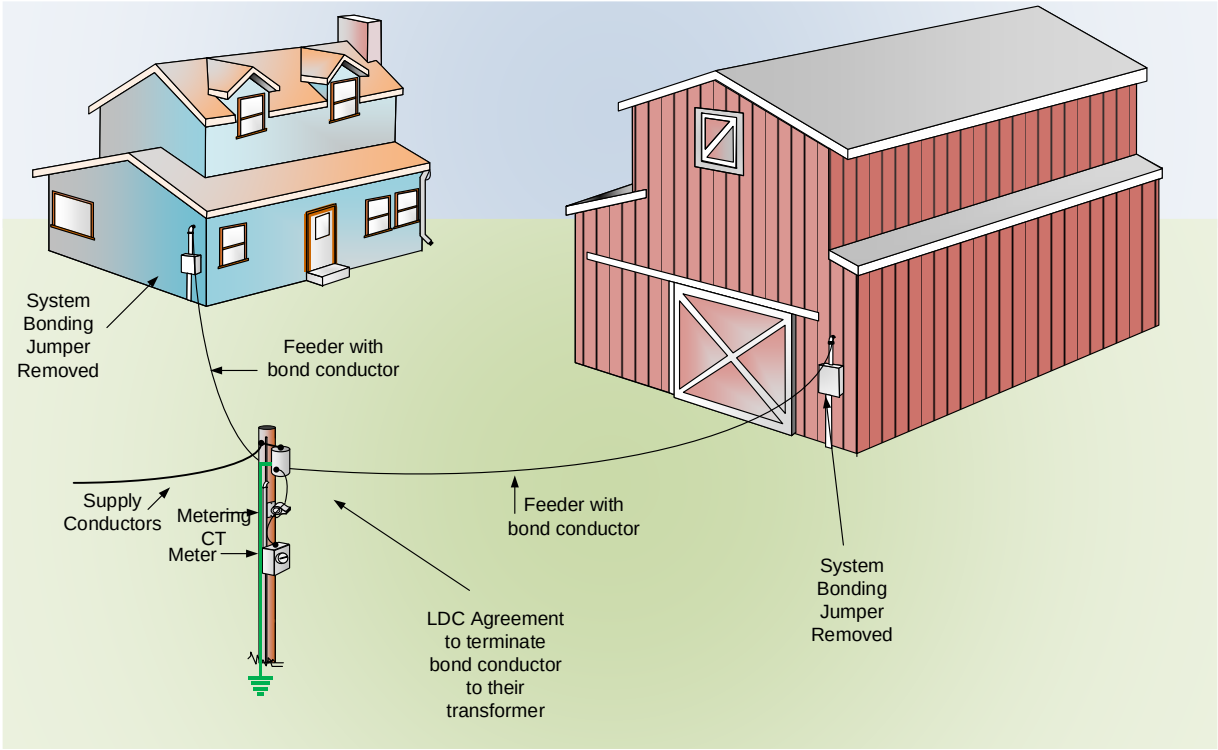
Diagram B4 –CMS – grounding at individual buildings



(c) Pole or pad mount Central metering system – grounding at utility transformer

Research has shown that sometimes single point groundings may be effective in mitigating some stray voltage issues and designers may wish to utilize this option for a CMS however it is not permitted by the OESC. Notwithstanding rule 10-210*, for* buildings on farms supplied by a CMS it shall be permitted to eliminate the *System Bonding Jumper* from the *Service Boxes* when the *LDC* permits connection of a bonding conductor run with the *Consumer's Service* conductors to their transformer. (See Diagram B5)

Diagram B5 –CMS - with separate bonding conductors



Note

Where overhead conductors are used to distribute 3-wire 120/240 V feeders, acceptable methods of installations for the conductors feeding a building include:

- Quadruplex Type NS75, with the bare conductor utilized as the bonding conductor. The neutral conductor is required to be insulated, and properly identified as per Rule 4-030;
- Triplex Type NS75, with the bare conductor utilized as the bonding conductor and a white neutral conductor lashed over the triplex conductors; or
- Triplex Type NS75, with the bare conductor utilized as the neutral conductor (not in contacted with bonded metal as per Rule 12-318) and a green conductor lashed over the triplex conductors.

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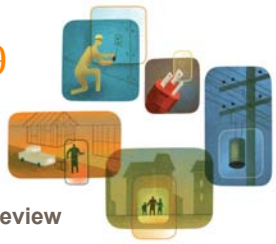
UAC
CMS
June 4, 2019



Ted Olechna,
Director, Code & Plan Review

CMS

- AGENDA ITEM 2
- CMS

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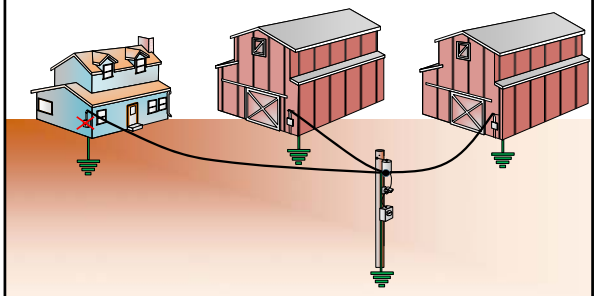
Typical Central Metering Supply



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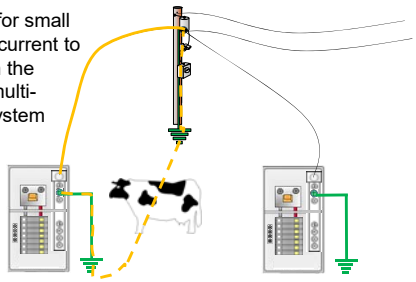
Stray Voltage – On Farms

It is normal for small amounts of current to flow through the earth on a multi-grounded system



Unlike humans, livestock are much more sensitive to current flow

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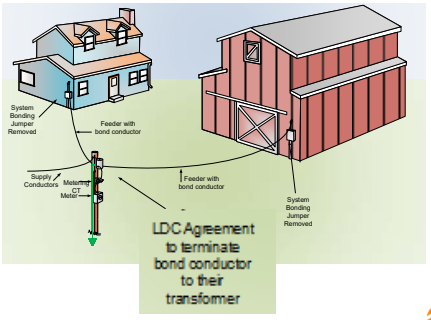
Central Metering Supply



LDC owned TX neutral:

For CM services, would the LDC permit the connection of a customer owned bonding conductor to the X2 point of the LDC transformer?

-This would be similar to OESC installations;
- Research has shown that this can sometimes help mitigate stray voltage;
- Allows customer to design solution (not always an issue)
- ESA would permit a deviation to Rule 10-210 (Grounding and Bonding at the Service Box)

Central Metering Supply

- ESA will be reviewing SECTION 75
- Specifically CM services
- Pole mount/Padmount
- Bonding/grounding in farm buildings

- Looking for participants in the review of CM service requirements in OESC (Overhead/Underground)?

QUESTIONS ?

Electrical Safety Authority

3-Phase 3-Wire Solidly-Grounded Wye Customer Services

3-Phase 3-Wire Solidly-Grounded Wye Customer Services

Background

January 2018 – Flash #1 released.

- Requested LDCs provide data on the number of possible transformers with exposure to a specific fire and shock hazard.
- Transformers that are a solidly-grounded wye-connected secondary system and there does not exist a grounded neutral conductor between the transformer's secondary neutral terminal and the customer's service entrance equipment. Pictures with have red titles.

June 2018 – Flash #2 released.
Requested LDCs provide proposals regarding corrective actions by September 2018.

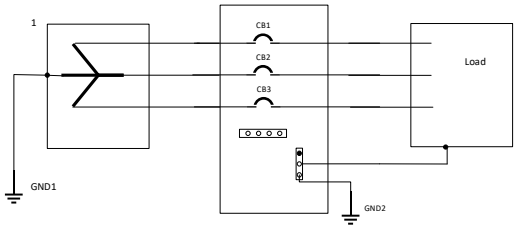
Fall 2018 – All LDC proposals "reviewed" without additional comment.

2 Issues brought to Utility Regulations by LDCs or ESA

- Use of "Bonding Conductor" instead of a "Neutral Conductor".
- Use of ESA data when performing Visual Inspections.

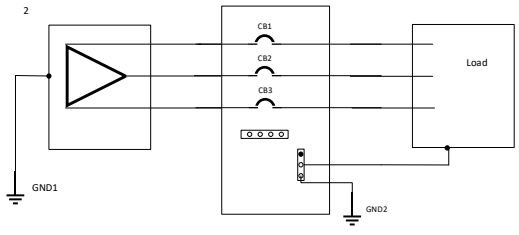
Electrical Safety Authority

Bad (Traditional Concern)



Electrical Safety Authority

Good (Traditional Delta)



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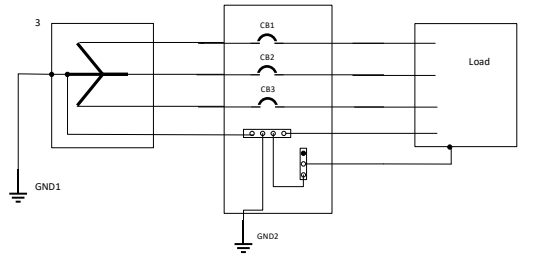
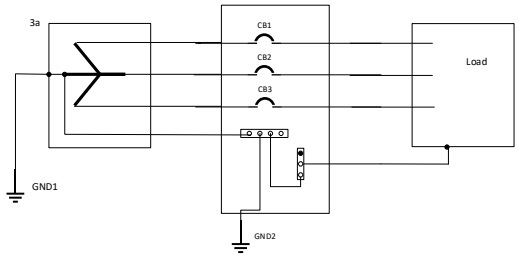
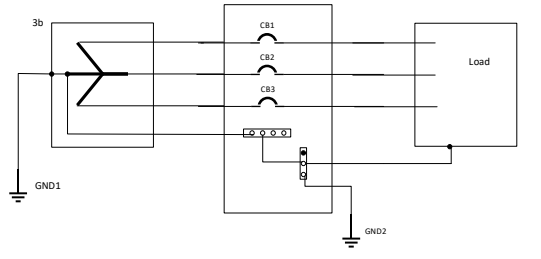
Good
(Traditional 4-wire (neutral))



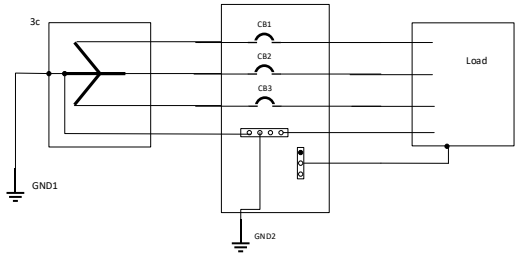
Good
(3 - No neutral to load)



Good
(3a – GND 2 moved (no change))

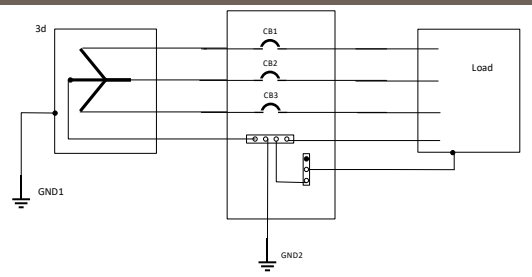


Bad – Customer issue
(3 – no system bonding jumper)



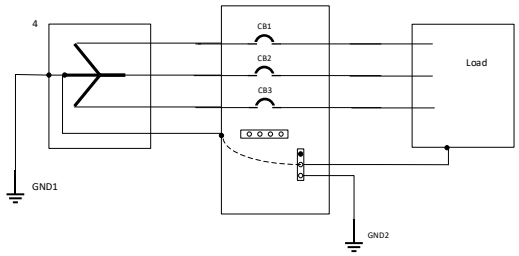
Bad – Transformer fault return through grounds (3 – Ungrounded TX)

Not part of this program, not communicated as a problem. Would be rare.

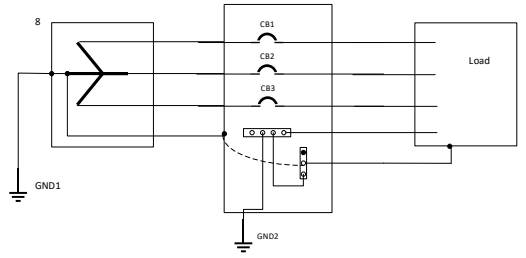


Good (1 - Bonding Conductor Added)

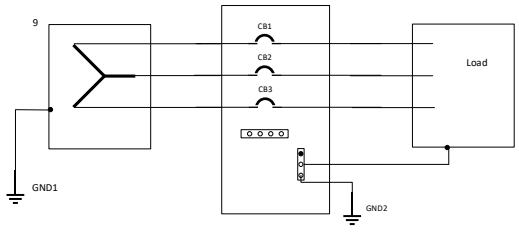
(Want communication to allow this)



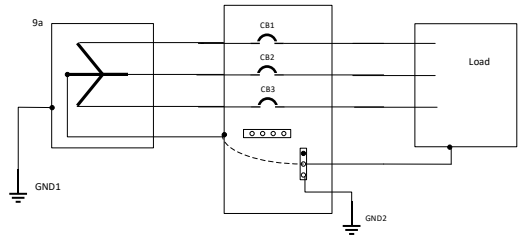
Bad – Customer Issue (Bonding Conductor used as a Neutral)



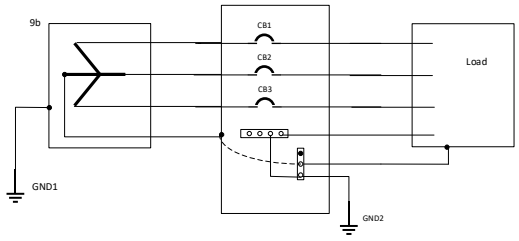
Good (Star Point of TX not grounded)



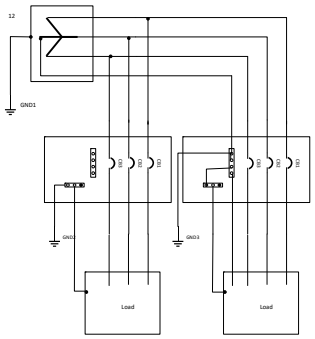
Bad
(9 + Bonding Conductor)
Transformer fault return through grounds.
Not part of this program, not communicated as a problem. Would be rare.



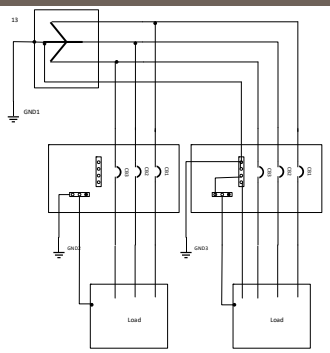
Bad – Customer Issue
(9a – 4 wire load)
Bonding Conductor used as Neutral



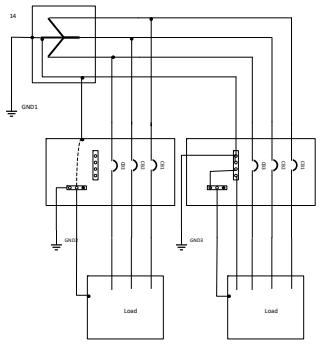
Bad
(3 wire customer faults through 4-wire customer)
(Addressed Flash #1 – Recommendation #1)



Bad
(12 + Grounded TX star point pretty much same problem as 12)



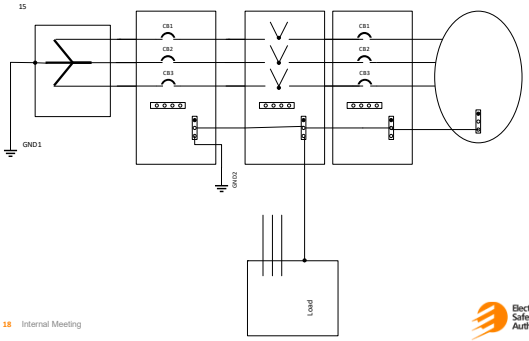
Good
(13 + Bonding Conductor for 3-wire customer)
(Want communication to allow this)



17 Internal Meeting

Electrical Safety Authority

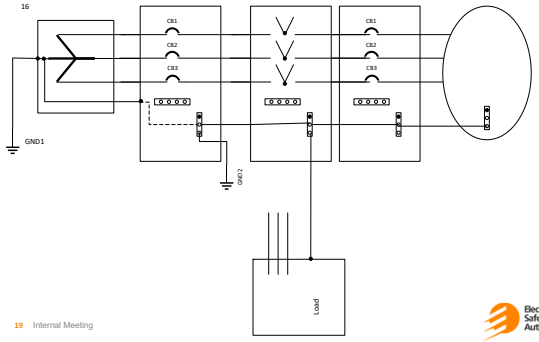
Bad
(Traditional Concern)



18 Internal Meeting

Electrical Safety Authority

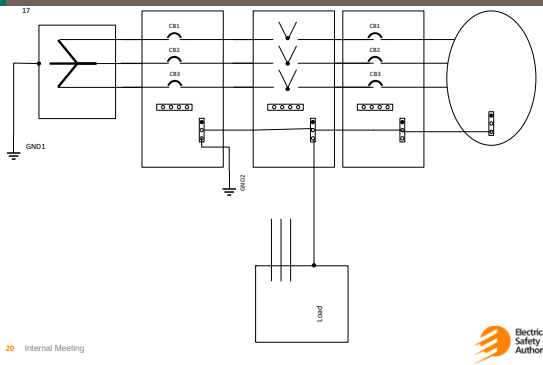
Good
(15 + Bonding Conductor)
(Want communication to allow this)



19 Internal Meeting

Electrical Safety Authority

Good
(15 – Ungrounded TX Star Point)

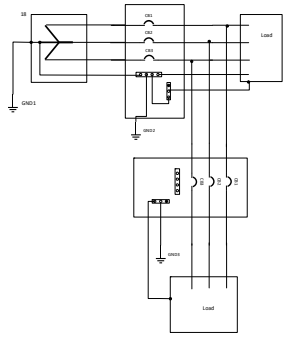


20 Internal Meeting

Electrical Safety Authority

Bad – Customer Issue
(2nd Building uses the ground for faults)

(Can't do anything with the 3 & 4, except use bonding conductor between the panels and remove GND3)



Additional Information

EXTRA

Additional Information

Part III definition of a "Neutral conductor".

- **Neutral conductor** — a metallic conductor that forms a continuous return path from source **to load** for a supply line.
- **Note:** *Neutral conductors are generally grounded.*
- **Supply line** — a line used for transmitting a supply of electrical energy.

√ - This conductor is metallic

X - Doesn't form a continuous return path from source to load for a supply line.

OESC definition of a "Neutral"

- **Neutral** - the conductor (when one exists) of a polyphase circuit or single-phase, 3-wire circuit that is intended to have a voltage such that the voltage differences between it and each of the other conductors are approximately equal in magnitude and are equally spaced in phase (see Appendix B).

√ - This conductor is intended to have a voltage such that the voltage differences between it and the other conductors are approximately equal in magnitude and are equally spaced in phase.

Additional Information
Flash #1

ESA RECOMMENDS

1. When a customer is identified as having a 3-phase, 3-wire service attached to a 3-phase transformer with a wye-connected secondary and a solidly-grounded secondary neutral terminal, the Electrical Distributor should check on other customers attached to the same transformer. For example, removing the ground strap on the transformer may cause issues to an existing customer with a 4-wire service.
2. If the ground strap is removed, it is recommended notification / signage be installed to ensure that during future site visits that crews do not reattach.
3. Reviewing the distributor's standard design drawings and standard design specifications to ensure there is sufficient information present to avoid this undue hazard.
4. Reviewing with field staff information regarding this type of service connection and mitigation techniques that can be used.
5. Informing staff that receive Public Safety Concerns (PSCs) that ESA will be issuing Z7s to Inspectors during this program as information comes into ESA. However ESA will not be issuing PSCs to the LDC for each customer identified under this safety program.
6. If the LDC starts developing Corrective Action Plans they should ensure higher risk installations are consider as a priority.

Electrical Safety Authority

ESA Severe Weather Response

UAC
June 4, 2019

Earl Davison
VP, Operations

Response Varies by Event

- Weather events are an annual occurrence
- ESA Response

Before	During	After

SAFETY FIRST
• Monitor Weather
• Marshall staff
  • CSC/Field
  • On call
• Mobilize Media
  • Info to municipality
  • Contractors
• Customer Center on Standby
	• Media Response
	• Education & Information
	• Emergency Response
	
	• Assess public safety:
	  • Disconnect
	  • Isolate
	  • Evacuate
	• Customer Center on standby or open
		• Repair Process
		  • normal business
		• House x house assessment for reconnection
		
		Each Inspector can work comfortably with 5 – 2 person service crews for restoration

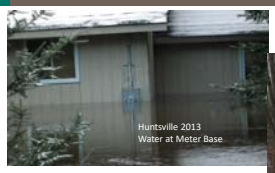
Tornado/Ice Storm
Short duration event

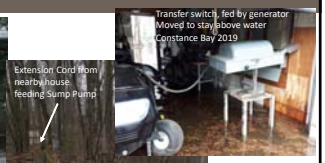
Short Term event

- Damage assessment, typically house x house
  - Inhabitable v Uninhabitable
  - Disconnect or reconnect

Electrical Safety Authority

Floods





Floods – sustained event

Do Nothing
- Water below outlets in basement

Isolate Branch Circuits:
- Water above basement outlets, but below panel

Disconnect
- Basement flooded, Water above panel

Issues
- Home Only
- Subdivision/Neighbourhood
- Decisions around Reconnection

These decisions almost always made in concert with Municipality, EMS, Police and LDC

Electrical Safety Authority

ESA is not a *"First Responder"*

- ESA Inspectors unequipped
  - Without required safety equipment or training
  - Examples:
    - Water access, at night, during a flood
    - Roads impassible - wrong vehicle types
- Vast Majority of ESA's inspection efforts are 24-72 hours AFTER the event
  - Repairs in progress, LEC involved

Electrical Safety Authority

ESA Fees

Overtime: typically waived during event
Reconnection: can be waived, typically not – ESA decision
Repairs: rarely waived

ESA is a self funded, not-for-profit entity
- Receives no public tax or ratepayer money
- Disasters often involve Declaration of Emergency by Municipality
  - Alternative funding mechanisms available
- Majority of revenues come from 8500 LEC's
  - Most LEC's are 10 or less employees (small business)

Electrical Safety Authority

Energy storage systems

64-900 General (see Appendix B)
Rules 64-050 to 64-078 shall apply to energy storage systems, except where otherwise specified.

64-902 Interactive point of connection
The output of interactive energy storage systems shall be permitted to be connected in accordance with Rule 64-112.

64-904 Voltage of energy storage systems
Energy storage systems with maximum voltages higher than 750 V dc but not exceeding 1500 V dc shall not be required to comply with Rules 36-204, 36-208, and 36-214 provided that

a) the installation is serviced only by qualified persons;
b) the part of the installation exceeding 750 V dc is inaccessible to the public; and
c) enclosures in which circuits exceeding 750 V dc are present are marked with the word "DANGER" followed by the maximum rated circuit voltage of the equipment.

64-906 Battery installations
Batteries installed as part of energy storage systems that are not self-contained shall meet the requirements of Rule 64-800 to 64-814.

64-908 Facilities with energy storage systems
1) Any structure or building with an energy storage system shall have a conspicuous, legible, and permanent marking or directory installed on the exterior of the building or structure at a location acceptable to the Electrical Safety Authority.
2) The plaque or directory required by Subrule 1) shall indicate the location of system disconnecting means and that the structure contains energy storage systems.

Generators and Energy Storage
1 Year Review

Feedback

Jason Hrycyshyn, P.Eng
Utility Advisory Council
June 4, 2019

Generators and Energy Storage
1 Year Review

Guideline version 1.0 was endorsed 1 year ago.

ESA agreed to review the document with the UAC after 1 full year of the Guidelines implementation.

ESA agreed to 1 change in regards to when something is deemed a distribution asset. This change did not change the intent of the direction.

No other parties has contacted ESA requesting changes.

2

Generators and Energy Storage
1 Year Review (Slide 1 of 3)

Change – (see red text)

What types of Energy Storage are deemed part of a distribution system under Regulation 22/04?

To be deemed part of a distribution system under Regulation 22/04 an energy storage unit shall meet the following criteria:

a. The energy storage unit is deemed a distribution asset by the Ontario Energy Board (OEB) or the energy storage unit is to primarily exist for such purposes as equipment upgrade deferrals or improved reliability of the distribution system (see Appendix A for more examples). * Note: See more information when the OEB has declared an energy storage unit to not be a distribution asset; ~~An energy storage unit will not be deemed by ESA as part of a distribution system if it is deemed not a distribution asset by the OEB;~~

3

Generators and Energy Storage
1 Year Review (Slide 2 of 3)

Change – (see red text)

What types of Generation are deemed part of a distribution system under Regulation 22/04?

To be deemed part of a distribution system under Regulation 22/04 a ~~G~~generator unit shall meet the following criteria:

a. The generator is deemed a distribution asset by the Ontario Energy Board (OEB) or the generator is to primarily exist for such purposes as equipment upgrade deferrals or improved reliability of the distribution system (see Appendix A for more examples). * Note: See more information when the OEB has declared an energy storage unit to not be a distribution asset; ~~An generator will not be deemed by ESA as part of a distribution system if it is deemed not a distribution asset by the OEB;~~

4

Generators and Energy Storage
1 Year Review (Slide 3 of 3)

Change – (see red text)

*Note: In the event that the OEB has determined the status to not be a distribution asset, at any point in time, ~~In the event that the OEB has not yet determined the status of the equipment and the LDC determines (using this guideline) that it likely is a "distribution asset" and at some future point the OEB deems the equipment to "not be a distribution asset"~~ then ESA will automatically harmonize with the OEB decision and will also consider the equipment to "not be part of the distribution system".

Clean version of above

*Note: In the event that the OEB has determined the status to not be a distribution asset, at any point in time, then ESA will automatically harmonize with the OEB decision and will also consider the equipment to "not be part of the distribution system".

5

Generators and Energy Storage
1 Year Review

ESA is looking for any other requests.

ESA is looking to include this Guideline in the upcoming process, which involves 5 year reviews.

6

Removal of Bulletins
Withdrawing Bulletins

Feedback

Jason Hrycyshyn, P.Eng
Utility Advisory Council
June 4, 2019

Removal of Bulletins
Withdrawing Bulletins

ESA will be withdrawing some bulletins in the near future and more are expected as Guidelines are reviewed/revised.

One of the goals of the Guideline reviews will be to incorporate Bulletins into the Guidelines in order to control the number of Bulletins.

ESA is seeking this councils advice on how best to communicate a Withdrawn Bulletin.

2

Removal of Bulletins
Withdrawing Bulletins

Standards Council of Canada
What does it mean if the status of a standard is marked as "withdrawn"?

A standard may be withdrawn if it:
- is not up-to-date technically
- does not reflect current practice or research
- is not suitable for new and existing applications (products, systems or processes)
- is not compatible with current views and expectations regarding quality, safety and the environment

This status is also used if:
- the standard is withdrawn and not replaced by the author for any of the reasons mentioned above
- there has been a change in the standard designation (e.g. if CSA A1234-2000 is superseded by CSA B5678-2005)

3

Removal of Bulletins
Withdrawing Bulletins

OPTIONS

1. Remove Withdrawn material from the website and inform the Bulletin Contacts via email.
   - Stakeholders may look for the Bulletin online and unnecessarily spend time looking for a bulletin which is not longer available to them.

2. Create a "Status" Column online with (Active, Flash, Withdrawn) markers. Withdrawn bulletins would still be available.
   - Stakeholders could find the bulletin they were seeking, if withdrawn, however it would contain a "Withdrawn" watermark.
   - Bulletin reference numbers would remain the same.
   - Bulletins would have a watermark and informative textbox.
   - Examples on next slides 5 & 6.

3. Other

4

Removal of Bulletins
Withdrawing Bulletins

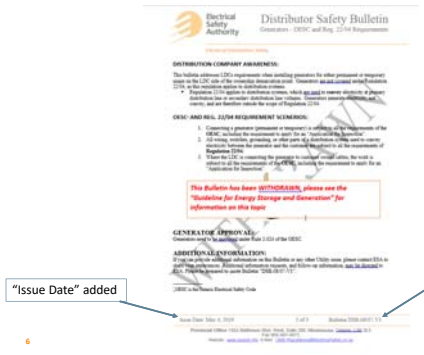
Status	Year (Version #1)	Bulletin/Flash Number	Bulletin/Flash Title/Description
ACTIVE BULLETIN	2019	DB-02-19	Certificate of Approval Requirements
WITHDRAWN	2019	DB-01-19	Unused vs Used Distribution Equipment
ACTIVE BULLETIN	2018	DB-05-18	Energized Temporary Distribution Work
ACTIVE FLASH	2018	FN-02-18 (Phase 2)	3-Phase, 3-Wire, Solidly-Grounded Wye Customer Services - Complete
ACTIVE FLASH	2018	FN-02-18 (Phase 2)	3-Phase, 3-Wire, Solidly-Grounded Wye Customer Services - Corrective Action Proposal Worksheets
ACTIVE FLASH	2018	FN-02-18 (Phase 2)	3-Phase, 3-Wire, Solidly-Grounded Wye Customer Services - Proposals
ACTIVE BULLETIN	2018	DB-04-18	Electrical Work and Service Connections
ACTIVE BULLETIN	2018	DB-03-18	Engineering Practices and Regulation 22/04 - Sections 4 & 5
WITHDRAWN	2018	DB-02-18	Distribution Stations Standard - CAN/CSA-22.3 No. 61936-1

Notes:
The bulletins marked as "Withdrawn" are marked so only for demonstration purposes. These bulletins exist and at the time of this presentation are "Active".

All Flash Notices expire and these will be removed from the ESA website at the appropriate time.

5

Removal of Bulletins
Withdrawing Bulletins



"Issue Date" added

"Version Control" added

6

Removal of Bulletins
Withdrawing Bulletins

QUESTIONS

1. Is there a preference for removing withdrawn material or keeping it available?
2. Will anything proposed cause you any issues?

7

Electrical Safety Authority

Measurements Canada Drawings -
Sections 7 & 8 - Regulation 22_04

Feedback

Jason Hrycyshyn, P.Eng
Utility Advisory Council
June 4, 2019

Measurements Canada Drawings
Sections 7 & 8 - Regulation 22_04

ESA has been identified that Regulation 22/04 and metering requirements may not be compatible.

ESA is looking into providing direction with respect to Sections 7 & 8.

Measurements Canada Drawings
Sections 7 & 8 - Regulation 22_04

ESA's understanding is that metering work must be done to meet the Measurements Canada Standards

https://www.ic.gc.ca/eic/site/mc-mc.nsf/eng/lm04068.html

Metering must also meet the requirements of Regulation 22/04. ESA re-enforced requirements in 2013 with the release of the following bulletin.

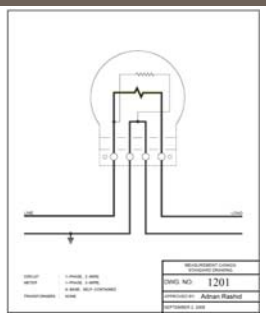
https://www.esasafe.com/assets/files/esaeds/pdf/dib/DIB-02-13-Metering-Standards-for-C-I-installations.pdf

Measurements Canada Drawings
Sections 7 & 8 - Regulation 22_04

The Measurement Canada Standard Drawings and Specifications are not signed by a P.Eng, nor is recognized as an "Authority" under Regulation 22/04.

ESA is looking into recognizing Measurements Canada to be an "Authority" for the metering work.

ESA is seeking this council's thoughts



Measurements Canada Drawings
Sections 7 & 8 - Regulation 22_04

Regulation 22/04 Section 7 Excerpt:

(2) Review and approval of plans, standard design drawings and standard design specifications under this section shall be carried out,

(a) by a professional engineer, who may or may not be the professional engineer who prepared the plans or assembled the standard design drawings or standard design specifications; or

(b) by the Authority at the request of the distributor. O. Reg. 22/04, s. 7 (2).

5

Measurements Canada Drawings
Sections 7 & 8 - Regulation 22_04

Regulation 22/04 Section 8:

No changes are expected for Section 8. As currently written Section 8 does not appear to require any additional direction or amending.

6

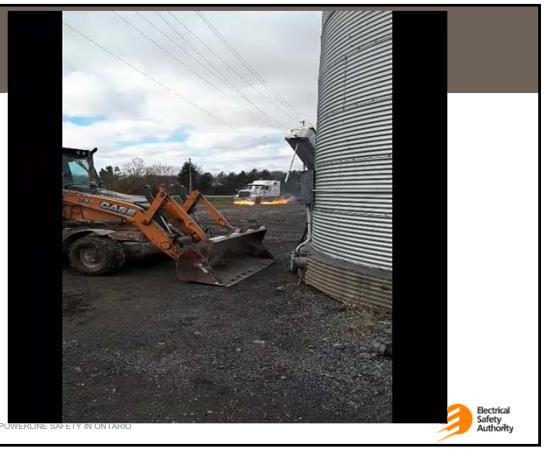
Electrical Safety Authority

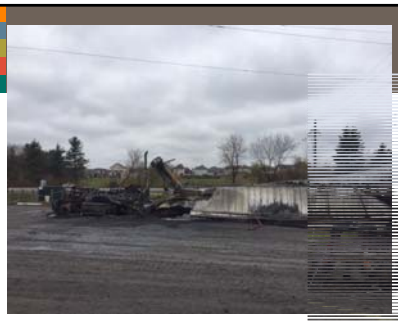
Serious Incidents-UAC

Patrick Falzon,
Powerline Safety Specialist
Powerline Safety Group
Electrical Safety Authority
June 4, 2019

Dump Truck Operator Contact

- Unloading materials under the overhead powerlines on a farm
- Extended box contacted the powerlines
- Truck caught on fire
- Operator exited the truck in a correct manner
- Property owner requested ESA force the LDC to relocate the powerlines running across the property
- Installation was compliant to the overhead standards



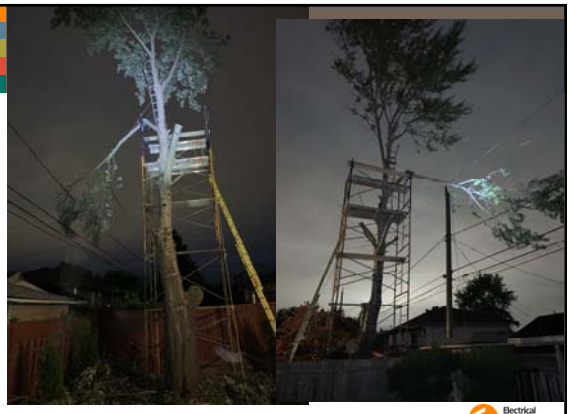


Near miss

•Brick laying crew knocked off an energized transformer off its pad
•The crew was trying to reposition the transformer back on its foundation
•No injuries

Near Miss- Tree Trimming

- Property owner cutting down a tree at 9pm?
- He secured a 50ft scaffold to the tree along with a 20ft extension ladder
- While in the process of cutting a 6in diameter 20ft limb, the limb sagged and landed on a 16kV powerline
- The limb caught fire and eventually fell onto of the secondary distribution bus
- No injuries



Worker Fatality- Raised Platform

- 19 year worker succumbed to his injuries a week later while changing flags on a flag pole
- Using a scissor lift
- Contacted the 27.6kV overhead powerlines

Worker Fatality- Raised Platform

Electrical Safety Authority

Electrical Safety Authority

Powerline Safety Campaign

June 4, 2019

Background

Powerline contact is the leading cause of electrical fatalities in Ontario

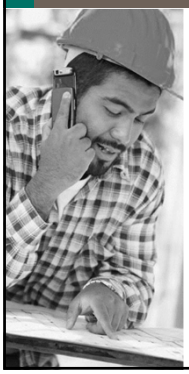
- 19 people died from powerline contact over the last 10 years
- 1,248 contacts with powerlines over same period
- Dump trucks are the #1 cause in the construction sector
- Awareness of powerline hazard is relatively low (consumer – 33%, worker 37%)
- Intent to change behaviour is even lower, requiring a focus not just on awareness of the hazard but also how to avoid it

Electrical Safety Authority

Communications Strategy

1. **Prioritize awareness efforts against the occupational target group** (construction workers, dump truck drivers, and arborists), but strengthen the approach with broader outreach to Ontario homeowners (targeting males 18-55)
2. **Leverage strength of current creative platform**, maximizing resources by using existing assets and content where possible
3. **Encourage partners to be advocates for powerline safety within their industry**, creating specific content to encourage more engagement and depth of message communication
4. **Measure, refine, optimize**

Occupational Target Audience



I often post comments/reviews online
While watching TV, I search the internet for product advertising
Online streaming services changed the way I watch TV
Don't want responsibility, I'd rather be told what to do
I want to get to the very top of my career
Advertising influences my purchasing decisions

Adult animation, sports, sitcom, reality, music videos

Auction, auto, career search, sports, online dating

Electrical Safety Authority

Public Target Audience

I like taking risks
I don't want responsibility, I'd rather be told what to do
I follow at least one sport throughout the season
Online streaming services changed the way I watch TV
I often refer to the internet before making purchases
I look at my career as more than just a job

news, sports, movies, documentaries, business news

Auction, weather, sports, news, home improvement, entertainment, auto

Creative

:30 Creative Length **Occupational**

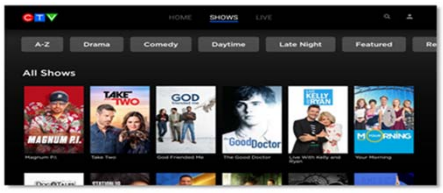
:15 Creative Length **Consumer**

Television

- Sports continues to be the best way to reach both targets
- Campaign timing aligns to some high profile live sports events
- CP24 will also be included in order to increase the reach in the Ontario market

*CP24 is the 3rd ranked specialty station in Ontario against M18-49

Video on Demand



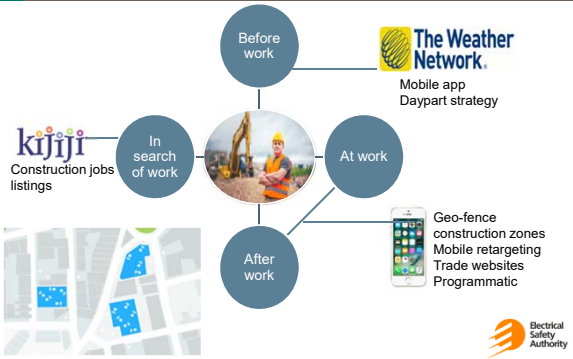
- 67% of both targets say that they have streamed video in the past 30 days, and spend 5+ hours per week watching
- Unlike traditional broadcast, VOD is sold on impressions
- VOD is non-skippable, low clutter (maximum 1 minute of commercial time per break)

Occupational Tactics

- Direct Mail to LDCs, Municipalities & Construction/Dump Truck Companies, Arborists, Landscaping Organizations
  - Online ordering now available year-round
  - Safety materials now available in additional languages: French & Portuguese
- Porta-potty advertising
- Trade media

Electrical Safety Authority

Digital Strategy



Electrical Safety Authority

Media Strategy

- Audio News Release
- Media pitching
- Social media

Powerlines can be deadly, even without direct contact

Electrical Safety Authority

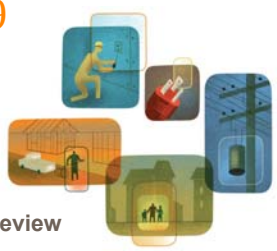
Thank you!

Electrical Safety Authority

Electrical Safety Authority

UAC
June 4, 2019

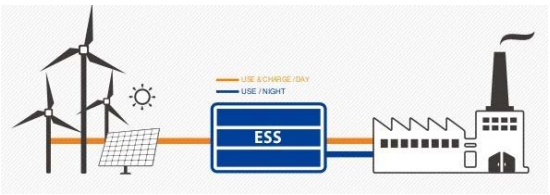
ESS



Ted Olechna,
Director, Code & Plan Review

64-000 1) OA - Scope – *New*

This Section applies to the installation of renewable energy and energy storage systems except where the voltage and current are limited in accordance with Rule 16-200 1) a) and b) (i.e.Class 2)



Electrical Safety Authority

AGENDA ITEM 11

Energy Storage Systems (ESS)

Electrical Safety Authority

64-002 OA - Definitions – *New*

Energy storage systems (ESS) — equipment or systems that receive electrical energy and provide a means to store that energy in some form for later use in order to supply electrical energy when needed.

Electrical Safety Authority

64-002 OA - Definitions – *New*

Energy storage systems, self-contained — energy storage systems where the components such as cells, batteries, or modules and any necessary controls, and ventilation, illumination, fire-suppression, or alarm systems are assembled, installed, and packaged in a single energy storage container or unit.

ANSI/CAN/UL 9540

Energy storage systems, other — energy storage systems that are not self-contained but are individual devices assembled as a system.

Electrical Safety Authority

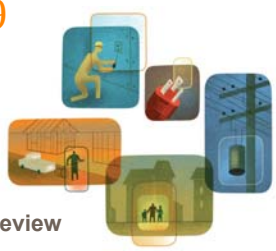
QUESTIONS ?

Electrical Safety Authority

Electrical Safety Authority

UAC
June 4, 2019

OBC - EV



Ted Olechna,
Director, Code & Plan Review

CMS

- AGENDA ITEM 12
- Ontario Building Code Requirements - EV Charging

Electrical Safety Authority

• OBC Changes - EV Charging

OBC Technical Bulletin Building Code Amendments - Part 3.pdf

Ontario Regulation 88/19, amending Ontario's 2012 Building Code, was filed on May 2, 2019.

Page 5 / 5

Previous Page | Next Page

Electric Vehicle Charging (3.1.21.)

Note: Amendments related to electric vehicle charging requirements in the Building Code came into effect on the date the regulation was filed – May 2, 2019.

All requirements including transition provisions related to electric vehicle charging in non-residential buildings have been deleted.

3.1.21.1. Electric Vehicle Charging Systems

(1) Except as provided in Sentence (3), where vehicle parking spaces are located in a *building*, other than an apartment *building*, **not less than 20% of the parking spaces shall be provided with *electric vehicle supply equipment* installed in accordance with Section 86 of the Electrical Safety**

Safety Authority

• OBC Changes - EV Charging

Electric Vehicle Charging (9.34.4.)

Note: Amendments related to electric vehicle charging requirements in the Building Code came into effect on the date the regulation was filed – May 2, 2019

The current electric vehicle charging requirements pertaining to houses have been deleted.

9.34.4.1. Electric Vehicle Charging Systems

(3) Except as provided in Sentence (6), where a ***house* is served by a garage, carport or driveway,** the following shall be installed to permit the future installation of *electric vehicle supply equipment* that conforms to Section 86 of the Electrical Safety Code:

(a) a minimum 200 amp panelboard,

Electrical Safety Authority

QUESTIONS ?

Electrical Safety Authority