AMA Electrical Staff

• Provincial Electrical Administrator
  – Clarence Cormier (Edmonton)

• Electrical Team Lead
  – Kevin Glubrecht (Red Deer)

• Electrical Technical Advisor
  – Bob Hall (Edmonton)

• Electrical Technical Advisor
  – Cameron Doram (Red Deer)

• Electrical Technical Advisor
  – David Phillips (Edmonton)

• Electrical Technical Advisor
  – Gregg Marshall (Calgary)

• Partnership Support Officer
  – Steve Eagles (Red Deer)
Staying Current in the Electrical Loop
How to Stay Current in the Electrical Industry

• IAEI - International Association of Electrical Inspectors
  http://www.iaei.org/

• EIAA - Electrical Inspectors Association Alberta
  https://www.eiaa.ca/

• Solar Energy Society of Alberta
  http://www.solaralberta.ca/

• ECAA - Electrical Contractors Association
  http://www.ecaa.ab.ca/

• Contact City / town inspections and permitting department –
  local Authority Having Jurisdiction (AHJ)
  http://www.municipalaffairs.alberta.ca/permits
How to Stay Current in the Electrical Industry Cont.

- Alberta Municipal Affairs  
  [http://www.municipalaffairs.alberta.ca/](http://www.municipalaffairs.alberta.ca/)  
  Call Center: 1.866.421.6929  
  Email [safety.services@gov.ab.ca](mailto:safety.services@gov.ab.ca)

- Safety Codes Council  
  [http://www.safetycodes.ab.ca/](http://www.safetycodes.ab.ca/)
EIAA MISSION STATEMENT

• The Electrical Inspectors Association of Alberta will promote the uniform understanding and application of the Rules and Regulations adopted under the Safety Codes Act. This shall be done without bias and with fairness. We will assist in the formulation of standards, technical, professional knowledge and procedures upon well-grounded information, in achieving safe electrical installations, in the interest of safety, to life and property.

• How to get involved: https://www.eiaa.ca/
Safety Codes Act

Responsibilities
The Safety Codes Act established a unifying administration to ten safety disciplines with each have their own safety codes to keep the public safe in the places they live, work and play.

For more information on a particular discipline, click one of the links below:

- Building
- Fire
- "Electrical"
- Gas (Natural and Propane)
- Plumbing
- Private Sewage
- Boilers and Pressure Vessels
- Elevators
- Amusement Rides
- Passenger Ropeways
SAFETY CODES ACT

Part 1

Responsibilities

Owners, care and control

5 The owner of any thing, process or activity to which this Act applies shall ensure that it meets the requirements of this Act, that the thing is maintained as required by the regulations and that when the process or activity is undertaken it is done in a safe manner.

1991 cS-0.5 s5

Design duties

6 A person who creates, alters, has care and control of or owns a design or offers a design for use by others shall ensure that the design complies with this Act and that it is submitted for review or registered if required by this Act, and if the design is deregistered, the person shall provide notice of its deregistration in accordance with the regulations.

1991 cS-0.5 s6
Manufacturers’ duties

7 A person who manufactures any thing or undertakes a process or activity to which this Act applies shall ensure that the thing, the process or the activity complies with this Act.

1991 cS-0.5 s7

Contractors’ duties

8 A contractor who undertakes construction, operation or maintenance of or builds or installs any thing to which this Act applies shall ensure that this Act is complied with.

1991 cS-0.5 s8

Vendors’ duties

9(1) A person who is a vendor in the ordinary course of business, other than as an employee or an agent, shall not advertise, display or offer for sale, for lease or for other disposal, or sell, lease or otherwise dispose of, any thing to which this Act applies unless that thing complies with this Act.

(2) A person who sells, leases or otherwise disposes of a thing referred to in subsection (1) shall provide any warnings or instructions required by this Act.

(3) No person shall advertise, display or offer for sale, for lease or for other disposal, or sell, lease or otherwise dispose of, any thing that is prohibited from being sold by the regulations.

1991 cS-0.5 s9
Electrical Code

New Electrical Codes Already In Force Under the Regulation
Electrical Code

Go back, we're not ready for change
NOTICE

ELECTRICAL CODE REGULATION

This notice is intended for all Albertans who may have cause to use the Electrical Code Regulation.

Codes in Force under the Regulation
The Electrical Code Regulation was recently amended by Alberta Regulation 126/2015. Changes will take effect January 1, 2016, at which time the following codes will be in force:

- CSA-C22.1-15 – Canadian Electrical Code, Part 1 – This code provides the minimum safety standards for the installation and maintenance of electrical equipment.
- Code for Electrical Installations at Oil and Gas Facilities – 5th Edition, 2015 – This code applies to electrical installations used in the search, transmission or production of oil, natural gas and related hydrocarbons, and it provides area classification guidelines.

Information on Purchasing the Codes
The Canadian Electrical Code may be purchased directly from the Canadian Standards Association at www.shop.csa.ca, or from applicable electrical wholesalers and post-secondary institutions.

The Code for Electrical Installations at Oil and Gas Facilities and the Alberta Electrical Utility Code will be available for purchase from the Alberta Queen’s Printer at www.qp.alberta.ca.

The Electrical Code Regulation 209/2006, with amendments up to and including Alberta Regulation 126/2015, will be available for purchase or download from the Alberta Queen’s Printer at www.qp.alberta.ca.

October 16, 2015
For more information, please call 1-800-421-6929, or visit www.manoaalberta.gov.ab.ca

New Electrical Code

- Codes can be ordered online from CSA at: http://shop.csa.ca/
New Electrical Code

- The Alberta Electric Utility Code is published and it was announced September 1, 2016. A copy can be purchased from the Alberta Queens Printer.

- The date the code will come into effect according to section 65 in the Safety Codes Act and the new automatic adoption policy will be May 1, 2017. The 2015 overhead and underground standards will also apply as they are referenced in the 5th edition of the AEUC.
STANDATA’S
What is a STANDATA?

• Electrical STANDATA, developed jointly by Alberta Municipal Affairs and the Safety Codes Council. These information bulletins contain interpretations, clarifications, recommended practices or province-wide variances on Codes and Standards matters related to the Safety Codes Act.

• STANDATA is a living document that is constantly changing. It is recommended to subscribe.
How do you receive STANDATA’s?

• To receive STANDATA notifications, please go to: http://municipalaffairs.alberta.ca/am_list_subscription_services.cfm and complete the posted subscription form.

• Once the form is submitted you will be automatically notified when new STANDATA or other related information is posted on the Safety Services site.

• Links to currently posted STANDATAs can be viewed at: http://www.municipalaffairs.alberta.ca/cp_index.cfm
How to Subscribe for an Electrical STANDATA:

• Go to the website:
  [http://www.municipalaffairs.alberta.ca/1840](http://www.municipalaffairs.alberta.ca/1840)
STANDATA’S Cont.

- Select the discipline you are wanting to subscribe to
  [http://www.municipalaffairs.alberta.ca/cp_gas](http://www.municipalaffairs.alberta.ca/cp_gas)
• Fill out the required information
• Click subscribe when completed

http://www.municipalaffairs.alberta.ca/am_list_subscription_services
Questions
2017 Submissions
Electrical Equipment manufactured or built in Alberta

Question
• Is a permit required to build the product in Alberta if the product is to be sold outside Alberta?

STANDATA/Electrical Code Regulation
– **Section 2 - Electrical Systems Equipment**
  • (2) No person shall manufacture, install, sell or offer for sale any equipment related to electrical systems for **use in Alberta** unless the equipment has been
    – (a) certified by a certification body in accordance with the certification body’s terms of accreditation with Standards Council of Canada, or
    – (b) inspected by an inspection body in accordance with the inspection body’s terms of accreditation with Standards Council of Canada
Exemptions

2 This Regulation does not apply to the following:

a) an accredited corporation operating within the scope of its terms of accreditation;

b) equipment and materials regulated under the Elevating Devices, Passenger Ropeways and Amusement Rides Permit Regulation (AR 28/2012);

c) equipment, materials and systems regulated under the Pressure Equipment Safety Regulation (AR 49/2006). AR 204/2007 s2;17/2015

Permit required

3 (1) Subject to subsection (2), a person shall not start any undertaking for which a permit is required under this Regulation unless a permit has been issued.
Electrical Equipment manufactured or built in Alberta Cont.

Answer

- An SCO could ask the person(s) manufacturing the product for a proof of sale. This would indicate and prove the product is intended to be sold/used outside of Alberta.

- If a receipt can not be produced, then all applicable codes and standards in Alberta would have to be followed. It is the responsibility of the contractor, or accredited corporation to provide this information upon request. It is also advised these parties and local AHJ have a working relationship. This working relationship will aid in ensuring there is no confusion with this process.

- For further information on this item contact Alberta Municipal Affairs at 1-866-421-6929 or email safety.services@gov.ab.ca and ask to speak to our partnership expert David Ramsay.
Question

• Are hanging luminaires permitted to be installed over a bathtub? What code rule allows or doesn’t allow this installation?

Code rule:
Section 0 Definitions

– **Damp location** — an exterior or interior location that is normally or periodically subject to condensation of moisture in, on, or adjacent to electrical equipment and includes partially protected locations under canopies, marquees, roofed open porches, and similar locations.

– **Wet location** — a location in which liquids may drip, splash, or flow on or against electrical equipment.

**30-318 Luminaires in damp or wet locations**

1) Luminaires installed in damp or wet locations shall be approved for such locations and be so marked.

2) Luminaires suitable for use in wet locations shall be permitted to be used in damp locations as well.
30-606 Lampholders in wet or damp locations

1) Where lampholders are installed in wet or damp locations, they shall be of the weatherproof type.

**Building Code (reference only, please consult with a Building Duty Officer for further information)**

- The following is for protection of the walls around the bathtub and may help in determining “wet location”

9.29.2. Waterproof Wall Finish

- 9.29.2.1. Where Required
  1) Waterproof finish shall be provided to a height of not less than
     a) 1.8 m above the floor in shower stalls,
     b) 1.2 m above the rims of bathtubs equipped with showers, and
     c) 400 mm above the rim of bathtubs not equipped with showers
https://www.youtube.com/watch?v=r3oHNRY6JvE
(Need an internet connection to work, but could change your mind)

Answer
• The fixture shall be approved for location and if installed in wet or damp locations, they shall be of the weatherproof type as per 30-606 and other rules such as GFCI protection may apply
Question
• Is a NuTek outlet box considered a Rigid a PVC outlet box?

Code Rules
30-302 Supports
4) Where the weight of a luminaire does not exceed 23 kg, the luminaire shall be permitted to be supported by a ceiling outlet box attached directly to the building structure or by a ceiling outlet box attached to a bar hanger.

6) Rigid PVC boxes shall not be used for the support of luminaires unless they are marked as being suitable for the purpose.
Certificate of Compliance

Certificate: 1390394 (LR, 5043-ZD05)  
Project: 70015879  
Issued to: Thomas & Betts Limited  
760 Thomas Ave  
St.-Jean-sur-Richelieu, QC, J2X 2M9  
Canada  
Attention: Mr. Pierre Asselin

The products listed below are eligible to bear the CSA Mark shown with adjacent indicators 'C' and 'US' for Canada and US or with adjacent indicator 'US' for US only or without either indicator for Canada only.

Michael Chung  
Issued by: Michael Chung

PRODUCTS
CLASS 4411 01 - OUTLET BOXES AND FITTINGS - Boxes  
Non-metallic outlet boxes with integral clamps:

Cat Nos: W-OCT, W-FWCT, W-WSW, 2-FWSW, 3-FWSW, 3-FWSW for use with non-metallic sheathed cables Nos 14/2, 14/3, 12/2, 12/3, 10/2, 10/3 AWG.

Cat Nos: W-OCT, F-WOCT, F-FWCT, 2-FWSW, 3-FWSW, 3-FWSW for use with non-metallic sheathed cables Nos 14/2, 14/3, 12/2, 12/3 AWG.

Cat Nos: W-RED, F-WRED for use with non-metallic sheathed cable Nos 10/3, 8/3 AWG.

Cat Nos: W-SW/BX, F-SW/BX for use with armored cables Nos 14/2, 14/3, 12/2, 12/3 AWG.

Cat Nos: 4-FWSW, 4-FWSW for use with non-metallic sheathed cables Nos 14/2, 14/3, 12/2, 12/3 AWG.
NuTek outlet box Cont.

CLASS 4411 B1 - OUTLET BOXES AND FITTINGS - Boxes - Certified to US Standards

Non-metallic outlet boxes with integral clamps:

Cat Nos: W-OCT, W-OWT, W-SW, W-FWSW, FWSW for use with non-metallic sheathed cables Nos 14/2, 14/3, 12/2, 12/3, 10/2, 10/3 AWG.

Cat Nos: W-OCT, W-OWT, J-SW, J-FWSW, J-FWSW for use with non-metallic sheathed cables Nos 14/2, 14/3, 12/2, 12/3 AWG.

Cat Nos: W-OTR, J-ORT for use with non-metallic sheathed cables Nos 10/2, 10/3 AWG.

Cat Nos: W-OWX, W-FWX for use with armored cables Nos 14/2, 14/3, 12/2, 12/3 AWG.

APPLICABLE REQUIREMENTS

CSA Std. C22.2 No 18.2 - Non-metallic Outlet Boxes

UL Std. 514C - Non-metallic Outlet Boxes; Flush Device Boxes and Covers.
Answer

• NuTek outlet boxes are not considered Rigid PVC as per manufacturer’s specifications. They are classified as non-metallic outlet boxes as per CSA certificate of compliance. Therefore 30-302(6) does not apply to NuTek brand non-metallic outlet box;

• 30-302(4) might be useful to installers and is provided as a courtesy.
In-situ Modification

Question(s)

• What are the requirements when converting fluorescent fixtures to LED fixtures?
• Are Permits required?
• Are the fixtures required to be re-certified?

• STANDATA

• Retrofitting Luminaires for Energy Conservation or Similar Programs
  – As indicated above, repairs or alterations to certified equipment, if not done properly, may void certification.

  – REMOVED FOR MODIFICATION When all luminaires are removed from the ceiling and modified either on site or at a remote location, these locations can be termed a 'defined factory location'.
IN-SITU MODIFICATION It may be more practicable to modify the luminaires without removing them from the ceiling.

A suitable label showing the following information is to be placed on each luminaire:

a) Identification of the party responsible for the modifications
b) New Electrical Ratings
c) New Bulb Type and Size (if applicable)
d) Date Code
e) Reference to the Certification Body’s File Number
In-situ Modification Cont.

- Permit Regulation
  - **Electrical Discipline**
    - **Electrical permit**
      - 8 (1) A permit in the electrical discipline is required to install, alter or add to an electrical system.
      
      - (2) Despite subsection (1), a permit is not required for the following:
        - (e) the replacement of electrical equipment with units of a similar type if the replacement is made for the purpose of maintaining the system and does not modify the ratings or characteristics of the electrical installation.

- It is important to note the permit issuer can set additional requirements as explained in Part 2 - 22 of the Permit Regulation. For this reason you must always consult with the local AHJ.
In-situ Modification Cont.

Answer

- Converting a luminaire from fluorescent to LED is known as in-situ modification. Contractors should always contact the local AHJ before performing or quoting jobs to find out additional requirements that are specific to each area. In addition to the job requiring a permit, the fixtures may be required to be recertified and this is determined by the C.B
  - Example 1: Replacing existing fluorescent tubes with LED tubes that utilize the existing ballast, no re-wiring. Contact your local AHJ, as permitting requirements vary from municipality to municipality. Fixture certification is a different matter handled by C.B’s/I.B’s.
    - In the above scenario it is Municipal Affairs opinion the fixture would not require re-certification or permits.
  - Example 2: Removing the ballast and connecting the tombstone directly to line voltage. Contact your local AHJ, as permitting requirements vary from municipality to municipality. Fixture certification is a different matter handled by C.B’s/I.B’s.
    - In the above scenario it is Municipal Affairs opinion the fixture would require re-certification and permits.
Example 3: Using an approved kit to modify the fluorescent to use LED lamps. Contact your local AHJ, as permitting requirements vary from municipality to municipality. Fixture certification is a different matter handled by C.B’s/I.B’s.

- In the above scenario it is Municipal Affairs opinion the fixture would require permits, however because an approved kit was used and compatible with the existing fixture re-certification most likely not required.

The above examples are Municipal Affairs opinions only. In all cases of in-situ modification contact your local AHJ, C.B, and I.B/s to ensure all requirements are met.
Cannabis Extraction Facilities

These slides are to get you thinking of the near future if the federal government goes ahead with Marijuana Legalization.

Question
• What electrical requirements will be required in the facilities?
• Zoning?

Recommendation
• Currently we have NEC for reference. Based on the Class I Division I location, all equipment in the extraction room must be rated for use in Class I Division I locations. Depending on the type of exhaust system provided, this could be the entire room or the area inside of a hood or booth.
Cannabis Extraction Facilities Cont.

• Comments

• Questions

• Thoughts

• Concerns
Question

- Does the CE Code permit the typical wired wall switch be eliminated and replaced with a wireless switch?
Code Rules

• **30-500 Lighting equipment at entrances (see Appendix G)**
  - An exterior luminaire controlled by a wall switch located within the building shall be provided at every entrance to buildings of residential occupancy.

• **30-502 Luminaires in dwelling units (see Appendix G)**
  - (1) Except as provided in Subrule (2), a luminaire controlled by a wall switch shall be provided in kitchens, bedrooms, living rooms, utility rooms, laundry rooms, dining rooms, bathrooms, water closet rooms, vestibules, and hallways in dwelling units.
  - (2) Where a receptacle controlled by a wall switch is provided in bedrooms or living rooms, such rooms shall not be required to conform to the requirements in Subrule (1).
• 30-504 Stairways (see Appendix G)
  – (1) Every stairway shall be lighted.
  – (2) Except as provided for in Subrule (3), three-way wall switches located at the head and foot of every stairway shall be provided to control at least one luminaire for stairways with four or more risers in dwelling units.
  – (3) The stairway lighting for basements that do not contain finished space nor lead to an outside entrance or built-in garage, and that serve not more than one dwelling unit, shall be permitted to be controlled by a single switch located at the head of the stairs.

• 30-506 Basements (see Appendix G)
  – (1) A luminaire shall be provided for each 30 m2 or fraction thereof of floor area in unfinished basements.
  – (2) The luminaire required in Subrule (1) that is located nearest the stairs shall be controlled by a wall switch located at the head of the stairs.
• 30-510 Garages and carports (see Appendix G)
  – (1) A luminaire shall be provided for an attached, built-in, or detached garage or carport.
  – (2) Except as provided in Subrule (3), luminaires required in Subrule (1) shall be controlled by a wall switch near the doorway.
  – (3) Where the luminaire required in Subrule (1) is ceiling-mounted above an area not normally occupied by a parked car, or is wall-mounted, a luminaire with a built-in switch accessible to an adult of average height shall be permitted to be used.
  – (4) Where a carport is lighted by a luminaire at the entrance to a dwelling unit, additional carport lighting shall not be required.
Answer - This item was reviewed by the ESC (Electrical Sub Council) for their input.

- Municipal Affairs opinion is that although these devices are approved equipment, they do not meet the intent of Rules 30-500 – 30-510 as a minimum prescriptive requirement.
  - These devices could be used in addition to the requirements of Rules 30-500 – 30-510, however, not as a replacement.

- Wireless “switches” are transmitters. These “switches” (transmitters) are also re-locatable, therefore the CE Code requirement of where switches are to be located cannot be considered enforceable. Therefore, they do not meet the minimum requirements as stated in the code.

- It was decided at this time that a STANDATA will not be issued. Persons not agreeing with Municipal Affairs opinion’s are advised to go directly to Part one with a submission.
Cable Ampacity for Cables 5KV +

Question

• Is there a regulatory expectation of how ampacities of 5KV + Shield Cables will be determined?

Code Rules

• 4-004 Ampacity of wires and cables
  – (1) The maximum current that a copper conductor of a given size and insulation is permitted to carry shall be as follows:
    • (g) shielded cables rated 5 kV to 46 kV in sizes No. 2 AWG to 1000 kcmil, as specified in Tables D17A to D17N for the configurations described therein and the conditions described in Table D17, or as calculated by the IEEE 835 calculation method.
  – (2) The maximum current that an aluminum conductor of a given size and insulation is permitted to carry shall be as follows:
    • (g) shielded cables rated 5 kV to 46 kV in sizes No. 2 AWG to 1000 kcmil, as specified in Tables D17A to D17N for the configurations described therein and the conditions described in Table D17, or as calculated by the IEEE 835 calculation method.
Cable Ampacity for Cables 5KV + Cont.

Answer

• IEEE 835 could be used, a computer program exists that uses this standard. Variables are entered including; elevation, temperature and other criteria from the tables. Information is entered and a number is generated regarding the required ampacity.

• Table D17A to D17N could be used if all conditions of use for the tables are met.

• Both could be accepted. It is worthy to note on pg 575 in the CE Code and in most locations, elevations in Alberta are above the 300 m requirement as stated in Table D17 which states the conditions of use for Tables D17A to D17N.
EMT Luminaire Support

Question
• Can EMT be used as a luminaire support?

Code Rules
• CE Code 2015
  - 12-3012 Boxes, cabinets, and fitting supports
    1) Boxes, cabinets, and fittings shall be fastened securely in place.
    2) Boxes and fittings having a volume of less than 1640 mL shall be permitted to be attached to a firmly secured exposed raceway by threading or other equally substantial means.
12-1110 Support of luminaires
  • Rigid PVC boxes shall not be used for the support of luminaires unless they are marked as being suitable for the purpose.

30-302 Supports
  1) Every luminaire shall be securely supported.
  2) Where a luminaire weighs more than 2.7 kg or exceeds 400 mm in any dimension, it shall not be supported by the screwshell of the lampholder.
  3) Where the weight of a luminaire does not exceed 13 kg, the luminaire shall be permitted to be supported by a wall outlet box attached directly to the building structure or by a wall outlet box attached to a bar hanger.
  4) Where the weight of a luminaire does not exceed 23 kg, the luminaire shall be permitted to be supported by a ceiling outlet box attached directly to the building structure or by a ceiling outlet box attached to a bar hanger.
5) Where the weight of a luminaire prohibits the installation methods specified in Subrule (3) or (4), the luminaire shall be supported
   a) independently of the outlet box; or
   b) by a fixture hanger provided with an integral outlet box suitable for the purpose.

6) Rigid PVC boxes shall not be used for the support of luminaires unless they are marked as being suitable for the purpose.
EMT Luminaire Support Cont.

Answer

• 2-024, 30-302(5)(b) state equipment is to be used for its specific purpose. If the contractor can prove by showing an ESCO the manufacturers specifications and prove the connector / coupling / EMT can support the weight of the fixture being installed, the installation could be accepted. If this information cannot be supplied, the installation should not be accepted.

• Threaded equipment exists; therefore threaded pipe is one method that could be used to suspend a fixture.

• It is worthy of note and in such cases, the responsibility should be put on the installer to demonstrate the equipment is suitable for the purpose. The code is written in the permissive, while some rules tell us what not to do, generally the code outlines what is acceptable, not what is unacceptable.
EMT Luminaire Support Cont.

- Could be Acceptable
EMT Luminaire Support Cont.

- Not Acceptable

12-3004 Terminal fittings
  (3) The fittings shall not be used at outlets for luminaires.
EMT Luminaire Support Cont.

- May not be Acceptable
Residential Receptacles

Question

• Is an outdoor receptacle located on a 3rd story balcony required to be on a dedicated branch circuit?

Code Rule

• **Canadian Oxford Dictionary**
  – **Porch** — a covered shelter projecting in front of the entrance of a building.
  – **Balcony** — a platform enclosed by a wall or balustrade on the outside of a building, with access from an upper-floor window or door

• **CE Code 2015**
  
  **Definitions**
  – **Dwelling unit** — one or more rooms for the use of one or more persons as a housekeeping unit with cooking, eating, living, and sleeping facilities.
  – **Single dwelling** — a dwelling unit consisting of a detached house, one unit of row housing, or one unit of a semi-detached, duplex, triplex, or quadruplex house.
Residential Receptacles Cont.

- **Receptacles**

  **26-712 Receptacles for dwelling units**
  
  - This Rule applies to receptacles for dwelling units (including single dwellings) as follows:
    - (a) except as otherwise provided for in this Code, in dwelling units duplex receptacles shall be installed in the finished walls of every room or area, other than bathrooms, hallways, laundry rooms, water closet rooms, utility rooms, or closets, so that no point along the floor line of any usable wall space is more than 1.8 m horizontally from a receptacle in that or an adjoining space, such distance being measured along the floor line of the wall spaces involved;
    - (b) at least one duplex receptacle shall be provided in each area, such as a balcony or porch, that is not classified as a finished room or area in accordance with Item (a)

**26-714 Receptacles for single dwellings**

- This Rule applies to receptacles for single dwellings only as follows:
  - (a) for each single dwelling, at least one duplex receptacle shall be installed outdoors so as to be readily accessible from ground or grade level for the use of appliances that need to be used outdoors;
Residential Receptacles Cont.

26-726 Branch circuits for single dwellings
- This Rule applies to branch circuits for single dwellings only as follows:
  - (a) outdoor receptacles readily accessible from ground level and installed in accordance with Rule 26-714(a) shall be supplied from at least one branch circuit dedicated for those outdoor receptacles.

Answer
- The balcony receptacle could be on with a general house circuit due to being inaccessible from ground level.

- **Example:** If you have a deck 3 feet off the ground, and the deck railing is built in such a way you could reach through the railing to access the receptacle.
- In the above example it is our opinion this receptacle could be considered as being readily accessible from ground level. Rule 26-726 could apply.
Hotels/Motels with Cooking Facilities

Question
- Is a hotel room with cooking facilities considered a dwelling unit? Could the following apply; 26-710, 26-712, 26-720, and 26-724?

Canadian Oxford Dictionary
- **Hotel** — an establishment providing accommodation, meals, and other services for travellers and tourists.
- **Motel** — a roadside hotel designed primarily for motorists, typically having the rooms arranged in low blocks with parking directly outside.
Hotels/Motels with Cooking Facilities Cont.

**CE Code**

- **Definitions**
  - *Dwelling unit* — one or more rooms for the use of one or more persons as a housekeeping unit with cooking, eating, living, and sleeping facilities.

**Answer:**

- A hotel/motel room with cooking facilities could fit the definition of a dwelling unit, therefore rules regarding receptacle locations for dwelling units could apply.

- With added cooking facilities in a hotel/motel room, considerations should be made when performing the service calculation.

- **Appendix B**
  - **Rule 8-208**
    - For the purpose of this Rule, a motel unit with cooking facilities may be considered an apartment.
Grounding Electrodes

Question
• When installing a ground plate in frozen ground, what should be considered to ensure an effective ground?

CE Code 2015
• Definitions
  – *Grounding electrode* — *a buried metal water-piping system or metal object or device buried in, or driven into, the ground to which a grounding conductor is electrically and mechanically connected.*
• Code Rule

Grounding electrodes

10-700 Grounding electrodes (see Appendix B)

2) Manufactured grounding electrodes shall
b) in the case of a plate electrode, be
   » (i) in direct contact with exterior soil at no less than 600 mm below grade level; or
   » (ii) encased within the bottom 50 mm of a concrete foundation footing in direct contact with the earth at not less than 600 mm below finished grade.

5) Where a local condition such as rock or permafrost prevents a rod or a plate grounding electrode from being installed at the required burial depth, a lesser acceptable depth shall be permitted.
Answer

• The CE Code 2015 is clear on how plate electrodes are to be installed. If the SCO is of the opinion an effective ground can not be established they should request a test be done to ensure continuity.

• If this test fails a better grounding system would be required and possible engineer involvement.

• Options exist; Many different methods are available in industry to achieve effective grounding, even in frozen ground.
Grounding Electrodes Cont.

**Canadian Electrical Code Handbook reference**

- **Rod electrode driven into the earth**
  - At least two rods
  - At least 3 m

- **Plate electrode direct buried in the earth**
  - Minimum 600 mm below finished grade level
  - 0.2 m² total surface area

- **Plate electrode in a concrete foundation footing**
  - Concrete footing installed a minimum of 600 mm below finished grade level
  - Plate electrode having 0.4 m² of surface area placed within the bottom 50 mm of a concrete footing
  - Minimum 600 mm

- **Sized by Rule 10-812**
  - To service equipment
AFCI Summary Sheet in dwelling units for 15A/20A Receptacles

**AFCI protection required**

15A/20A receptacles
- Washer/Microwave/Hallway
- Out door receptacles attached to dwelling
- Receptacle **not** located within 1 m of a wash basin, in a bathroom or washroom, 26-710(f) (see STANDATA on 26-724(f)(i))
- Family room / Living Room/Bedrooms
- Undeveloped basement
- Attached garage/car port
- Built in appliances (could be dishwasher or cappuccino maker)
- Utility room/Hot water tank
- Sewer receptacle (i.e. attached to dwelling)
- Central Vacuum
- Gas range
- Refrigerator/Freezer not in Kitchen

**AFCI protection NOT required**

- Refrigerator/Freezers and located in Kitchen 26-712(d)(i)
- Receptacle located within 1 m of a wash basin, in a bathroom or washroom, 26-710(f) (see STANDATA on 26-724(f)(i))
- Detached garage/carport (does not fit definition of dwelling unit)
- Sump and required to be a single receptacle 26-724(f)(ii)(A)
- Out door receptacle not attached to dwelling, could include a sewer receptacle (i.e. on a post and not attached structurally)
- Kitchen Counter 26-712(d)(v)
- Island/peninsula 26-712(d)(iv)
- Gas range adapter - a device fed by a 40A 220v branch circuit.
AFCI Protection Required

Question:

• Are fridges, freezers required to be AFCI protected?

Code Rule:

26-712 Receptacles for dwelling units
   (d) in dwelling units there shall be installed in each kitchen
   (i) one receptacle for each refrigerator;

26-724 Branch circuits for dwelling units (see Appendix B)
   (f) each branch circuit supplying 125v receptacles rated 20A or less shall be protected by a combination-type arc-fault circuit interrupter, except for branch circuits supplying
   (i) receptacles installed in accordance with
   (B) Rule 26-712(d)(i)

Answer:

• If located in the kitchen AFCI not required, if located outside the kitchen AFCI required.
AFCI Protection Cont.

Question:

• Does a detached garage fit the requirements under 26-724 requiring AFCI protection?

Code Rule:

26-724 Branch circuits for dwelling units (see Appendix B) This Rule applies to branch circuits for dwelling units (including single dwellings) as follows:…

Definitions:

• **Dwelling Unit** — one or more rooms for the use of one or more persons as a housekeeping unit with cooking, eating, living, and sleeping facilities.

• **Single Dwelling** — a dwelling unit consisting of a detached house, one unit of row housing, or one unit of a semi-detached, duplex, triplex, or quadruplex house
AFCI Protection Cont.

Answer:

• Dwelling unit and single dwelling is a defined term in the Canadian Electrical Code, Part I this is the definition that must be used when interpreting this rule.

• Municipal Affairs Opinion
  – an attached garage is attached structurally to the dwelling. AFCI protection is required.
  – Detached garage – AFCI Not required
General Discussion Items

• What are other regions doing, or asking for from houses that are moved from one location to another?

• The Residential No-Charge Energy Savings Program offers direct, no-charge installation of energy efficient products across the province, in rural and urban houses, apartments and condos.
  – https://www.efficiencyalberta.ca/residential-no-charge/
General Discussion Items

• Non-Certified Products
  – What are you doing in your area?
  – We receive quite a few calls on companies selling non-certified products, who is responsible for what?

• Accessibility to Electrical equipment
  – 2-122 Installation of electrical equipment (see Appendix G)
    • Electrical equipment shall be installed so as to ensure that after installation there is ready access to nameplates and access to parts requiring maintenance.
  – 2-312 Accessibility for maintenance (see Appendix G)
    • Passageways and working space around electrical equipment shall not be used for storage and shall be kept clear of obstruction and arranged to give authorized persons ready access to all parts requiring attention.
Questions
The End

THANK YOU
CODE FOR ELECTRICAL INSTALLATIONS AT OIL AND GAS FACILITIES

SUBJECT:  Section 19 – Classification of Oil and Gas Facilities

General – Retroactive Application of Requirements

Upon adoption of a new edition of a Code, an existing installation in compliance with the previous edition of the Code(s) in force at the time of the installation is generally not required to be upgraded to meet the requirements of the newly adopted Code.

There have been instances however, where an existing installation is deemed to pose an unacceptable risk, despite having met the requirements in force at the time it was erected. In those cases, new legislation is normally introduced to mandate that the installation be brought to current Code requirements. An example would be the mandating of smoke alarms in the late ‘70s to be installed retroactively in all homes, old and new.

Modifications to an existing installation that introduce changes to the characteristics of the installation however, would require that the installation be made to comply with the requirements of the current Code in force at the time the modifications are made.

Drilling Rigs

Because of changes made in the 5th edition of the Code for Installations at Oil and Gas Facilities (2015 O&G Code) that affect drilling operations, specifically:

a) the Zone 1 area classification for 1.5m around the shale shaker, and

b) the extension of the Zone 2 area classification around the mud tanks from 2m to 3m; the question is raised as to whether the new requirements apply to drilling rigs manufactured prior to the adoption of the 2015 O&G Code.

In response, the following matters are considered:

1. Is the relocation of the drilling rig considered a modification that introduces changes in characteristics of the rig?

   Response: Although every new location will likely produce fluids of varying characteristics different from other locations, the Oil and Gas Code anticipates this by having a typical area classification that remains static. So, despite the changing characteristics of the process, the characteristics of the rig remain essentially unchanged. Consequently, the rig should not require to be re-classified for every re-location.

2. Are requirements of previously adopted Codes that have been amended in subsequent Codes considered unsafe?
Response: It is generally understood that despite the changes made to a Code over time, the previous edition is not considered unsafe, but rather that the newly revised edition introduces requirements that are considered safer. Given that improvements for safer installations are made to a Code over time, older installations are still considered safe. Owners/users of these older installations are however encouraged to look at opportunities for updating their facilities.

3. Is there a safety risk with not having older installations made to comply with current Code in force?

Response: All installations, even those that comply with the current codes in force, pose an element of safety risk. Code development and maintenance seeks to continually improve the Code to reduce risk and consequently to have new installations pose a lesser risk. Risks associated with older installations however, continue to be considered acceptable.

In summary, drilling rigs manufactured to comply with an earlier version of the O&G Code in force at the time of manufacture are not required to be upgraded retroactively to the requirements in the current O&G Code in force. Owners of drilling rigs are however, encouraged to update their facilities when opportunities present themselves.
ELECTRICAL SAFETY
Variance

April 2017

VARIANCE
CANADIAN ELECTRICAL CODE

SUBJECT: Rule 2-024 – RE: Oil and Gas Industry Electrical Submersible Pumps

Preamble
Rule 2-024 requires that electrical equipment be approved. Section 2 of the Electrical Code Regulation mandates approval requirements:

Electrical systems equipment
2(1) If a code, standard or body of rules declared in force under the Act with respect to electrical systems requires approved equipment, that equipment must meet the requirements of this section.
(2) No person shall manufacture, install, sell or offer for sale any equipment related to electrical systems for use in Alberta unless the equipment has been
(a) certified by a certification body in accordance with the certification body’s terms of accreditation with the Standards Council of Canada, or
(b) inspected by an inspection body in accordance with the inspection body’s terms of accreditation with the Standards Council of Canada.
(3) Subsection (2) does not apply to electrical equipment of an electric distribution system or a transmission line as defined in the Hydro and Electric Energy Act.

(Note: “certification body” is defined as ‘an organization accredited by the Standards Council of Canada as a certification body;’ and “inspection body” is defined as ‘an organization accredited by the Standards Council of Canada as an inspection body.’)

There is seldom occasion where we cannot meet this requirement. Situations do exist however, where the requirement may be onerous or impracticable.

In the specific situation of Electrical Submersible Pumps (ESP’s) and associated down-hole cable assemblies, certification organizations have yet to identify a demand for developing a product certification program around these particular electrical products. In addition, standards development organizations have not developed a certification standard for these products, consequently, certified ESP’s and cables are not available.
Variance

This Variance applies to ESP’s and associated down-hole cables used in wells within the Oil and Gas industry. ESP’s are multistage centrifugal pumps driven by 3-phase motors constructed to fit within the inside diameter of the well tubing. Motors range in size from 5kW to 1200 kW and in lengths from 1.2 m to 12 m. Power cables are normally 3-phase with tape-in or plug in pot head connection at the motor. Instrument cables may also be associated with the ESP installation.

ESP’s and associated down-hole cables mentioned in this variance have a history of successful and safe operation. This installation poses no fire or shock risks. The motor is underground in an oxygen deficient atmosphere and could not create an explosion. Personnel are physically isolated from the motor and cable, and consequently, there is no shock hazard. Creating a certification program for this type of equipment, with a proven safety record, adds no value. Therefore, a Variance is required to address the approval requirements of Rule 2-024.

Therefore, manufacturers, distributors, owners and installers of ESPs and associated down-hole cables shall be permitted to deviate from Rule 2-024 of the Canadian Electrical Code provided they meet the following conditions:

Conditions

1. a) Manufactured to North American Standards
   ESP’s and/or associated down hole cables are acceptable when the manufacturer declares that they have manufactured, inspected and tested the ESP’s and/or associated down-hole cables to the requirements of the appropriate and current standards. These standards include but are not limited to:
   - IEEE 1017 Recommended Practice for Field Testing Electric Submersible Pump Cable.
   - IEEE 1018 Recommended Practice for specifying Electric Submersible Pump Cable Ethylene-Propylene Rubber Insulation.
   - IEEE 1019 Recommended Practice for specifying Electric Submersible Pump Cable Polypropylene Rubber Insulation.

b) Manufactured to Other than North American Standards
   Where ESPs and/or associated down-hole cables are manufactured to other than North American standards, the manufacturer must declare that the product has equivalent safety performance as one manufactured to North American standards. Alternatively, a licensed engineering professional may evaluate and accept the product standard to which the ESP’s and/or associated down-hole cables were manufactured to, if it compares favourably with the appropriate North American standards concerning safety performance.
2. **Product Identification**

   The following documentation for ESPs and associated down-hole cables must be readily accessible:
   - a manufacturer’s declaration stating that the product meets industry recognized standards; and
   - specification sheets stating the product’s electrical ratings and characteristics.

3. **Additional Requirements**

   - The installation is bonded to ground. Proper overcurrent and overload protection must be provided in accordance with the CE Code, Part 1
   - All above ground components associated with the installations meets the requirements of the CE Code and the Electrical Code Regulation.
   - The installation is subject to a Safety Codes inspection to verify compliance with the CE Code Part 1.

**Expiry**

This variance remains in effect until such time that it is revoked by the Administrator.
VARIANCE
Canadian Electrical Code

SUBJECT: Rule 2-024 – RE: Liquid-filled Transformers

Preamble
Rule 2-024 requires that electrical equipment be approved. The definition of ‘approved’ in the Canadian Electrical Code does not apply because Alberta regulation has otherwise defined it. In Alberta, section 2 of the Electrical Code Regulation defines ‘approved’ as follows:

Electrical systems equipment

2(1) If a code, standard or body of rules declared in force under the Act with respect to electrical systems requires approved equipment, that equipment must meet the requirements of this section.

(2) No person shall manufacture, install, sell or offer for sale any equipment related to electrical systems for use in Alberta unless the equipment has been

(a) certified by a certification body in accordance with the certification body’s terms of accreditation with the Standards Council of Canada, or

(b) inspected by an inspection body in accordance with the inspection body’s terms of accreditation with the Standards Council of Canada.

(3) Subsection (2) does not apply to electrical equipment of an electric distribution system or a transmission line as defined in the Hydro and Electric Energy Act.

(Note: “certification body” is defined as ‘an organization accredited by the Standards Council of Canada as a certification body;’ and “inspection body” is defined as ‘an organization accredited by the Standards Council of Canada as an inspection body.’)

There is seldom occasion where we cannot meet this requirement. Situations do exist however, where the requirement may be onerous or impracticable.

In the specific situation of liquid-filled transformers, certification organizations have yet to identify a demand for developing a product certification program around this particular electrical equipment. Consequently, certified liquid-filled transformers are not available.
Conditions

Owners/users required to use liquid-filled transformers are permitted to deviate from Rule 2-024 of the Canadian Electrical Code provided they meet the following conditions.

1. a) Manufactured to Canadian Standards
   Liquid-filled transformers are acceptable when the manufacturer declares that they have manufactured, inspected and tested the transformer to the requirements of the appropriate and current Canadian standards. These standards include but are not limited to:
   - CAN/CSA-C2 Single Phase and Three Phase Distribution Transformers
   - CAN/CSA-C88 Power Transformers and Reactors
   - CAN/CSA-C227.3 Low Profile, Single Phase, Dead Front Pad-mounted, Distribution Transformers
   - CAN/CSA-C227.4 Three Phase, Dead Front Pad-mounted, Distribution Transformers

b) Manufactured to Other than Canadian Standards
   Where liquid-filled transformers are manufactured to other than Canadian standards, the manufacturer must declare that the product has equivalent safety performance as one manufactured to Canadian standards. Alternatively, a licensed engineering professional may evaluate and accept the product standard to which the liquid-filled transformer was manufactured if it compares favourably with the appropriate Canadian standards concerning safety performance.

2. Product Identification
   In addition to meeting the requirements of Rule 2-100 of the Canadian Electrical Code, the liquid-filled transformer must identify the standard to which it was manufactured.
   
   The following documentation or appropriate marking must also accompany the product:
   - a manufacturer’s declaration stating that they have manufactured the product to one or more appropriate Canadian standards, or
   - when manufactured to other than Canadian standards:
     i. a manufacturer’s declaration that the product has equivalent safety performance as one manufactured to the appropriate Canadian standards, or
     ii. a licensed engineering professional’s evaluation report indicating the product as having equivalent safety performance as one manufactured to appropriate Canadian standards.

3. Maintenance
   The owner of the equipment shall ensure the product is maintained to industry standards and manufacturer’s specifications.

4. Expiry
   This variance remains in force until such time that it is revoked by the Administrator.