Our Goal is **FOR ALL STAKEHOLDERS TO HAVE A SUCCESSFUL PROJECT** with us and that together we keep people and structures safe and buildings economically viable to serve the needs of our community.

We strive for:

*EXCELLENT CUSTOMER SERVICE!*  
and  
*QUALITY INSPECTIONS!*  

September 13th, 2017 ELECTRICAL CONSISTENCY MEETING  

Our October meeting is split for our **CODE CHANGE CLASSES**  

Plan to attend either October 4th or 24th,  
7:30 am registration. Please email [Gary.Mullis@MecklenburgCountyNC.gov](mailto:Gary.Mullis@MecklenburgCountyNC.gov) with your planned date of attendance for reserving your seat.  

Classes are scheduled for 8 hours and provide CE credits
I. Customer Service Tips

II. Q and As

1. If I install a disconnect within sight of a VAV that contains duct heaters, so as not to be “serviced while energized”, would this alleviate the requirements of 424.66(B)?

No. The requirement for providing working space is still applicable in 110.26. 110.26A allows an adjustment to the minimum distances of A1, 2, or 3 based on the condition of not being energized. 424.66(B) provides no allowance for reduction.

2. The inspector turned me down for using duct seal to seal my service raceways as required by 230.8. He said it was not identified for use with the conductor insulation. What gives? I got the idea straight out of the NEC handbook.
While duct seal may be acceptable in some locations it may not be in others. Per NCGS 66.23-27 all electrical products need to be listed. Per NEC 110.3 B the product must be used per the manufacturer’s instructions. If this installation were just for condensation concerns I would judge the duct seal to be appropriate. If it was for weatherproof or water control I would turn it down. More concise info is needed for this question.

3. My customer wants to install the bathroom receptacles inside a cabinet that sets on top of the countertop. These will still be within 3 feet of the sink but only accessible by opening the cabinet door. Would this be allowed? No, not as the required outlet. Inside the cabinet would not meet the requirements in 210.52 (D) of the code.
4. Are PVC raceways for (data and phone) installed under a commercial parking lot required to be a minimum 24” deep? These would qualify under Article 800. Per 90.3 of the NEC Chapter 8 stands alone. No depth is provided.

5. I am doing a tenant unfit at a strip mall. The inspector is requiring receptacles for the storefront windows. Do I have to install these? They are not shown on the plans and the owner has no use for them.

*Per NEC Definition, Show Window.* Any window used or designed to be used for the display of goods or advertising material, whether it is fully or partly enclosed or entirely open at the rear and whether or not it has a platform raised higher than the street floor level.

The provisions for show windows are found in 210.62, 220.14 (G) and .43 (A). The requirement is for an appropriate number of
receptacles and loading allotment. The requirement must be met.

6. How far apart are we required to keep water and electrical pvc conduit in an underground trench? Article 300 specifies no separation requirements.

7. Does bonding of equipment of services (250.92--bonding bushings around impaired knockouts) also encompass separately derived systems? In other words, if there is a concentric knockout with metal raceway, do I need a bonding bushing for a separately derived system? Assume the voltage is less than 250 to ground.

Yes

V. Bonding

250.90 General. Bonding shall be provided where necessary to ensure electrical continuity
and the capacity to conduct safely any fault current likely to be imposed.

250.92
(B) Method of Bonding at the Service. Bonding jumpers meeting the requirements of this article shall be used around impaired connections, such as reducing washers or oversized, concentric, or eccentric knockouts. Standard locknuts or bushings shall not be the only means for the bonding required by this section but shall be permitted to be installed to make a mechanical connection of the raceway(s).

250.96 Bonding Other Enclosures.
(A) General. Metal raceways, cable trays, cable armor, cable sheath, enclosures, frames, fittings, and other metal non–current-carrying parts that are to serve as equipment grounding conductors, with or without the use of supplementary equipment grounding conductors, shall be bonded where necessary to ensure electrical continuity and the capacity
to conduct safely any fault current likely to be imposed on them. Any nonconductive paint, enamel, or similar coating shall be removed at threads, contact points, and contact surfaces or be connected by means of fittings designed so as to make such removal unnecessary.

8. I was turned down for having a panel in a detached garage, using five 15 amp breakers as my disconnect means. It seems to be allowed per 225.33 A. Why am I turned down? Up to six disc. means are allowed in one location. However, you must meet the requirements of 225.39. In your case 5 x 15 = 75 so this would qualify, but if a main is used it would be a 60-amp minimum.

9. I have a new concern we are seeing in the field. Several jobs are providing for future circuit use by rolling up cables and flex and dead ending in a jbox. Some are leaving as much as 20’ rolled up in a tight circle of about 2’ diameter. It seems this
would possibly cause induction and heating on them. Is there a code reason to address them? While this might cause an issue if used, and still rolled up there is no induction without load. No code violation exists.

10. Does an acupuncture treatment room require compliance with NEC 517 patient care area? Acupuncture is not recognized currently as a medical procedure by state boards, so 517 does not apply.

11. NEC 210.64 requires a receptacle within 50ft of service equipment. If there is a back to back installation with meter outside and panel inside, would there have to be a receptacle within 50ft of meter and panel? For 2014 code there has to be a receptacle for the service equipment. Our interpretation is that the location is where the service OCP is (230.66).
12. Where does NEC state I have to feed exit/emergency lights from local lighting circuits? Am I allowed to use a dedicated circuit?

700.12 F 2 addresses this when using unit equipment. Unit equipment would be the fixture or controller. Dedicated circuit use would not comply with unit equipment use.

13. Do light pole bases require ground rods per 250.32 if more than 1 circuit is present?

Joe Starling has new interpretation regarding this, and other instances of structure vs. equipment.

NC Department of Insurance
Office of the State Fire Marshal - Engineering Division
1202 Mail Service Center, Raleigh, NC 27699-1202
919-647-0000
Structures versus Equipment
Code: 2014 Electrical Code Date: June 28, 2017
Section: Article 100 – Structure
Note:
The intent of this interpretation is to clarify the definition of a structure solely within the context of the electrical code. The electrical code’s definition of a structure shall not extend, apply, or modify the general or legal definition of a structure or where a structure is defined in other technical codes.

**Question 1:**
Does the electrical code consider a standby generator or a heat pump mounted on a stand a structure?

**Answer 1:**
No. The 2017 NEC has clarified the intent for the definition of a structure within the context of the electrical code. The new language states a structure is “[t]hat which is built or constructed, other than equipment.” Even though the current language in the 2014 NEC states “[t]hat which is built or constructed” and omits the statement “other than equipment,” the intent was never to include equipment.

Article 100 of the NEC defines equipment as “[a] general term, including fittings, devices, appliances, luminaries, apparatus, machinery, and the like used as part of, or in connection with, an electrical installation.” Therefore, anything that solely is
defined as equipment, does not meet the definition of a structure.

**Question 2:**
Does the electrical code consider equipment stands structures?

**Answer 2:**
The stand is a “structure” per the broad language of the definition; however, if the stand is ancillary to the generator and its existence is for no other purpose, then such stands are not intended to be defined as a structure for purposes of applying the electrical code.

Additionally, a post or similar object that has a panel, receptacle, switch, septic pump controls, etc., that is mounted on the post or similar object is also not intended to be defined as a structure for purposes of applying the electrical code if the sole purpose of the post or similar object is only for affixing the electrical equipment.

For all interps. see,
The light poles are equipment and therefore 250.32 would not apply. This changes our stance on other equipment such as, pool panels on a rack, panel, receptacle, switch, septic pump controls, etc...

14. In regards to the Industrial Machinery exemption from 3rd party listing, how far does our jurisdiction go in hazardous areas? What if we have equipment in a Class 1 Div.2 location that is not listed?

(b9)   Exclusion for Industrial Machinery. - Nothing in this Article shall extend to or be construed as being applicable to the regulation of the design, construction, location, installation, or operation of industrial machinery. However, if during the building code inspection process, an electrical inspector has any concerns about the electrical safety of a piece of industrial machinery, the electrical inspector may refer that concern to the Occupational Safety and Health Division in the North Carolina Department of Labor but shall not
withhold the certificate of occupancy nor mandate third-party testing of the industrial machinery based solely on this concern. For the purposes of this paragraph, "industrial machinery" means equipment and machinery used in a system of operations for the explicit purpose of producing a product or acquired by a State-supported center providing testing, research, and development services to manufacturing clients. The term does not include equipment that is permanently attached to or a component part of a building and related to general building services such as ventilation, heating and cooling, plumbing, fire suppression or prevention, and general electrical transmission.

We have no obligation to inspect the equipment but we must maintain the safety and code compliance of the building and systems.

15. How do you determine OCP for a 10KVA/240V UPS?

Most units are marked on their nameplate with that information or have it in their installation
instructions. Without that info in review time we allow the load at 125% to size the OCP. Otherwise we need the unit information. For inspections follow the nameplate or manufacturer’s instructions.

16. For TP, my understanding is that I do not have to have the garage door installed if my panel is in the garage is lockable. If my panel is in the garage and has a lock on it and I am only energizing the garage GFCI receptacle circuit, is the house still required to be lockable?

Per the NCEC 10.8.5 Security and Notification. The applicant shall maintain the energized electrical system or that portion of the building containing the energized electrical system in a secured and locked manner or under constant supervision to exclude unauthorized personnel. The applicant shall alert personnel working in the vicinity of the energized electrical system to its presence.

There are many variables that would apply to any job site. We need to be sure we are meeting the
minimum requirement. In the case above how is the receptacle secure and locked? Safety being our main concern we see no harm in allowing a GFCI protected receptacle to be accessible.

17. Is a residential accessory building required to have GFCI protection on receptacles if it is constructed of a wood floor raised on cinder blocks and has a ramp and or stairs to access. No, per 210.8(A)(2) it states it must be at or below grade level.

18. What are the receptacle spacing requirements for areas within a residence with built-in cabinetry and book cases? I/E libraries, beside fireplaces, media room/walls. We have only required a receptacle where we encounter a countertop or desk top.

(2) Wall Space. As used in this section, a wall space shall include the following: (1) Any space 600 mm (2 ft) or more in width (including space measured around corners) and unbroken along the floor line by doorways and similar openings, fireplaces, and fixed cabinets.
19. Why is Mecklenburg county turning me down for my deck bond? It's 12" from the inside wall of the pool as I have been instructed to do per Union County.

When using the alternate means per 680.26(B)(2)(b) you must meet all of the following requirements in which states (4) The required conductor shall be 450 mm to 600 mm (18 in. to 24 in.) from the inside walls of the pool. With this information, 12" is not within 18-24" and does not meet NCEC.

20. I recently installed a job with several runs of PVC due to the corrosive environment. The inspector turned me down for insufficient support. I had the conduits supported at three feet from the boxes and every five feet thereafter as I’ve always done. What’s the issue?

In 352.30 we have the rules for support of PVC. The three feet from the box is consistent but differing sizes have different support requirements for the run. If you had ½” to 1” the run support spacing is three feet per the table.
21. Are non required GFCI receptacles required to be readily accessible?

Only required outlets per 422.5. 110.3 B may impact that though. Also per 210.8 we have specified outlets. If not specified readily accessible would be unnecessary.

22. Can I run PVC on a roof to feed an RTU? There is no permanently installed ladder.

Yes, if it meets requirements of Article 352. Concerns would be support, ambient temps. and protection.

23. When installing a disconnect to comply with 445.18, is it required to be Service Entrance rated?

No. Remember this is just addressing the genset requirements.

24. I have several cash wrap stations on a job. They are all third party listed, but none of the switch or receptacle boxes are grounded. Do I have to accept this or can we require that the corrections be made?
We need to take pictures and contact the NRTL. We should not accept products that readily appear unsafe. Requiring corrections should come from the NRTL. We would be looking for an acceptable NRTL label without obvious flaws or they could apply for field labeling.

25. Are GFCI receptacles required on a wet bar countertop? Does the circuit have to be a 20A /#12 wire?
   a) Yes in 6’ of the sink.  B) No. General use circuits are acceptable unless this is in a kitchen or dining room/area.

26. Is countertop receptacle spacing (2-4) required? If it is not in the kitchen?
   No, per 210.52 except for pantry and dining room/area.

27. I am replacing a service only, but have to move it 30'. Do I have to use AFCI protection for the new wire refeeding the old circuits?
   No, NCEC Amendment addresses this.

210.12 Arc-Fault Circuit-Interrupter Protection.
Branch Circuit Extensions or Modifications – Dwelling Units.
In any of the areas specified in 210.12(A), where branch-circuit wiring is modified, replaced, or extended, the branch circuit shall be protected by one of the following:
(1) A listed combination-type AFCI located at the origin of the branch circuit.
(2) A listed outlet branch-circuit type AFCI located at the first receptacle outlet of the existing branch circuit.

**Exception:** AFCI protection shall not be required where the extension of the existing conductors is not more than 1.8 m (6 ft) 15.24 m (50 ft) and does not include any additional outlets or devices.

28. I am replacing my service and have to move it a few feet. I have enough of the existing branch circuit wires to reach the new service but it is romex. Do I have to change the wire to UF cable in the new pipe?

**No, NCEC Amendment addresses this.**

300.9 Raceways in Wet Locations Above Grade. Where raceways are in wet locations above grade, the interior of these raceways shall be considered to be a wet location. Insulated conductors and cables installed in raceway in wet locations above grade shall comply with 310.10(C).
Exception: The raceway shall not be considered a wet location if:
(1) The section of raceway routed in a wet location above grade does not exceed 1500 mm (5 ft) in length; (2) Any fittings or conduit bodies are watertight and listed for use in wet locations; and (3) Raceway is open at its termination point in a dry location.

29. Does a microwave/hood need to be on a dedicated circuit? (422.16.B (3)(4)) then 210.23(A)(2)
Maybe. It would depend on the load and the manufacturer’s requirement.

30. Can a dishwasher and disposal be on the small appliance circuit?
No per 210.52 B.

31. Do standalone diesel dispensers require seal-offs?
514.9 (A), Requires at the dispenser, a listed seal shall be provided in each conduit run entering or leaving a dispenser or any cavities or enclosures in
direct communication therewith. However, 514.2 (A) refers to Unclassified Locations. Where the AHJ can satisfactorily determine the flammable liquids having a flash point below 38 degrees C (100 degrees F), such as gasoline, will not be handled, such locations shall not be required to be classified. NFPA 30 considers Class 1, flammable liquids to have a flash point less than 100 degrees F. Class 2, combustible liquids have a flash point between 100 degrees and 140 degrees F. Because diesel is a Class 2 liquid, it does not require a Class 1 Location, therefore a seal-off fitting would not be required as long as the conduit does not pass through the classified area.

32. Do all emergency systems in health care facilities have to meet the requirements of article 700 or 517 (Essential System)?

**Deletion: 517.2 Definitions – Emergency System.**

The term *emergency system* has been eliminated from Article 517, leaving only *essential electrical system* with the three separate branches: the
critical, life safety and the equipment. The diagram in Figure 517.30, No. 1 has been re-worked to reflect these changes as well. In an effort to correlate the requirements of the NEC and, in particular, Article 517 with NFPA 99, Health Care Facilities Code and section 517.30(B) was re-organized in regard to the essential system of a hospital. This action eliminated references to the emergency system as this is not addressed to NFPA 99. In incorporating the changes made to correlate with NFPA 99, emergency system is no longer used in Article 517. This removes major confusion resulting from the previous use of the word “emergency” in similar, yet sometimes quite different, ways in Article 517 and in Article 700.

33. I have an apartment building with a 2000 amp, 120/208V, 3 phase service, feeding 5 single phase meter centers. The meter centers have 200 amp main breakers, feeding SER cable to sub-panels in each one of the units. The SER carries the full load of each of the units. I installed 4/0 Al. SER, but the inspector said I would need 300 MCM SER, per 310.15(b) (16). Is he correct?
Per the amendment in the NCEC the conductor size can be based on 75 degree C column of 310.15 (B) (16). Since 4/0 Al. is good for 180 amps, it would be acceptable as long as the load is 180 or less, because you can use the next largest standard size overcurrent protection, per 240.4 (B), which would be 200 amps. As a point of interest, it is easy to mistakenly use article 310.15 (B) (7) to size the feeders, because they carry the full load of the service, however the 120/208 voltage of the system, would prohibit its use.

IV. Electrical Website review

https://www.mecknc.gov/LUESA/CodeEnforcement/Inspections/trades/Electrical/Pages/default.aspx