1. I have a piece of equipment that is fed by more than one circuit. What are the rules regarding this installation?

**Answer:** Each Disconnecting means must be identified for its purpose.

**Code Reference:** NEC 110.22(A); NEC 409.110(2); NEC 210.7

NEC 110.22(A) requires each disconnecting means shall be legibly marked to indicate its purpose unless located and arranged so the purpose is evident. The marking shall be of sufficient durability to withstand the environment involved. NEC 409.110(2) requires industrial control panels to be labelled with the following: supply voltage, number of phases, frequency, and full load current for each incoming supply circuit. For receptacles, 210.7 requires where two or more branch circuits supply devices or equipment on the same yoke, a means to simultaneously disconnect the ungrounded conductors supplying those devices shall be provided at the point at which the branch circuits originate. The intent is to make sure the person doing the service work is aware of the installation having more than one circuit supplying the equipment, so all of the sources of power supplying the equipment can be disconnected.

2. I looked at a request from a large commercial retail building that wanted to split a tenant space into 2 spaces on 2 meters. My question is that there are already 1000 amps worth of disconnects tapped from one 600 amp 480 volt disconnect. Can I add another meter as the total served space isn't changing, or do you need load calc's off the existing meters, or do I need to upgrade the main? Not sure how you look at that so I wanted to check first...

**Answer:** Maybe; Maybe; Maybe; up to the AHJ

**Code Reference:** NEC 230.79; NEC 215.2 & 3; NEC 220.40; SPS 316.220(2)

NEC 220.79 requires the rating of the service disconnect to be sized not less than the calculated load as determined by Part III, IV, or V of Article 220. The tenant meters and corresponding disconnecting means are part of the feeder circuit supplying the individual spaces. NEC 215.2 requires the feeder conductors to be sized per NEC 220 Part III, IV & V. NEC 215.3 requires the overcurrent device to be sized in accordance with the provisions of Part I of NEC 240. NEC 220 Part III, IV and V allows demand factors to be applied to these conductors and thus the overcurrent devices. Therefore, it is not uncommon for service disconnects to have a smaller rating than the cumulative rating of all the feeder breakers that it serves. Depending on the added loads to the service, the
inspector may require submittal of load calculations for the service. Often in this type of arrangement another heating system is added as well as more lighting, maybe a water heater, etc. SPS 316.220(2) allows a Wisconsin professional engineer, architect or designer of electrical systems to use diversity factors or historical data to compute the service or feeder size. With the increased use of energy saving lights, HVAC equipment, as well as other equipment, it would be up to the AHJ to determine whether load calculations would be required.

3. I'm wiring a treatment room in a dental clinic. I'm installing a receptacle inside a cabinet to supply a computer. Does this receptacle require redundant grounding?

**Answer:** Yes  
**Code Reference:** NEC 517.13(A)  
NEC 517.13(A) requires all branch circuits serving receptacles in patient care areas are required to provide redundant grounding. There is not an exception if the receptacle is in a cabinet.

4. I have a post that is wrapped by wood/drywall in a basement that is 8” by 8” or larger. Does this space need a receptacle? When you measure all four sides, it is longer than 24”.

**Answer:** No  
**Code Reference** NEC 210.52(A)(2)  
NEC 210.52 states that 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  
2. The space occupied by fixed panels in exterior walls, excluding sliding panels  
3. The space afforded by fixed room dividers, such as freestanding bar-type counters or railings.  
A wall is typically 2 X 4 or 2 X 6 construction. An 8 X 8 or larger would be treated as an individual column. A receptacle would be permitted, but not required. Once the wall gets to be 2 feet wide, then a receptacle could be required on each side of the wall space. Again, if the wall is less than 2 feet wide an outlet would be permitted.

5. Is it permissible to glue “carflex” and “smurf tube” to PVC fittings and adapters?

**Answer:** No for Carflex; Yes for ENT  
**Code Reference** SPS 316.110  
The following is from the Carlon website: Can you glue Carflex directly into Carlon PVC fittings? Technically, you're not supposed to solvent cement fittings to Carflex. Liquidtight Flexible Nonmetallic Conduit requires fittings to be attached mechanically rather than solvent cemented. In addition, since our Carflex is a type B Liquidtight flexible nonmetallic conduit, you must use type B liquidtight fittings with it.
On your ENT product do I need to glue the fittings on or do they just use the snap in feature? When using schedule 40 fittings on ENT, solvent cement is required. Solvent cement is not required when using Carlon's snap on fittings.

The following is from the IPEX website for Kwikon brand: 2.1B. All ENT tubing, ENT fittings, ENT boxes and accessories shall be manufactured by the same company so as to form a complete ENT system. Kwikon does not allow use of its product with another brand fitting. EZ Flex ENT must use Cantex #50 Cement. Regular cement is too aggressive for ENT.

Answer: follow the manufacturer’s instructions for the proper installation of products.

6. How much AC or MC whip can I have run to fixtures in a dropped ceiling?

Answer: 6’ in accessible ceiling, 12” in a non-accessible ceiling.

Code Reference: NEC 320.30(D)(3); NEC 330.30(D)(2)

NEC 320.30(D)(3) and NEC 330.30(D)(2) permits types AC/MC cable to be permitted to be unsupported where the cable is not more than 1.8 m (6 ft) in length from the last point of cable support to the point of connection to luminaires or other electrical equipment and the cable and point of connection are within an accessible ceiling. For the purpose of this section, Type AC/MC cable fittings shall be permitted as a means of cable support. If the ceiling is not accessible, then the normal securing requirements apply.

7. Here is a cut sheet, as well as the picture of the label, for the recessed can light we discussed briefly Monday night at the code class. The MED E26 refers to a standard Edison Base Socket. The lamp would be an LED Lamp that would screw into a standard socket. Am I permitted to put the LED label inside the recessed can?

Answer: Permitted if housing and trim are identified as compatible and instructions require adding the label.

Code Reference: SPS 316.110; UL White Book Luminaire Marking Guide

This particular installation involves the use of a manufacturer’s recessed housing and compatible trims. The installation of the trim requires the type of LED bulb that must be used with this combination. In the installation instructions of the trim it indicates that the sticker be installed to show the maximum wattage LED bulb permitted by this manufacturer’s combination of housing and trim.

8. We installed bollards in front of the meters and service gear. Now the inspector says they are too close and have to be moved. What gives? This is not a switchboard, panelboard or motor control center.

Answer: The bollards may need to be moved.

Code Reference: NEC 110.26; NEC 110.26(A)
NEC 110.26 requires access and working space about all electrical equipment to permit ready and safe operation and maintenance of such equipment. The wording no longer implicates these rules apply only to switchboards, panelboards or motor control centers. Many times testing and maintenance are done on this type of equipment without de-energizing the equipment. Without the proper spacing of NEC 110.26(A), the bollards may need to be moved.

9. We installed a pull box to transition some feeders. It is a metal pull box with metal pipes coming in and out of it. Do we have to bond this metal box with an equipment grounding conductor? What if it was a metal pull box and there were PVC raceways running in and out of it?

Answer: No, Yes

Code Reference: NEC 250.134; NEC 250.148

NEC 250.134 requires the box to be bonded. 250.134(A) permits the use of any equipment grounding conductor permitted by NEC 250.118 of which EMT, RMC & IMC are included. If the pipes were nonmetallic, the bonding would need to be done with one or more of the equipment grounding conductors routed into the pull box. At a minimum, the box would need to be bonded using the equipment grounding conductor for the largest circuit that would be entering the box. NEC 250.148 requires where circuit conductors are spliced within a box, or terminated on equipment within or supported by a box, any equipment grounding conductor(s) associated with those circuit conductors shall be connected within the box or to the box with devices suitable for the use.

10. I wired a basement that had a Bilco door that I talked to you about a while ago. How do you handle the 3 way switch @ the top and bottom of the stairs? What about the egress light?

Answer: 3-way switches not required unless part of the interior of the dwelling; light would be required if an exit

Code Reference: NEC 210.70(A)(2)(b) & (c)

NEC 210.70(A)(2)(b) requires that for dwelling units at least one wall switch– controlled lighting outlet shall be installed to provide illumination on the exterior side of outdoor entrances or exits with grade level access. A vehicle door in a garage shall not be considered as an outdoor entrance or exit. There is no exception for a bilco door. Also NEC 210.70(A)(2)(c) states where one or more lighting outlet(s) are installed for interior stairways, there shall be a wall switch at each floor level, and landing level that includes an entryway, to control the lighting outlet(s) where the stairway between floor levels has six risers or more. There is no requirement for a switch at the top and bottom of outside stairways. Obviously there are ideal locations to install the switch, but the code is silent. Answer is the light is required, but 3-way switching is not. NEC 210.70(A)(2)(b) & (c).
11. I have an apartment building with a pretty large swimming pool the motor for this swimming pool is 208 volts and 70 amperes. Does this need GFCI protection?

**Answer:** No  
**Code Reference:** NEC 680.21(C)  
NEC 680.21(C) requires outlets supplying pool pump motor connected to single-phase, 120 volt through 240 volt branch circuits, rated 15 or 20 amperes, whether by receptacle or by direct connection, shall be provided with ground-fault circuit-interrupter protection for personnel. Since this pump is more than 20 amperes, it would not require GFCI protection for personnel.

12. Is bonding at (4) points around the pool required for a vinyl lined swimming pool?

**Answer:** No.  
**Code Reference:** NEC 680.26(B)(1) & (2)  
NEC 680.26(B)(1)&(2) states that the requirement applies to conductive pool shells only. For nonconductive pool shells, bonding at four points shall not be required. If the nonconductive pool is supported by a conductive material, the conductive material is required to be bonded once to the equipotential bond as required in NEC 680.26(B)(3)

13. Am I permitted to splice paralleled conductors? If so, are there any items I need to be aware of?

**Answer:** The code is silent on this issue  
**Code Reference:** NEC 310.10(H)  
The code does not address splicing paralleled conductors, however the circuit integrity must be maintained. Any amount of unbalanced resistance in a parallel run will cause more current to flow in one or more of the paralleled conductors. This can create overheating and an unsafe installation. Factors to consider would be splicing all conductors of the parallel run with identical splice products using the same torque or pressure for each connection. Any wires extending beyond the splice would have to follow all the rules of NEC 310.10(H). Care needs be taken if making these splices.

14. Are the receptacles installed on porches and landings counted as the required receptacles for the front and back of the residence if they can’t be accessed at grade level? Is a 24” elevation of the deck or landing still at grade level?

**Answer:** No, No  
**Code Reference:** NEC 210.52(E)  
In NEC 210.52(E) for dwelling unit receptacle outlets the following requirements are listed.  
(1) One-Family and Two-Family Dwellings. For a one-family dwelling and each unit of a two-family dwelling that is at grade level, at least one receptacle outlet accessible
while standing at grade level and located not more than 2.0 m (6½ ft) above grade shall be installed at the front and back of the dwelling.

(2) Multifamily Dwellings. For each dwelling unit of a multifamily dwelling where the dwelling unit is located at grade level and provided with individual exterior entrance/egress, at least one receptacle outlet accessible from grade level and not more than 2.0 m (6½ ft) above grade shall be installed.

(3) Balconies, Decks, and Porches. Balconies, decks, and porches that are accessible from inside the dwelling unit shall have at least one receptacle outlet installed within the perimeter of the balcony, deck, or porch. The receptacle shall not be located more than 2.0 m (6½ ft) above the balcony, deck, or porch surface.

Exception to (3): Balconies, decks, or porches with a usable area of less than 1.86 m² (20 ft²) are not required to have a receptacle installed.

The key words are while standing at grade. If the deck is elevated, it is not at grade.

15. I am looking at wiring a car wash. The specs said to bring the PVC conduits outside in an area about 18” wide by 12” deep on the outside of the building. It appeared there would be an open bottom panelboard that would then go over these conduits. Is something like that legal?

Answer: Yes it can be legal.

Code Reference: NEC 300.12 Exception No. 2

NEC 300.12 requires that all raceways and cables be secured to cabinets, boxes, fittings, or other enclosures. Exception No. 2 permit raceways and cables installed into the bottom of open bottom equipment, such as switchboards, motor control centers, and floor or pad-mounted transformers, shall not be required to be mechanically secured to the equipment. There are open bottom enclosures designed for use outdoors. They must meet the requirements for a NEMA enclosure for use outdoors and be installed per manufacturer’s instructions.

16. Why is the electrical inspector making me use a listed wire for my stereo and phone/computer wiring we are installing in my basement remodel?

Answer: It is required to be

Code Reference: NEC 800.113

800.113 Installation of Communications Wires, Cables and Raceways Installation of communications wires, cables, and raceways shall comply with 800.113( A) through (L). Installation of raceways shall also comply with 800.110.

(A) Listing. Communications wires, cables, and raceways installed in buildings shall be listed.

Listed cables have a fire resistance rating to prevent the spread of fire through the walls. The unlisted speaker cable is typically used from the electronic equipment to a wall receptacle jack or between pieces of electronic equipment.
17. I am installing a 1200 amp, 277/480 volt circuit breaker which will be supplied from a portable generator. The loads to be supplied are considered optional, freezers and refrigeration equipment, the building already has a permanently installed generator for the emergency loads. The 1200 amp breaker is to be installed in the existing 3000 amp switchgear and kirk keys are to be installed by the switchgear Manufacturer to avoid back feeding into the Utility. My question is do I need to provide this new 1200 amp breaker with GFPE as required by 215.10. The AHJ says this is needed, this breaker will only be used when power will be out for over 2 hours, and will potentially be used only 1 or 2 times a year, therefore I do not think this is needed.

**Answer:** Yes  
**Code Reference:** NEC 215.10

This 1200 ampere 277/480 volt breaker is required to be equipped with ground fault protection of equipment. This feeder needs to follow the requirements of NEC 215.10 for GFPE.

18. When “Chicago” type grid systems are used to hang drywall ceilings, I’ve been allowed to secure and support MC cable onto the Chicago grid system. I just want to confirm that this is acceptable to you as well before we get too far along. Please let me know your thoughts.

**Answer:** Only approved per the ceiling manufacturer’s requirements.  
**Code Reference:** NEC 300.11(A)(1) & (2) Exception; NEC 300.23; SPS 316.110

Certain manufacturers of suspended ceilings permit cables that supply circuits associated with the ceiling installation to be installed attached to the ceiling grid. Typically they have requirements for the number of cables and the weight associated with these cables. NEC 300.23 requires that the cables installed above the suspended ceilings allow access above the panels. It is advisable if planning to install wiring such as this, to have the manufacturer’s requirements available for the AHJ.

19. We have a pavilion building that has fans and equipment in a mezzanine for cooling and circulating the air in the building. The fans do not have guards on them and I can’t locate my equipment anywhere up there where I have proper working clearances. The owner said not to worry about because “their people” will be servicing the equipment. Really?

**Answer:** This may be permitted  
**Code Reference:** NEC 110.26; OSHA 1926.403

NEC 110.26 requires working space for equipment operating at 600 volts, nominal, or less to ground and likely to require examination, adjustment, servicing, or maintenance while energized to have the required working clearances. If the equipment cannot be serviced while energized, then these clearances are no longer applicable. In this particular case, any point of entry into the mezzanine was interlocked so all electrical equipment is disconnected from its source upon entry into the space. OSHA 1926.403
mirrors this assessment. However, without the interlocking feature, proper clearances and guards would be required for all equipment.

20. I have a project coming up with a "Mother-in-law" apartment above the detached garage. Would that need to be a 100A service?

**Answer: The disconnecting means for the dwelling unit must have a rating not less than 100 amperes.**

**Code Reference: NEC 230.79(C); SPS 316.230(4); NEC 225.39(C)**

We are assuming this arrangement has been approved by the local zoning authority. After that, the code is fairly straightforward. NEC 230.79(C) indicates that for a one-family dwelling, the feeder disconnecting means shall have a rating of not less than 100 amperes, 3-wire. SPS 316.230(4) states: This is a department rule in addition to the requirements of NEC 230.79:

(a) Two- or multi-family dwellings. Except as provided in par. (b), for 2-family or multi-family dwellings, the service equipment shall have a rating of not less than 150 amperes, 3-wire or 4-wire. Where the combined rating of all service disconnecting means is 150 amperes or larger, the service or feeder equipment rating for each dwelling unit shall have a rating of not less than 60 amperes.

(b) Exception. Service equipment having a rating of not less than 100 amperes, 3-wire or 4-wire, may be installed in an existing 2-family dwelling only where both of the following conditions are complied with:

1. The load computed in accordance with NEC 220 does not exceed 80 amperes.
2. Specific written approval is granted by the municipal inspection department having jurisdiction.

NEC 225.39(C) requires that for a one-family dwelling, the feeder disconnecting means shall have a rating of not less than 100 amperes, 3-wire. If the “mother-in-law” apartment meets the requirements of a dwelling unit, it must have a disconnecting means not less than 100 amperes. If the garage has a separate service, the dwelling unit disconnect must have a rating not less than 100 amperes. If the garage is fed from the house, the dwelling unit still must have a disconnecting means not less than 100 amperes. The size of the service, whether it is on the house or the garage, is sized per NEC 220 Part III, IV or V.

21. I'm installing a disconnect for a hermetic motor compressor, what rating should the disconnect meet?

**Answer: Per the nameplate rated load current or the branch circuit selection current, whichever is greater and the locked rotor current respectively.**

**Code Reference: NEC 440.12(A)**

NEC 440.12(A) Disconnect should be rated per the manufacturer's nameplate rated load current or the branch circuit selection current, whichever is greater, and locked rotor current respectively as follows.
(1) Ampere Rating. The ampere rating shall be at least 115 percent of the nameplate rated-load current or branch-circuit selection current, whichever is greater. Exception: A listed unfused motor circuit switch, without fuseholders, having a horsepower rating not less than the equivalent horsepower determined in accordance with 440.12(A)(2) shall be permitted to have an ampere rating less than 115 percent of the specified current.

(2) Equivalent Horsepower. To determine the equivalent horsepower in complying with the requirements of 430.109, the horsepower rating shall be selected from Table 430.248, Table 430.249, or Table 430.250 corresponding to the rated load current or branch-circuit selection current, whichever is greater, and also the horsepower rating from Table 430.251(A) or Table 430.251(B) corresponding to the locked-rotor current. In case the nameplate rated-load current or branch-circuit selection current and locked-rotor current do not correspond to the currents shown in Table 430.248, Table 430.249, Table 430.250, Table 430.251(A), or Table 430.251(B), the horsepower rating corresponding to the next higher value shall be selected. In case different horsepower ratings are obtained when applying these tables, a horsepower rating at least equal to the larger of the values obtained shall be selected.

22. New central vacuum cleaning systems come with an in wall hose connection that has the electrical outlet for the beater bar as an integral part of the hose outlet. This connection is usually for a unique plug configuration that would not enable anything but the vacuum cleaner hose/cord to be plugged into it. The hose outlet comes with a piece on 12-2 NM potted into the assembly. This electrician’s customer wants hose connections installed in the bathroom (really). The electrician questioned the requirement for GFCI protection of the bathroom installed outlet, as it is impossible to plug anything else into this.

**Answer:** GFCI protection is required

**Code Reference:** NEC 210.8(A)(1)

GFCI Protection is required for all 125-volt, 15- and 20-ampere receptacles installed in the locations specified in 210.8(A)(1) through (8) per NEC 210.8(A). NEC 210.8(A)(1) includes bathrooms in this list. There are no exemptions for special plug types.

23. Can a PVC conduit be installed in a slab-on-grade dentist’s office for an exam room if it contains a grounding conductor?

**Answer:** No

**Code Reference:** NEC 517.2; NEC 517.10; NEC 517.13(A)

No, the definition for Health Care Facilities tells us that a dental exam room is included per 517.2. 517.10 tells us that the exam area of the dentist office is covered by 517 Part II. 517.13(A) requires all branch circuits serving the patient care area shall be provided with an effective ground fault current path by installation in a metal raceway system, or a cable having a metallic armor or sheath assembly. The metallic system is required to be an equipment grounding conductor per NEC 250.118.
24. Can SER aluminum cable be installed in an underground conduit from a house to feed a garage panel?

**Answer:** No  
**Code Reference:** NEC 338.12(A)(2)  
No, SE Style R cable, also known as SER cable is a SE cable and is not permitted to be used in an underground application whether it is, or is not, installed in a raceway per 338.12(A)(2).

25. Can I use MC cable in an outside canopy at the front of a store?

**Answer:** Yes if approved for wet locations.  
**Code Reference:** NEC 330.10(3) & (11)  
NEC 330.10(3) specifically permits the use of MC cable outdoors or indoors and (11) allows In wet locations where any of the following conditions are met:  
a. The metallic covering is impervious to moisture.  
b. A moisture-impervious jacket is provided under the metal covering.  
c. The insulated conductors under the metallic covering are listed for use in wet locations, and a corrosion resistant jacket is provided over the metallic sheath.

26. Is it acceptable to install both the Class 2 thermostat cable (CL2P) for the roof top HVAC unit and the fire alarm cable (FPLP) in the same conduit from the RTU to just below the roof? This conduit is approximately 20 inches in length, after the cables exit the conduit below the roof, they are then installed thru bridal rings.

**Answer:** Yes  
**Code Reference:** NEC 300.12  
Since the conduit is not an installed raceway system, but is being used as a sleeve, the cabling systems are permitted to be installed in the sleeve. Once they leave the sleeve, they are required to follow the requirements in their respective code sections for installation.

27. What is the new GFCI’s self-test feature all about? What does it do and does it take the place of the homeowner testing the GFCI every month?

**Answer:** Self describing; Follow manufacturer’s instructions  
**Code Reference:** SPS 316.110  
Several manufacturers have devised a “self test” GFCI receptacle. They are designed to test themselves at factory determined intervals. If the internal self-test feature does not operate properly, a flashing indicator light will come on that
indicates the unit should be replaced. As far as manual testing goes, check the manufacturer’s instructions.

28. In a basement what constitutes habitable space for outlet spacing? I have an owner who only wants a strip of baseboard heat and an outlet for his flat screen TV on the wall. He said he doesn’t need any other outlets. They are installing insulation in the studded out walls and then putting drywall over the studs.

Answer: This sounds like habitable space.
Code Reference: NEC 210.52(A); SPS 320.7 (UDC)
In Article NEC 210.52(A) the requirements for receptacle outlet spacing applies to every kitchen, family room, dining room, living room, parlor, library, den, sunroom, bedroom, recreation room, or similar room or area of dwelling units. SPS 320.7 in the UDC defines a "Habitable room" as any room used for sleeping, living or dining purposes, excluding such enclosed places as kitchens, closets, pantries, bath or toilet rooms, hallways, laundries, storage spaces, utility rooms, and similar spaces. It appears this space is being modified to be a family room or similar area. Therefore, the requirements for lighting, receptacle outlet, smoke and carbon monoxide detectors now need to become compliant for this room.

29. Is a receptacle required in all residential garages?

Answer: Attached Yes, Detached – only if provided with power.
Code Reference: NEC 210.52(G)(1)
The requirements for garage receptacles are provided in 210.52(G)(1). Receptacles are required in all garages attached to the dwelling. A detached garage is only required to have a receptacle if the garage is provided with power. Therefore, if the detached garage has power for a light it also needs a receptacle. The NEC does not require receptacles in multi-family dwelling garages.

30. We have an old school building being converted to apartments. The owner wants to leave the brick on the outside walls for "effect". We need to install receptacle outlets on these walls in the bedroom and living room areas. It is nearly impossible to run floor outlets since the floor joists run in the wrong direction. Would it be possible to run surface metal raceway on the brick, and when we get to the metal studs, use fittings to transition from the surface metal raceway to MC cable?

Answer: No
Code Reference: SPS 316.314; SPS 316.312; NEC 312.5(C)
SPS 316.314(1) states: CONDUCTORS ENTERING BOXES, CONDUIT BODIES, OR FITTINGS. This is a department exception to the requirements of NEC 314.17 (B) and (C): Exception: Nonmetallic sheathed cable is not required to be secured to the box or conduit body where it is installed in accordance with the wiring method specified in s.
SPS 316.312. The use of this method is typically seen where conduits are run down a basement wall on the surface to protect the NM cable. This practice is not permitted for MC cables.

31. What size conductors are required for both a 100 amp and a 200 amp subpanel in a dwelling (additional not main power feeder panels).

**Answer:** Size the conductors from NEC 310.15(B)(16)

**Code Reference:** NEC 310.15(B)(7); NEC 310.15(B)(16)

The conductor sizes ampacities listed in table 310.15(B)(7) (#4 copper & #2 aluminum for 100 amps and 2/0 copper and 4/0 aluminum for 200 amps) do not apply to secondary panels like these. This table can only be applied to the service conductors or main feeder that supplies the entire load of the dwelling. The wire size for the specified amapcity would be derived from 310.15(B)(16) #3 copper and #1 aluminum for 100 amps and 3/0 copper and 250 kcmil aluminum for 200 amps would be required.

32. Is it acceptable to install a 100 Amp electrical panel when the meter socket is rated 60 amps?

**Answer:** No

**Code Reference:** NEC 110.10; NEC 230.94

The meter socket and all upstream wiring on the service shall be selected and coordinated to clear a fault and carry an overload if those conditions occur as stated in NEC 110.10. NEC 230.94 requires the service overcurrent device to protect all circuits and devices for the service.

33. At Final Electrical Inspection my inspector said I need color code labels at my electrical panels because I have 277/480 volt and 120/208 volt electrical power in the building. I have never had to do this before, where is he getting that code?

**Answer:** NEC 210.5(C)(1) & (3)

**Code Reference:** NEC 210.5(C)(1) & (3)

NEC 210.5(C)(1) requires that Where the premises wiring system has branch circuits supplied from more than one nominal voltage system, each ungrounded conductor of a branch circuit shall be identified by phase or line and system at all termination, connection, and splice points.

NEC 210.5(C)(3) requires The method utilized for conductors originating within each branch-circuit panelboard or similar branch-circuit distribution equipment shall be documented in a manner that is readily available or shall be permanently posted at each branch-circuit panelboard or similar branch-circuit distribution equipment.

34. Does the NEC require a GFCI receptacle in the unfinished furnace room located within a finished basement?
Answer: Yes
Code Reference: NEC 210.52(G)(1) & (2)
210.52 (G) (1) & (2) requires at least one receptacle outlet, in addition to those for specific equipment, shall be installed in each basement and here a portion of the basement is finished into one or more habitable rooms, each separate unfinished portion shall have a receptacle outlet installed in accordance with this section.

35. We forgot to order the color code fixture whips, (brown, orange , yellow) for our 277 volt fixtures. Is it ok to identify the black wire of the fixture whip with brown, orange, or yellow tape at the terminations?

Answer: Not required
Code Section: NEC 210.5(C)(1); Article 100 Definitions; NEC 410.117(C)
NEC 210.5(C)(1) requires that Where the premises wiring system has branch circuits supplied from more than one nominal voltage system, each ungrounded conductor of a branch circuit shall be identified by phase or line and system at all termination, connection, and splice points. In Article 100, a branch circuit is defined as the circuit conductors between the final overcurrent device protecting the circuit and the outlet(s). NEC 410.117(C) permits tap conductors of a type suitable for the temperature encountered shall be permitted to run from the luminaire terminal connection to an outlet box placed at least 300 mm (1 ft) from the luminaire. Such tap conductors shall be in suitable raceway or Type AC or MC cable of at least 450 mm (18 in.) but not more than 1.8 m (6 ft) in length. The fixture whip or tap conductors do not need to be identified with the system marking.

36. I am installing a PV system in the farm field and the strings are installed underground in a conduit to the barn. I am installing a combiner box on the outside of the barn, the combiner box has 8 fuses with the safe touch type fuseholders, will this combiner box be acceptable for the disconnect? The inspector is requiring a disconnect suitable for service equipment to be located on the outside of the barn for these PV circuits or within 8’ of entering the barn, I am saying the combiner box is acceptable for the disconnect for the PV circuits feeding the barn.

Answer: No
Code Reference NEC 250.24
The 2011 NEC section 250.24 requires this disconnect to be listed as service equipment. The 2014 NEC, which Wisconsin has not yet adopted, section 250.24 only requires the disconnect to be listed as service equipment if the feeder is a 3 wire with no equipment grounding conductor, in other words an existing feeder which was installed when it was allowed by the NEC to only install the ungrounded conductors with a grounded conductor only, no equipment grounding conductor installed with the feeders. Your best
option may be to apply for a variance to DSPS to allow you to install the combiner/disconnect switch in accordance with the 2014 NEC Code.

37. A BBQ restaurant we are working on has wagon wheel lighting fixtures that were made in the old west (China). There is not a listing mark on the fixtures. Are lighting fixtures required to be listed?

**Answer:** Yes  
**Code Reference:** NEC 410.6  
*All luminaires and lampholders shall be listed.*

38. When do I need to use 2 ground rods?

**Answer:** Anytime a ground rod is required per NEC 250.  
**Code Reference:** SPS 316.250(2)  
According to SPS316.250(2) this is a department rule in addition to the requirements in NEC 250.53 (A) (3): A single electrode consisting of a rod, pipe or plate shall be augmented by one additional electrode of any of the types in NEC 250.52 (A) (4) to (A)(8). Though there are other options in 250(A)(4) to (A)(8), the most logical is to use two ground rods.

39. I installed a beautiful light over my bathtub and put it on a dimmer. The inspector rejected the installation. I see lots of people with lights over their bathtubs. Why am I getting picked on?

**Answer:** Not permitted.  
**Code Reference:** NEC 410.10(D)  
NEC 410.10(D) requires that no parts of cord-connected luminaires, chain-, cable-, or cord-suspended luminaires, lighting track, pendants, or ceiling-suspended (paddle) fans shall be located within a zone measured 900 mm (3 ft) horizontally and 2.5 m (8 ft) vertically from the top of the bathtub rim or shower stall threshold. This zone is all encompassing and includes the space directly over the tub or shower stall. Luminaires located within the actual outside dimension of the bathtub or shower to a height of 2.5 m (8 ft) vertically from the top of the bathtub rim or shower threshold shall be marked for damp locations, or marked for wet locations where subject to shower spray. The inspector was doing his job. This installation is not permitted.

40. We have an area in town that has our local fair and other events each year. The owner wants us to put some 120 volt receptacles around this area for trailers and motor homes to plug. I want to put 2 duplex receptacles on each post so they can feed four units. Is this ok?

**Answer:** No
Code Reference: NEC 551.71

NEC 551.71 requires that every recreational vehicle site with electrical supply shall be equipped with at least one 20-ampere, 125-volt receptacle. A minimum of 20 percent of all recreational vehicle sites, with electrical supply, shall each be equipped with a 50-ampere, 125/250-volt receptacle conforming to the configuration as identified in Figure 551.46(C). These electrical supplies shall be permitted to include additional receptacles that have configurations in accordance with 551.81. A minimum of 70 percent of all recreational vehicle sites with electrical supply shall each be equipped with a 30-ampere, 125-volt receptacle conforming to Figure 551.46(C). This supply shall be permitted to include additional receptacle configurations conforming to 551.81. The remainder of all recreational vehicle sites with electrical supply shall be equipped with one or more of the receptacle configurations conforming to 551.81. Dedicated tent sites with a 15- or 20-ampere electrical supply shall be permitted to be excluded when determining the percentage of recreational vehicle sites with 30- or 50-ampere receptacles. Additional receptacles shall be permitted for the connection of electrical equipment outside the recreational vehicle within the recreational vehicle park. All 125-volt, single-phase, 15- and 20-ampere receptacles shall have listed ground-fault circuit-interrupter protection for personnel. Informational Note: The percentage of 50 ampere sites required by 551.71 may be inadequate for seasonal recreational vehicle sites serving a higher percentage of recreational vehicles with 50 ampere electrical systems. In that type of recreational vehicle park, the percentage of 50 ampere sites could approach 100 percent.

41. Do I have to provide available fault current levels on a commercial service change?

Answer: Yes

Code Reference: NEC 110.9; NEC 110.10; NEC 110.24(A) & (B)

NEC 110.9 & 110.10 requires the equipment to have sufficient interrupting and short circuit ratings. In order to verify this information, the installer and inspector needs to have this information available to them before doing the service change. NEC 110.24(A) requires service equipment in other than dwelling units shall be legibly marked in the field with the maximum available fault current. The field marking(s) shall include the date the fault current calculation was performed and be of sufficient durability to withstand the environment involved. This applies to new installations. NEC 110.24(B) states that when modifications to the electrical installation occur that affect the maximum available fault current at the service, the maximum available fault current shall be verified or recalculated as necessary to ensure the service equipment ratings are sufficient for the maximum available fault current at the line terminals of the equipment. The required field marking(s) in 110.24(A) shall be adjusted to reflect the new level of maximum available fault current. This would apply to modifications and service changes as well.

42. I have a new church being constructed in the City. They are installing a full body Baptismal unit that has a 120 volt cord and plug pump with a 240 volt heater. This unit
will be permanently installed in a concrete floor and has a permanent drain. There is a separate area within this unit for the Pastor to walk into that is dry to perform his duties. My question is which section of Article 680 is this unit covered under? Would wiring methods in Part II of 680 need to be followed? Any help would be appreciated. Thanks.

**Answer:** NEC 680 Parts I, II, & IV; Yes  
**Code Reference:** NEC 680.2; NEC 680.43; NEC 680.26(B)(2); NEC 680.26(C)  
First we go to NEC 680.2. A pool is defined as manufactured or field-constructed equipment designed to contain water on a permanent or semi-permanent basis and used for swimming, wading, immersion, or therapeutic purposes. A spa or hot tub is defined as a hydromassage pool, or tub for recreational or therapeutic use, not located in health care facilities, designed for immersion of users, and usually having a filter, heater, and motor-driven blower. It may be installed indoors or outdoors, on the ground or supporting structure, or in the ground or supporting structure. Generally, a spa or hot tub is not designed or intended to have its contents drained or discharged after each use. Per the pastor, this unit would not be drained after each use, only occasionally. This use is similar to a hot tub or spa. 680.43 refers to Parts I and II as applicable except as modified by part IV. NEC 680.26 (B) (2) Perimeter Surfaces. The perimeter surface shall include unpaved surfaces, as well as poured concrete surfaces and other paving. This situation deals with an indoor full body Baptismal unit which we are treating as an indoor Spa or Hot tub per NEC 680.43. The proposed walking surface surrounding the baptismal unit is wood. 680.26(B) requires that the equipotential bonding grid "extend within or under paved walking surfaces for 1 m (3 ft) horizontally beyond the inside walls of the pool". Also, 680.26(C) would require the pool water to be bonded to the perimeter bonding.

43. Does a radon fan disconnect need to be located within site of the motor?

**Answer:** Yes if over 1/8 HP; No if 1/8 HP or less  
**Code Reference:** NEC 430.102(B); NEC 430.109(B)  
NEC 430.102(B) states the disconnect for the motor must be within sight from the motor location if the motor is greater than 1/8 HP. The branch-circuit circuit-breaker can serve as the required disconnect but only where the motor is rated 1/8 HP or less per NEC 430.109(B).

44. Can Romex be installed in outdoor conduit? Does it comply with 334.10(A) when it is normally dry 95% of the time in most geographic locations?

**Answer:** No  
**Code Reference:** NEC 300.9, NEC 310.10(C), Article 100 Location, Wet; NEC 334.12(B)(4)
No, under Article 100 a wet location includes areas exposed to the weather. Section 300.9 tells us that the inside of the raceway needs to be treated as wet location and refers the user to 310.10 (C)(3) which tells us that the cable needs to be listed for a wet location. Section 334.12(B)(4) tells us that NM Cable is not permitted to be used in a wet location.

334.10(A) tells us that NM Cable is permitted to be used exposed and concealed in dry locations.

45. I saw a cable that serves a lighting fixture in an Air Handler. Can you tell if it's plenum rated, i.e. is it okay for it to be located in the air stream?

**Answer:** No.

**Code Reference:** NEC 300.22(C)(1)

This is a flexible cord Type SJOOW, which would be a violation of NEC 300.22(C)(1) which states the approved wiring methods for an environmental air plenum would consist of a metallic wiring method. Rubber cords would not be permitted.

46. I went to wire a hot tub for a customer. When I got there, it was pretty obvious it was sitting right over the underground service entrance feeding the building. I told the owner the hot tub would need to be moved or we would have to have the utility relocate the underground wiring. She said the hot tub installer didn’t say anything and they do this for a living. She also indicated 2 other electricians have given her prices and they didn’t say anything about this issue. Am I wrong?

**Answer No you are correct.**

**Code Reference:** NEC 680.40; NEC 680.10; Utility Service Rules

NEC 680.40 indicates Spas and Hot Tubs must comply with Part I and Part IV of NEC 680. NEC 680.10 states underground wiring shall not be permitted under the pool or within the area extending 1.5 m (5 ft) horizontally from the inside wall of the pool unless this wiring is necessary to supply pool equipment permitted by this article. Where space limitations prevent wiring from being routed a distance 1.5 m (5 ft) or more from the pool, such wiring shall be permitted where installed in complete raceway systems of rigid metal conduit, intermediate metal conduit, or a nonmetallic raceway system. All metal conduit shall be corrosion resistant and suitable for the location. The minimum cover depth shall be as given in Table 680.10. Similar clearances are found in the NESC 234 as well as the utility work rules around the State.

47. Can a cord- and -plug connected motor and receptacle be used as the disconnect for an exterior radon fan?

**Answer:** Yes with conditions

**Code Reference:** NEC 430.102(B); NEC 430.109(C); SPS 316.110; UL White Book
A disconnect shall be provided for the radon mitigation fan. A properly rated snap switch in a weather-tight enclosure is one of three options permitted in NEC 430.109(C). NEC 430.109(C) permits a general use switch as the disconnect for motors 2 HP or less. The ampere-rating of the switch must be at least twice the full-load current rating of the motor. An AC-only switch must have an ampere rating of at least 125% of the motor full load current. NEC 430.109(F) permits cord and plug connection on motors as long as the attachment plug and receptacle are horsepower rated. The cord and plug is required to be listed for use in a wet location and sized properly. SPS 316.110. The 2014 UL white on page 452 can assist you in determining what makings you should look for on the cord when determining NEC compliance.

48. Do the outlets in a bathroom for plugging in LED lights have to be 20 amperes and GFCI protected?

Answer: Yes
Code Reference: NEC 210.11(C)(3); NEC 210.52(D); NEC 210.8(A)(1); NEC 210.70(A)(1)
NEC 210.11(C)(3) indicates that in addition to the number of branch circuits required by other parts of this section, at least one 20-ampere branch circuit shall be provided to supply bathroom receptacle outlet(s). Such circuits shall have no other outlets. Exception: Where the 20-ampere circuit supplies a single bathroom, outlets for other equipment within the same bathroom shall be permitted to be supplied in accordance with 210.23(A)(1) and (A)(2). 210.52(D) states that in dwelling units, at least one receptacle outlet shall be installed in bathrooms within 900 mm (3 ft) of the outside edge of each basin. Also, NEC 210.8(A)(1) requires that all receptacle outlets installed in a dwelling unit bathroom must be GFCI protected. NEC 210.70(A)(1) says at least one wall switch–controlled lighting outlet shall be installed in every habitable room and bathroom. So if you have a switch controlled lighting outlet, you can add a switch controlled receptacle for “accent lighting”. However, this receptacle must be 20 amperes and GFCI protected.

49. I have EMT conduit embedded in some old outside walls that are below grade. Can I sleeve NM cable through these old EMTs?

Answer: No for an exterior concrete wall below grade
Code Reference: NEC 334.12(B)(4); SPS 316.358
NM cable shall not be installed in a wet or damp location per NEC 334.12(B)(4). A concrete wall below grade would be considered a damp location at best. NM cable would not be permitted to be installed in the EMT in concrete. In new installations, EMT is not permitted to be installed in concrete in an exterior concrete wall below grade per SPS 316.358.
50. I have a 24 unit apartment building with ten garages for individual parking spaces (these are for the high rent guys). Do the receptacles for these garages need GFCI protection? These spaces are not assigned to any individual unit and are fed from the house panel.

Answer: Maybe
Code Reference: NEC 210.8(B)(8)
NEC 210.8(B)(8) states in garages, service bays, and similar areas where electrical diagnostic equipment, electrical hand tools, or portable lighting equipment are to be used GFCI protection would be required. Since these appear to be common area garage spaces that are not assigned to a specific dwelling unit, they would be similar to those parking spaces that are in an open parking garage. However, if hand tools may be used on these cars, then the GFCI requirement would apply. Check with the AHJ for the interpretation for the building in question.

51. I sized the ampacity of the conductors to a motor using the name plate rating on the motor. The inspector said that the motor conductors are the wrong size. Is he right?

Answer: Yes
Code Reference: NEC 430.6(A)(1)
NEC 430.6(A)(1) says that you shall use 430.247,248,249,250, in determining ampacity of conductors and other components for motors. Except for special motors, the nameplate amperage rating is used for sizing overload protection.

52. In a rec room area I have shelf that a microwave sets on that’s not part of the counter top. The receptacle is within 6 ft. of the sink. Would I have to GFCI and AFCI this receptacle?

ANSWER: Yes to both
Code Reference: NEC 210.8(A)(7); NEC 210.12(A)
NEC 210.8(A)(7) say any receptacle in any direction that is within 6 ft. of the sink shall be GFCI protected. One way to describe this is to use a 6’ string. If you touch one end to the sink and can reach a receptacle with the other end, that receptacle needs to be GFCI protected. Because this is not a kitchen, NEC 210.12 would apply also and the receptacle would have to be AFCI protected.

53. I have been told the low voltage wiring between the inside exit light and the emergency light is considered an emergency circuit, and therefore the wiring to the remote emergency heads must be in MC cable or a raceway. If the wiring is in a raceway to the remote heads, the wiring cannot be a CL2 wire, and that the wiring must be a Chapter 3 wiring method, is this true?

Answer: The wiring method must be AC, MC or a raceway.
Code Reference: SPS 316.700(1)(a)
SPS 316.700(1)(a) requires emergency circuits to be installed in a raceway or MC or AC cable. This portion of the circuit is supplied from the battery backup on the exit/emergency light, therefore in a loss of power, this circuit is required to supply power to the emergency lights, in this case the remote heads. This would also apply in the case of an inverter which supplies multiple emergency lights, the wiring on the output side of the inverter would be classified as emergency circuits and these circuits would need to be supplied in MC or AC cable or a raceway system. There is no violation if the CL2 cable is installed in the raceway, if it is sized properly for the load, and is not prohibited by other codes or manufacturer’s restrictions.

54. I have a small kitchen area without a lot of counter space. I installed a GFCI protected receptacle in the appliance garage. From there I fed the refrigerator. This is one of the kitchen appliance circuits. I installed 2 other outlets above the countertop space and that is the other kitchen appliance circuit. The inspector says the circuit in the appliance garage doesn’t count, and I have to have a 2nd circuit feeding the outlets above the countertop. Most of the appliances are plugged into the appliance garage circuit. Is he right?

**Answer: Yes he is right.**

**Code Reference: NEC 210.52(C)(5)**

In NEC 210.52(C)(5) receptacle outlets rendered not readily accessible by appliances fastened in place, appliance garages, sinks, or rangetops as covered in 210.52(C)(1), Exception, or appliances occupying dedicated space shall not be considered as these required outlets. The small appliance branch circuit that serves the appliance garage and refrigeration would not be a compliant 20 ampere small appliance branch circuit, so there would be only one small appliance branch circuit that would be legal for this arrangement.

55. The inspector says he won’t allow this service (see photo) to be energized. What’s the problem? How can I make him happy?

**Answer: Doesn’t appear to have proper protection.**

**Code Reference: NEC 300.5(D)(1) and Table.**

NEC 300.5(D)(1) requires that direct-buried conductors and cables emerging from grade and specified in columns 1 and 4 of Table 300.5 shall be protected by enclosures or raceways extending from the minimum cover distance below grade required by 300.5(A) to a point at least 2.5 m (8 ft) above finished grade. In no case shall the protection be required to exceed 450 mm (18 in.) below finished grade. Also check with the local electric utility for any rules they may have.

56. We're doing a service upgrade on an existing home built in the 80's. We are replacing the panel, meter socket and riser. The existing overhead drop clears the newly built detached garage roof by 2', is this ok? Can we use the same attachment point on the home?
57. I am curious to know if I can consider the 0-10v signal as class 1 (725.41(B)) so I can run the signal wires in the same raceway with the 277v lighting power. This is for an LED retrofit. Attached is the dimmer information. From what I see it looks okay, but would like your opinion. (See Attached)

Answer No
Code Reference: NEC 725.121; NEC 725.124; NEC Chapter 9 Table 11; SPS 316.110; NEC 725.136
NEC 725.121(A) specifies the power supply for a Class 2 or 3 circuit. NEC 725.124 requires the power source of a Class 2 or 3 circuit to be durably and plainly visible. After discussion with the manufacturer, these are Class 2 circuits as described in NEC Chapter 9 Table 11. Therefore, the 0-10v signal wiring could not be installed with the 277v lighting power wiring per NEC 725.136.

58. My temporary service was not approved. Who cares if it’s a little rough looking, it’s just a temporary.

Answer: Temporary does not mean “forget the code”.
Code Reference: NEC 590.2(A)
NEC 590.2(A) states except as specifically modified in this article, all other requirements of this Code for permanent wiring shall apply to temporary wiring installations. Openings in panels, physical protection of conductors, conduit and cable support, 2 ground rods, proper corresponding fittings, deterioration of equipment and workmanship are often issues.

59. Does a break room in an office building with a sink and counter now require GFCI protected outlets if they have a toaster and microwave plugged in on the counter?

Answer: Maybe
Code Reference: NEC 210.8(B)(2) & (5)
This area would not qualify as kitchen per NEC 210.8(B)(2). Therefore, we need to look at NEC 210.8(5) and any receptacle within 6’ of the sink would require GFCI protection.

60. What type of labels do we need to provide at the service if they have a generator in the building?
Answer: Generator location; Grounding electrode connection location if not separately derived system

Code Reference: NEC 700.7; NEC 701.7; NEC 702.7

In each section, (A) requires that a sign shall be placed at the service-entrance equipment that indicates the type and location of the generator(s). In (B), it states that where removal of a grounding or bonding connection in normal power source equipment interrupts the grounding electrode conductor connection to the alternate power source(s) grounded conductor, a warning sign shall be installed at the normal power source equipment stating:

WARNING
SHOCK HAZARD EXISTS IF GROUNDING ELECTRODE CONDUCTOR OR BONDING JUMPER CONNECTION IN THIS EQUIPMENT IS REMOVED WHILE ALTERNATE SOURCE(S) IS ENERGIZED.

61. I have a 3 phase, 75 KVA transformer, 480 volt primary and a 120/208 volt 3 phase, 4-wire secondary. The primary overcurrent device is sized to properly protect the transformer. I would like to have the secondary side supply 2 machines, each equipped with 100 ampere main breakers within the control cabinets, and each machine is located approximately 50’ from the transformer, but not near each other. Is this installation acceptable with the secondary breakers not grouped together?

Answer: No

Code Reference: NEC 240.21(C)

NEC 240.21(C) limits the secondary conductors to 10’ or 25’ maximum length, therefore the breakers located on the machines are beyond the required length of conductor. Overcurrent devices would be required to installed within the 10’ or 25’ maximum length. 240.21(C)(1) requires the tap conductors to be protected by an overcurrent device and does not allow the next size up to be used. Table 450.3(B), note #2 under the table requires: if the overcurrent protection is required (for protecting the transformer) then you are allowed to use up to 6 overcurrent devices and these devices must be grouped together. When using more than 1 overcurrent device in this installation, the multiple overcurrent devices are not allowed to exceed the value allowed for 1 overcurrent device. Since the secondary current of the transformer is 208 amperes (75 kVA / 208 x 1.732) the 2 – 100 amp breakers could be compliant. In summary, 2 overcurrent devices are allowed, the secondary conductors cannot be more than 10’ or 25’ in length and the devices are not required to be grouped if they devices are not providing overcurrent protection for the transformer, in other words if the transformer is properly protected on the primary side in accordance with Table 450.3(B).

62. My meter is located on my detached garage. There is no water or other grounding electrodes in the garage, so I installed two ground rods. I ran a feeder to my house. I
grounded the equipment grounding conductor in the house to the metal water pipe. I then ran another grounding electrode conductor out to my detached garage and connected it the ground rods serving the garage. The inspector says I have to install two ground rods at the house. Why?

**Answer: 2 more rods are not required**  
**Code Reference: NEC 250.32(A); NEC 250.52(A)(1); NEC 250.53(D)(2); SPS 316.250(2)**

NEC 250.32(A) requires a building or structure that is supplied by a feeder shall have a grounding electrode system installed. NEC 250.52(A)(1) requires the metal water piping in contact with the earth for 10 feet to be utilized. NEC 250.53(D)(2) requires the water piping to be supplemented. SPS 316.250(2) requires that if using ground rods, you must install 2 ground rods. There is no distance limitation to the length of the grounding electrode conductor that would connect to the ground rods.

63. The inspector says that I must AFCI the laundry room receptacle. Is he correct?

**Answer: Yes**  
**Code Reference NEC 210.12(A)**  
The state says that this falls under similar rooms in 210.12(A), hence AFCI protection is required. This will become clear in the 2014 NEC as laundry rooms are added to the list.

64. We're installing a new fire alarm system in an existing foodstore. Do we have to run the alarm circuit wiring in conduit?

**Answer: Not unless there is a local ordinance.**  
**Code Reference: NEC 760.130**

NEC 760.130 permits fire alarm circuits on the load side of the power source shall be permitted to be installed using wiring methods and materials in accordance with 760.130(A), (B), or a combination of (A) and (B). Power-limited fire alarm conductors and cables described in NEC 760.179 shall be permitted. Conduit is also always an option. Some municipalities require fire alarm wiring to be installed in a raceway. DSPS has determined the State Electrical Code is outside the scope of the Commercial Building Code and therefore not uniformed by Act 270. Check with your local AHJ.

65. Can I install NM cable in a groove cut in a concrete floor to feed a kitchen island?

**Answer: Maybe**  
**Code Reference: NEC 334.10(A)(1); NEC 334.12(B)(4); NEC 300.4(F)**

NEC 334.10(A)(1) allows NM cable to be installed for both exposed and concealed work in normally dry locations. NEC 334.12(B)(4) does not allow NM cable to be installed in wet or damp locations. If the concrete floor is not a slab on grade and the location is a dry location, this installation may be compliant. NEC 300.4(F) permits cable- or
raceway-type wiring methods installed in a groove, to be covered by wallboard, siding, paneling, carpeting, or similar finish, provided it is protected by 1.6 mm (1/16 in.) thick steel plate, sleeve, or equivalent or by not less than 32-mm (11/4-in.) free space for the full length of the groove in which the cable or raceway is installed. Exception No. 1: Steel plates, sleeves, or the equivalent shall not be required to protect rigid metal conduit, intermediate metal conduit, rigid nonmetallic conduit, or electrical metallic tubing. Exception No. 2: A listed and marked steel plate less than 1.6 mm (1/16 in.) thick that provides equal or better protection against nail or screw penetration shall be permitted.

66. We have a softball field with a batting fence. The manager would like a convenience outlet for an announcer table located behind said fence. Is this fence considered an appropriate structure to secure conduit to and feed the receptacle?

**Answer: Typically Yes.**

**Code Reference:** NEC 314.23(B); NEC 300.11(A)

314.23(B) permits boxes to be secured to a building or other surface and requires the support to be rigid and secure. 300.11(A) requires raceways, cable assemblies, boxes, cabinets, and fittings shall be securely fastened in place. Typically, fences around a batting area would be rigid and secure. Using proper fastening techniques would permit the receptacle and conduit to be supported to the fence.

67. Can a recessed can light be installed in a clothes closet?

**Answer: Yes with conditions.**

**Code Reference:** NEC 410.16(C)(3) & (4)

NEC 410.16(C) allows recessed luminaires to be installed in clothes closets with the following clearances to the closet storage space as follows:

(3) 150 mm (6 in.) for recessed incandescent or LED luminaires with a completely enclosed light source installed in the wall or the ceiling.

(4) 150 mm (6 in.) for recessed fluorescent luminaires installed in the wall or the ceiling. Both types of recessed luminaires are permitted with a clearance of 6 inches to the storage space, but an incandescent or LED luminaire must have a completely enclosed light source. Fluorescent luminaires are permitted to be of the open type.

68. What are the acceptable electrical installations for a dishwasher as far as disconnecting means go (cord and plug, hardwired).

**Answer: May be possible to do either.**

**Code Reference:** NEC 334.30; NEC 422.16(B)(2); NEC 422.31(B) & (C)

NEC 334.30 requires NM cable to be secured within 12 inches of every outlet box, junction box, cabinet or fitting. If the NM cable is secured within 12 inches without causing damage, NM cable could be used. NEC 422.31(C) would require a disconnect within sight of the dishwasher. NEC 422.16(B)(2) specifically permits cord and plug
connection with a flexible cord identified as suitable for the purpose in the installation instructions of the appliance manufacturer where all of the following conditions are met:
(1) The flexible cord shall be terminated with a grounding-type attachment plug.
Exception: A listed dishwasher or trash compactor distinctly marked to identify it as protected by a system of double insulation, or its equivalent, shall not be required to be terminated with a grounding-type attachment plug.
(2) The length of the cord shall be 0.9 m to 1.2 m (3 ft to 4 ft) measured from the face of the attachment plug to the plane of the rear of the appliance.
(3) Receptacles shall be located to avoid physical damage to the flexible cord.
(4) The receptacle shall be located in the space occupied by the appliance or adjacent thereto.
(5) The receptacle shall be accessible.
If the Code is met, either method would be acceptable.

69. I have bus duct located 12’ above the floor with a fused disconnect for a feeder. A machine has now been installed directly under the disconnect, thereby infringing on the proper workspace as required by 110.26. The machine is 48” deep by 10’ in length. Is this allowed to be installed under the fused disconnect?

Answer: No.
Code Reference: NEC 110.26(A)
NEC 110.26(A) does require proper working space to access the fusible disconnect, as the machine infringes on the required work space required to safely troubleshoot or service the fused disconnect, something would need to be moved.

70. I have an outdoor pavilion in which they would like to have lights installed and many circuits for receptacles due to the unknown types of activities which will occur at this facility. The plans call for an electrical service pedestal to be installed 25’ from the pavilion with 20 to 30 branch circuits from the service panel to the pavilion. At this point, it appears this is 2 structures, 1 being the service and associated service panel, the 2nd structure being the pavilion. With this assumption, can we install this many circuits to a separate structure? The pavilion footing has reinforcing rods in the footings.

Answer: No
Code Reference NEC 225.30
You are correct in assuming this is 2 buildings or structures. NEC 225.30 requires a building or other structure that is served by a branch circuit or feeder on the load side of a service disconnecting means shall be supplied by only one feeder or branch circuit unless permitted in 225.30(A) through (E), none of which would qualify for installing that many branch circuits to the 2nd building. A single feeder would need to be run to the pavilion and branch circuits would be permitted to be installed throughout the pavilion from a panel that is properly grounded to the rebar.
71. We wired a jockey pump to the fire pump system. The conductors were properly sized to the fire pump controller so we used the 10 ft. tap rule and tapped off in the fire pump controller to a service rated disconnect for the jockey pump. The Fire Inspector said that you cannot tap off in the controller to supply the jockey pump. I cannot find anything in the NEC that supports this. Is he correct?

Answer: Yes he is.
Code Reference: NEC 695(6)(I)(6); NFPA 20.9.7(6)
The answer is found in NEC 695(6)(I)(6) and NFPA 20.9.7(6) which states that the fire pump controller cannot be used as a junction box to supply power for jockey pumps or other equipment associated with the fire pump system.

72. I have a dwelling unit where the patio door has a 3’ x 3” landing outside the door which then leads directly to a set of steps. The 3’ x 3” landing is the same size as the slider portion of the patio door, so I have installed the receptacle to the side of the patio door, but outside the perimeter of the landing, the Inspector has rejected the installation, as the receptacle is not within the perimeter of the landing. Is my installation acceptable?

Answer: The Inspector is correct.
Code Reference: NEC 210.52(E)(3)
NEC 210.52(E)(3) reads as follows – “Balconies, decks, and porches that are accessible from inside the dwelling unit shall have at least one receptacle outlet installed within the perimeter of the balcony, deck, or porch. The receptacle shall not be located more than 2.0 m (6 ½ ft) above the balcony, deck, or porch surface”.

73. Can the control wiring that runs from the generator to the standby generator be in the same conduit as the control wiring for the optional standby power?

Answer: Yes
Code Reference: NEC 701.10
In NEC 701.10 the code states the legally required standby system wiring shall be permitted to occupy the same raceways, cables, boxes, and cabinets with other general wiring.

74. I installed a GFCI receptacle in the ceiling above a power vent water heater. The inspector says move it. I’m asking why since I can get to it with a ladder.

Answer: The GFCI mechanism must be accessible.
Code Reference: NEC 210.8; Definitions
NEC 210.8 requires GFCI’s to be readily accessible. Readily accessible is defined as capable of being reached quickly for operation, renewal, or inspections without requiring
those to whom ready access is requisite to climb over or remove obstacles or to resort to portable ladders, and so forth. There are a number of ways this could be accomplished.

75. I have a 2 unit (duplex) and the electrical inspector has rejected the service installation. I have installed 1 service disconnect inside the basement of 1 unit and the 2nd service disconnect is located outside directly under the double meter socket. The Inspector said the service disconnects must be grouped together outside or both service disconnects must be located inside each unit or occupancy.

**Answer: The disconnects must be grouped or on or in the individual dwelling units.**  
**Code Reference:** NEC 230.40 Exception No. 1  
NEC 230.40 requires each service to supply only one set of service-entrance conductors. Exc. 1 allows a building with more than one occupancy to have one set of service entrance conductors to be run to each occupancy.

76. I have an unfinished basement which is now being finished into a rec room. The electrician has utilized an existing branch circuit which previously supplied the pull chain lights in the basement. Does this existing branch circuit for the new finished area required AFCI protection?

**Answer: Yes**  
**Code Reference:** SPS 316.210(4)  
NEC 210.12(B) states that due to this area previously being an unfinished area and is converted to a habitable area, the ACFI protection as required by 210.12 (A) would be required with all branch circuits serving this newly created area. Although there is an existing branch circuit supplying the unfinished area, the circuit is now being repurposed for a finished area, therefore this new installation is required to be protected with AFCI circuits. SPS 316.210(4) deletes this requirement for extensions and modifications. AFCI protection only applies to “new branch circuits” in Wisconsin and this circuit is no longer an existing circuit in an unfinished area but a “new circuit” in a finished area.

77. I have an UPS system which is to be installed in the critical branch of the emergency system in a hospital. This UPS system is in addition to the existing generator, so the UPS is to be wired in to supply power for the few seconds it takes for the generator to supply power to the electronics and computers connected to the critical branch. Is the UPS system required to be listed as emergency equipment?

**Answer: Up to AHJ.**  
**Code Reference:** SPS 316.012(1)  
This up to the local AHJ if they wish to have the UPS listed for emergency equipment, if there is a listing for this unit as emergency equipment. Typically if these units are listed, this would serve as evidence the UPS system was evaluated to operate in a safe and reliable manner. SPS 316.012(1) does allow the AHJ to require listing of this equipment.
UPS equipment is evaluated to UL 1778. UPS that employ hospital grade components identified by the markings "Hospital Only", "Hospital Grade”, or a green dot on the BODY of the component, or otherwise implying suitability for medical use, are further evaluated to UL 2200.

Note: The answers to these questions are the interpretation set forth by the Wisconsin Chapter International Association of Electrical Inspectors Education Committee. These answers are subject to change by DSPS or the local Authority Having Jurisdiction.