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WC IAEI 2014 Code Panel Questions

- 1. Ok, I have a kitchen refrigerator and washing machine on 2 pole breaker. Can't say I've seen that before. My gut tells me they are on separate branch circuits so it would be ok, but I wanted your advice oh Zen master.**

Answer: Yes, 210.4(A) Permits multiwire branch circuits. A multiwire circuit shall be permitted to be considered as multiple circuits. All conductors of a multiwire branch circuit shall originate from the same panelboard or similar distribution equipment.

210.4(B) Requires that each multiwire branch circuit shall be provided with a means that will simultaneously disconnect all ungrounded conductors at the point where the branch circuit originates. Informational Note says: See 240.15(B) for information on the use of single-pole circuit breakers as the disconnecting means. 240.15(B) States: circuit breakers shall open all ungrounded conductors of the circuit both manually and automatically unless otherwise permitted in 240.15(B)(1), (B)(2), (B)(3), and (B)(4).

240.15(B)(1) Permits individual single-pole circuit breakers, with identified handle ties, to serve as the protection for each ungrounded conductor of multiwire branch circuits that serve only single-phase line-to neutral loads. Therefore, either a two pole breaker or two single pole breakers with identified handle ties are permitted for loads indicated in the question. The answer is YES the code sections are NEC 210.4(A) & (B) and 240.15(B)

- 2. I have received plans for a residential addition. Because of the grade change, the service disconnect will be mounted one foot off the ground. Is there a minimum allowable height for a service disconnect on a residential home?**

Answer: No. NEC 230 Part VI covers the requirements for the service disconnecting means. There is no minimum height stated in Part VI. NEC 230.70(A)(1) says the service disconnect must be readily accessible. NEC 404.8(A) says switches and circuit breakers used as switches that are to be readily accessible must be installed no higher than 6 ft. 7 in. above the floor, grade, or platform. There is no minimum height restrictions for the service disconnect. NEC 550.32(F) does require the disconnect for a mobile home to be located not less than 2 feet above grade or platform but for any other service there is no minimum mounting height for the service disconnecting means. The utility may have restrictions for the height of the meter off the ground. The answer is no, the code references are NEC 230.70(A)(1) & 400.8(A)

3. Can NM-B cable be installed in a piece of EMT conduit without a bushing?

No, 334.15(B) Protection from Physical Damage. Cable shall be protected from physical damage where necessary by rigid metal conduit, intermediate metal conduit, electrical metallic tubing, Schedule 80 PVC conduit, Type RTRC marked with the suffix -XW, or other approved means. Where passing through a floor, the cable shall be enclosed in rigid metal conduit, intermediate metal conduit, electrical metallic tubing, Schedule 80 PVC conduit, Type RTRC marked with the suffix -XW, or other approved means extending at least 150 mm (6 in.) above the floor.

Type NMC cable installed in shallow chases or grooves in masonry, concrete, or adobe shall be protected in accordance with the requirements in 300.4(F) and covered with plaster, adobe, or similar finish.

300.4(B)(1) Nonmetallic-Sheathed Cable. In both exposed and concealed locations where nonmetallic-sheathed cables pass through either factory- or field-punched, cut, or drilled slots or holes in metal members, the cable shall be protected by listed bushings or listed grommets covering all metal edges that are securely fastened in the opening prior to installation of the cable.

NEC 300.15(C) says a box or conduit body shall not be required where cables enter or exit from conduit or tubing that is used to provide cable support or protection against physical damage. A fitting shall be provided on the end(s) of the conduit or tubing to protect the cable from abrasion. Answer is no, code references are NEC 334.15(B); 300.4(B)(1); & 300.15(C)

4. I have 24 unit multi-family building that was built in 1978 and thus the 1978 NEC as amended via ILHR 16, State Electrical Code of record would apply. In reviewing the main electrical equipment / boiler room it was noted that an interior electrical generator was installed at the time the building was constructed and appeared to be non –operational. Doesn't NEC 700.3(B) & (D) need to be addressed? Under section (B) the generator system shall be tested periodically on a schedule (normally monthly) to ensure the system is maintained in proper operating condition. Under section (D) a written record shall be kept of such tests and maintenance done on the system. As was discussed with the maintenance person a log needs to be made up of

the operations test and date and time frame of the test and copy available on the site. Normally we as electrical inspectors only get back into those building to answer an electrical complaint. Who is the responsible party to be sure items are corrected and followed up on? The local volunteer FD and their inspection reports never seem to address this concern. What can I do in the future to solve this problem? Electrical and fire safety is everyone's concern.

Answer: Owners are ultimately responsible for issues with their properties. Fire inspections and other departments that investigate property maintenance need to keep properties safe. The office of the building manager/owner should contain a file /copy of the testing needed per fire codes. Periodic inspections and maintenance must be performed for safety. Code references are SPS 314.01(13)(B)(1) & 361.20.

- 5. I have several electricians who have been using 14 AWG conductors from a switch to a light on a 20 amp circuit. Some cite tapping, others point to fixture wire sizing to allow them to do it. I have rejected this installation in both cases as it is my understanding that the weakest link in the circuit needs to be the OCPD (Over Current Protective Device). They often state that the light is only using half an amp etc. and they are. Are they correct?**

Answer: No. Tap rules for branch circuits would be found in NEC 210.19(A)(4). Branch-circuit conductors that supply loads other than those specified in 210.2 and other than cooking appliances as covered in 210.19(A)(3) shall have an ampacity sufficient for the loads served and shall not be smaller than 14 AWG.

Exception No. 1: Tap conductors shall have an ampacity sufficient for the load served. In addition, they shall have an ampacity of not less than 15 for circuits rated less than 40 amperes and not less than 20 for circuits rated at 40 or 50 amperes and only where these tap conductors supply any of the following loads:

*(a) Individual lampholders or luminaires with taps extending not longer than 18 in. beyond any portion of the lampholder or luminaire. **NOT APPLICABLE***

*(b) A luminaire having tap conductors as provided in 410.117. **NOT APPLICABLE***

*(c) Individual outlets, other than receptacle outlets with taps not over 18 in. long. **NOT APPLICABLE***

*(d) Infrared lamp industrial heating appliances. **NOT APPLICABLE***

*(e) Nonheating leads of deicing and snow-melting cables and mats. **NOT APPLICABLE***

Exception No. 2: Fixture wires and flexible cords shall be permitted to be smaller than 14 AWG as permitted by 240.5.

*Fixture wires shall be of a type listed in Table 402.3, and they shall comply with all requirements of that table. The fixture wires listed in Table 402.3 are all suitable for service at 600 volts, nominal, unless otherwise specified. THW, THWN, THHN are not listed as fixture wires. **NOT APPLICABLE***

The answer is no and the code reference is 210.19(A)(4) & Table 402.3.

- 6. A new condo we are working on has lighting fixtures that are antiques and were bought on the internet. There does not appear to be a listing mark on the fixtures. Are these lighting fixtures required to be listed, or can they just be rewired and installed afterwards?**

Answer: They would have to be listed, NEC 410.6 Requires luminaires to be listed. They may also be Field Evaluated. For information on getting them Field Evaluated you can go to www.ul.com/field or 877 854-3577, Prompt # 2. The answer is they must be listed or Field Evaluated. NEC 410.6

- 7. Does the metal faucet on a hydromassage bathtub need to be bonded the same as the circulating pump motor when the rest of tub has plastic water pipes?**

Answer: No. Article 680.74 p. 590 Article 680.74 requires all metal piping systems and all grounded metal parts in contact with the circulating water to be bonded. Since this is not in contact with the circulating water no bonding is required. The answer is no, the code section is NEC 680.74

- 8. Can NM cable be installed outdoors in conduit when its ambient is not exceeded? Does it comply with Section 334.10(A) when it is normally dry 95% of the time in most geographic locations?**

Answer: No

334.12 Uses Not Permitted.

(B) Types NM and NMS. Types NM and NMS cables shall not be used under the following conditions or in the following locations:

(4) In wet or damp locations

300.9 Raceways in Wet Locations Above grade. Where raceways are installed in wet locations above grade, the interior of these raceways shall be considered to be a wet location.

300.7 ARTICLE 300—WIRING METHODS

Insulated conductors and cables installed in raceways in wet locations above grade shall comply with 310.10(C). The answer is no, the code reference is NEC 334.12(B)(4) and 300.7

- 9. Is it permissible to run non-metallic cable through kitchen cabinets at peninsulas and islands where it is not subject to damage or does it always have to be sleeved?**

Answer: Yes, 334.15(A) & (B); 334.15(A) requires the cable to closely follow the finish or be on running boards and 334.15(B) explains how to protect the cable WHERE necessary. Determination needs to be made if the cable is subject to physical damage. Drawers may provide protection, shelves that store pots and pans may not. So if the

installation is deemed “not subject to physical damage”, it would be permitted to run the NM cable in the cabinet without protection. Code reference is NEC 334.15(A) & (B)

- 10. I ran a 2-inch PVC feeder underground. Where it came up out of the ground I used a 2-inch rigid metal elbow and then continued with 2-inch PVC up a wall to a junction box 10 feet above the floor. I just used the rigid metal elbow for physical protection where it came out of the slab. Am I required to ground this steel elbow?**

Answer: Yes, 250.86 Exception No. 3, it would not be required if it was below earth 18 inches or encased in 2 inches of concrete. The answer is yes, the code section is NEC 250.86 Exception No. 3.

- 11. The plans for a new office building show there is skeleton-tube neon installed inside. Is this neon required to be listed?**

Answer: The NEC in 600.3(A) does not require field installed skeleton tubing to be listed where installed in conformance with the NEC. However, if it is not installed in compliance with the Code or the AHJ cannot determine compliance with the Code because of lack of installation instructions etc. the AHJ may require it to be listed. NEC 600.3(A)

- 12. I have a large county estate home being built with a large center living room and fireplace that is open on the inside for two and a half stories; with a slab on grade construction in that part of the house. The owners have many small children and have left a large (24”) inch oak tree in the room and about (15’) feet high with a tree house and ladder to get up to it. This is all covered with the house’s roof above it. My question is, how do I treat the area around the cut off tree which has a railing around it except for access to the ladder, and what do I do with the tree house area since it has walls, a door and (3) windows installed?**

Answer: My first thought would be to check with the building inspector to see if this is even legal. If it is and since it is inside of the dwelling and considered to have fixed wall area, receptacles are required per NEC 210.52(A). NEC 210.52(A)(3) would allow floor receptacle no more than (18”) inches out from the tree base to meet the requirements for the railing. Now for the tree house, it is considered to be a room in the dwelling and would require receptacles inside of it per 210.52(A). Also per 210.70(A)(1) lighting outlets are needed as well. In keeping with this idea, 210.70(A)(2)(c) a switch would also be needed at the top and bottom of the ladder going up to the tree house room. I know this is a long Q&A but it is real and the building has been built in Wisconsin. The answer is treat like any other room. Code References NEC 210.52(A) & 210.70(A)

- 13. I have a large and very old campground in my area and the owner does not want to correct the problems or re-wire it. What code can I cite to get things corrected?**

Answer: ANS: SPS 316.003(3) & (4). SPS 316.003(3) allows existing installations which were installed properly and in compliance with the Code in effect at the time of installation to remain as they were originally installed, provided the existing installation is safe and does not present a hazard to people, the health of persons, or property. SPS 316.009 all electrical power and communication equipment and lines shall be constructed, installed, operated and maintained so as to minimize hazards to life and property. SPS 316.010 states all electrical installations and equipment shall be cleaned and inspected at intervals as experience has shown to be necessary. Any equipment or electrical installation known to be defective so as to endanger life or property shall be promptly repaired, permanently disconnected, or isolated until repairs can be made. Construction, repairs, additions, and changes to electrical equipment and conductors shall be made by qualified persons only. The answer is cite SPS 316.003(3) & (4); SPS 316.009; & SPS 316.010.

- 14. Per NEC 394.12 (5) pg. 247 Knob and Tube wiring. Believe it or not, many homes still have it in use in all or part of the home. I was called to look at an attic roof problem and noted that the local CAP group has come in and covered the old wiring up with insulation. The space is low and not easy to get into. When I called them they said they did their job and do not see it as a problem since it is done all the time and they will not do any more work on this house. Per SPS 316.003 (3) I cited it as a violation. Am I correct since it seems that it states it can stay per the old code it was installed under? But in the last part of that section it does say that it (MAY) be required to be brought into compliance and that is what I am hanging my hat on. Is there anything else I can use? The Town Board chairman, my boss, thinks that I am being too hard on his brother-in-law.**

Answer: The answer is concealed knob and tube wiring is still acceptable by the NEC. 394.12(5) prohibits insulation to be installed around knob & tube wiring. Code references are SPS 316.003 & 394.12(5).

- 15. At an old cabinet shop business, they have a pole mounted NEMA 1 type panelboard out in the weather and it is rusted badly. The owner says he will get it covered up and does not want to spend a lot of money to have a licensed electrician on the site to work on it. What does he need to do to make this right and can he do it, since he feels it is just a repair?**

Answer: Clearly the equipment wasn't installed correctly in the first place. This would be a violation of SPS 316.003 being that it is an existing installation. It is our opinion this NEMA 1 panel should be replaced with a panel that is rated for outdoors (3R rated). 110.28 Enclosure Types. Enclosures (other than surrounding fences or walls) of switchboards, panelboards, industrial control panels, motor control centers, meter

sockets, enclosed switches, transfer switches, power outlets, circuit breakers, adjustable-speed drive systems, pullout switches, portable power distribution equipment, termination boxes, general-purpose transformers, fire pump controllers, fire pump motors, and motor controllers, rated not over 600 volts nominal and intended for such locations, shall be marked with an enclosure-type number as shown in Table 110.28.

Table 110.28 shall be used for selecting these enclosures for use in specific locations other than hazardous (classified) locations. The enclosures are not intended to protect against conditions such as condensation, icing, corrosion, or contamination that may occur within the enclosure or enter via the conduit or unsealed openings. Answer is the enclosure needs to be replaced with one that is code compliant. Code references are SPS 316.003 and NEC 110.28 and the Table.

- 16. I have an old overhead service that is attached to the side of the building in a traveled back alley. The riser goes down to a round 60 ampere meter socket. In this bar they only have a 60 ampere range and main cutout box that does not seem to be overloaded, since the bar only has a few lights and the canned and bottled beer is in an old unit cooler with water and ice to keep it from getting too warm. The outside riser has faulted out and needs to be replaced. The computed load per NEC 220 is 50 amperes.**

Answer: SPS 316.010 & SPS 316.003 addresses the problem. SPS 316.003 States: Existing electrical installations shall conform to the electrical code that applied when the installations were installed. An existing electrical installation may be required to be brought into compliance with the current code's requirements by the department and within the time period determined by the department when a hazard to life, health or property exists or is created by the installation. SPS 316.010 States: All electrical installations and equipment shall be cleaned and inspected at intervals as experience has shown to be necessary. Any equipment or electrical installation known to be defective so as to endanger life or property shall be promptly repaired, permanently disconnected, or isolated until repairs can be made. Construction, repairs, additions, and changes to electrical equipment and conductors shall be made by qualified persons only. Now the question remains as to how far do I have to go for replacement; down to the meter socket or to the main or possible the whole service? This is a call the AHJ must make and the State electrical inspector can and will help you. As an electrician or inspector, you must determine if the equipment is maintained and safe. You also need to verify for safety's sake if the assured bonding and grounding are adequate. This decision usually is determined from a component by component evaluation. The answer is that each component needs to be evaluated and determined if it is safe. The code sections are SPS 316.003 & SPS 316.010.

- 17. I have a rural house and shop building that is fed through the house service panel, but the shop has a separate phone company line into it. Since this is a feeder, do I have to provide an intersystem bonding point on the shop?**

Answer: Article 250.94 p. 117 Yes, intersystem bonding is required at the service equipment, metering equipment enclosure or at the disconnecting means for any additional building or structure. Remember to check with your local utility to see if they allow this to be installed on the metering equipment enclosure. The answer is yes, the code section is NEC 250.94.

- 18. I seem to be hearing different interruptions on whether an electrical service transfer switch is to be SUSE rated or not depending on which side of the main it is located. Does it have to be adjacent to the main? Can it be inside or outside from the main and not be required to be within sight of each other? Does it matter if it is SUSE rated gear as to where it has to be placed or allowed to be placed?**

Answer: First we need to understand what a service is. According to NEC Article 100 Definitions, a service is the conductors and equipment for delivering electric energy from the serving utility to the wiring system of the premises served. Now we need to understand that service equipment according to NEC Article 100 is the necessary equipment, usually consisting of a circuit breaker(s) or switch(es) and fuse(s) and their accessories, connected to the load end of service conductors to a building or other structure, or an otherwise designated area, and intended to constitute the main control and cutoff of the supply. 230.66 requires that service equipment rated at 600 volts or less shall be marked to identify it as being suitable for use as service equipment. Therefore, any equipment installed ahead of the main disconnecting means must be rated suitable for use as service equipment. This equipment is required to be capable of handling the fault current that may be imposed on it. The transfer switch may be permitted to be installed inside or outside provided the SPS 316.230(3)(b) (the 8 foot rule) are met. 230.82 allows only the following equipment shall be permitted to be connected to the supply side of the service disconnecting means: (3) Meter disconnect switches nominally rated not in excess of 600 volts that have a short-circuit current rating equal to or greater than the available short-circuit current, provided all metal housings and service enclosures are grounded in accordance with Part VII and bonded in accordance with Part V of Article 250. A meter disconnect switch shall be capable of interrupting the load served. 230.91 requires the service overcurrent device shall be an integral part of the service disconnecting means or shall be located immediately adjacent thereto. If the transfer switch is on the load side of the main disconnecting means then the equipment does not need to be SUSE rated and the requirements for feeder, branch circuit or tap connections must be met. So follow these code items when installing transfer switches. Code sections NEC 100; 230.66; SPS 316.230(3)(b); 230.82(3); 230.91

- 19. I have a fire that damaged a house. It occurred in the first floor area and the main panel is down in the basement. The insurance company is saying that the whole service does not have to be replaced and the old panelboard can be reused. But due to the bubbled paint on the outside of the panel I am concerned.**

Answer: SPS 316.010 would require all electrical installations and equipment shall be cleaned and inspected at intervals as experience has shown to be necessary. Any equipment or electrical installation known to be defective so as to endanger life or property shall be promptly repaired, permanently disconnected, or isolated until repairs can be made. Construction, repairs, additions, and changes to electrical equipment and conductors shall be made by qualified persons only. I would direct the insurance company representative the NEMA Document titled "Evaluating Fire and Heat-Damaged Electrical Equipment" See below:

Electrical Distribution Equipment

Electrical distribution equipment usually involves switches and low-voltage protective components, such as molded-case circuit breakers and fuses within assemblies (enclosures, panelboards, and switchboards, for example). These assemblies can be connected to electrical distribution systems using various wiring methods

The protective components are critical to the safe operation of distribution circuits. Their ability to protect these circuits is adversely affected by exposure to fire or heat and the potential reduction in integrity of electrical equipment due to heat degradation of materials, residue from burning materials, or moisture. In molded-case circuit breakers and switches, such exposure can affect overall operation of the mechanism through contaminants, through the presence of foreign particles, and through loss of lubrication. The condition of the contacts can be affected, and the dielectric insulation capabilities of internal materials can be reduced. Further, some molded-case circuit breakers are equipped with electronic trip units, whose functioning can be impaired. Answer: Evaluate the equipment as noted. Code Reference is SPS 316.010

- 20. I have a SFD house that is going to have a 60 ampere to 100 ampere up-grade and it has a # 8 Copper armored cable for a grounding electrode conductor going outside to two ground rods and an old copper ground ring (#8 copper) around the house. The electrician says it is good enough and does not want to replace it.**

Answer: SPS 316.009 states all electrical power and communication equipment and lines shall be constructed, installed, operated and maintained so as to minimize hazards to life and property. All electrical installations shall conform to the National Electrical Code, incorporated by reference in this chapter, and the requirements specified in this chapter. Article 250.66 permits a #8 copper grounding electrode conductor to be used for a 100 ampere. 250.64(B) states a grounding electrode conductors smaller than 6 AWG shall be protected in RMC, IMC, PVC, RTRC, EMT, or cable armor. The cable armor would need to be suitable for the use. The clamps for this connection must be listed for use in direct contact with earth. NEC 250.52(A)(4) requires a minimum #2 copper. The answer is the #8 grounding electrode conductor in armored cable to the ground rod might be ok if the conditions are right (probably not). And the ground ring if it is being used must be changed to #2 copper. In Wisconsin the 2 ground rods would be sufficient if there were

no metal water piping serving the dwelling unit. Code reference: SPS 316.009; 250.66; 250.64(B); 250.52(A)(4)

- 21. The central vacuum system installer installed a suction outlet in a kitchen at an existing house. The vacuum outlet was adjacent to a kitchen wall receptacle. The circuit he tapped his five foot whip to was one of the 20 amp small appliance branch circuits. When he was told that he can't tap off of this circuit, he said that the 30 foot vacuum cleaner hose is also serving the kitchen, so this is OK....is this OK?**

Answer: No. 210.52(B)(1) & (2); (1) states the 2 or more small appliance circuits can only serve 210.52(A) receptacles, countertop receptacles as in (C), and a receptacle outlet for the refrigerator, and in (2) no other outlets are allowed except for clock or gas range/appliance. The answer is no and the code section is NEC 210.52(B)(1) & (2).

- 22. We are wiring a condominium that is basically a duplex. It has two water mains coming in from the street. The service wires to the panels are run under the garage slabs to opposite sides of the building. The inspector says we can't simply go from each panel to the unit's individual copper water main. He says we have to connect each water main to each other by running a #4 AWG copper wire between the two units. He also told me that I have to tie both sets of ground rods to the underground metal water pipe. This seems excessive as they come out of their respective panels and the grounding electrode conductors from these panels go to the water pipes. How do I have to do this?**

Answer: 250.24(A) (1) through (6) requires a grounding electrode conductor to each service. Even though you said "condo" this indicates a single building. We must assure that the service for the building and the building itself is protected from lightning and surges. If there are two metal water services (in contact with the earth for a minimum of 10 feet) entering the building, then each water service would need to be used as a grounding electrode. Each water service would need to have a grounding electrode conductor connected within 5 feet of where each water service enters the building. This grounding electrode conductor would need to be connected to the grounded service conductor at or ahead of the main disconnect or disconnects. This could be done at a common location or at each disconnecting means per NEC 250.64(D). The supplemental grounding electrode is still required for each service per 250.50 & 250.53(D)(2), which also requires all electrodes to be bonded together. Keep in mind a water grounding electrode is not permitted to supplement another water grounding electrode. The answer is the service and/or both units need to be grounded. More information would be needed to make an accurate assessment. The code references are NEC 250.24(A)(1) through (6); 250.50; 250.53(D)(2) & 250.64(D).

- 23. Recently a code inspector mentioned to us that building service entrance conductors need to be sized for 100% of the service entrance main circuit breaker rating. Is**

this correct, or does NEC 240.4 (B) still apply for service entrance conductors? In our particular situation we had an 800A MCB with 2~500 Kcmil conductors per phase. The inspector indicated that we could not use these conductors because the ampacity ratings listed in Table 310.15(B)(16) indicated the conductors were only good for 380 amps, 760 amps total. We were asked to up-size the conductors to 2~600 Kcmil per phase.

Answer: Service entrance conductors are covered in NEC 230 Part IV. 230.42(A) says the ampacity of the service-entrance conductors before the application of any adjustment or correction factors shall not be less than either 230.42(A)(1) or (A)(2). Loads shall be determined in accordance with Part III, IV, or V of Article 220, as applicable. Ampacity shall be determined from 310.15.

(1) The sum of the noncontinuous loads plus 125 percent of continuous loads

Exception: Grounded conductors that are not connected to an overcurrent device shall be permitted to be sized at 100 percent of the continuous and noncontinuous load.

(2) The sum of the noncontinuous load plus the continuous load if the service-entrance conductors terminate in an overcurrent device where both the overcurrent device and its assembly are listed for operation at 100 percent of their rating

230.90 Where Required. Each ungrounded service conductor shall have overload protection.

(A) Ungrounded Conductor. Such protection shall be provided by an overcurrent device in series with each ungrounded service conductor that has a rating or setting not higher than the allowable ampacity of the conductor. A set of fuses shall be considered all the fuses required to protect all the ungrounded conductors of a circuit. Exception No. 2: Fuses and circuit breakers with a rating or setting that complies with 240.4(B) and 240.6 shall be permitted. NEC 240.4(B) says the next higher standard overcurrent device rating (above the ampacity of the conductors being protected) shall be permitted to be used, provided all of the following conditions are met:

(1) The conductors being protected are not part of a branch circuit supplying more than one receptacle for cord-and-plug-connected portable loads.

(2) The ampacity of the conductors does not correspond with the standard ampere rating of a fuse or a circuit breaker without overload trip adjustments above its rating (but that shall be permitted to have other trip or rating adjustments).

(3) The next higher standard rating selected does not exceed

800 amperes. Answer: The service entrance conductors, if under 800 amperes are permitted to be protected by an overcurrent device that is equal to or the next size higher as permitted by NEC 240.6. Code references are NEC 230.42(A)(1) & (2); NEC 220; 230.90(A) Exception #2; 310.15(B)(16); 240.4(B); 240.6

24. When hooking up a 100 amp mobile home feeder, can I use a 200 amp breaker in the pedestal and use tap rules to the panel?

Answer: Maybe!!! Article 550 covers the installation requirement for feeders to mobile homes, specifically 550.33. NEC 550.33(A) & (B) does not prohibit this “tap” installation, NEC 240.21(B)(5) allows outside feeder taps of unlimited length provided you comply with the 4 conditions which are included with this allowance. These 4 conditions are: (1) conductors are protected from physical damage, (2) the conductors terminate in a single circuit breaker, (3) the overcurrent device is part of the disconnecting means, and (4) the conductors are outside of the building and terminate in the overcurrent device nearest point of entrance to the building.

SPS 316.110 requires us to install products per their listing and installation instructions. Therefore it would require that the lug in which these conductors terminate into the 200 ampere circuit breaker be listed or the size of conductors being used. The 200 amp breaker lugs may not be listed to terminate 100 amp conductors. Code sections are NEC 550.33(A) & (B); 240.21(B)(5) and SPS 316.110

- 25. A local electrician says he used a Square D panel in the garage with a 100 amp main breaker installed (because it's cheaper to buy them that way), and that it's okay if he protects the panel with a 60 amp breaker back at the main provided that all the wiring is correct. I say incorrect because a home owner buying this house is under the impression there is a 100 amp supply at the detached garage. I hang my hat on SPS 316.110. Who is correct?**

Answer: NEC 225 addresses outside branch circuits and feeders. NEC 225 Part II deals with the disconnecting means. 225.31 states there must be a disconnecting means. 225.32, as amended by SPS 316.225 states the disconnecting means must be installed outside or not more than 8 feet inside the garage. NEC 225.36 states the disconnect must be SUSE rated. 225.39 says the feeder or branch-circuit disconnecting means shall have a rating of NOT LESS than the calculated load to be supplied, determined in accordance with Part III or IV of Article 220 for feeders. The feeder starts in the house. I see no violation of the Code using a 60 ampere breaker in the house (which is sized for the load) feeding a 100 ampere main breaker in the garage (where the 100 amp breaker serves as the disconnecting means for the garage). It appears the code is met. There doesn't appear to be a manufacturer's problem with protecting a 100 ampere breaker panel with a 60 ampere breaker. Answer – no code violation. Code reference: NEC 225.31; 225.32; SPS 316.225; NEC225.36; NEC 225.39

- 26. Is it allowable to have a switched receptacle outlet (for a lighting outlet) for a stairway? Does installing a midpoint landing have any bearing on the issue?**

Answer: No and No. NEC 210.70(A)(2)(a) requires At least one wall switch-controlled lighting outlet shall be installed in hallways, stairways, attached garages, and detached garages with electric power. A lighting outlet is an outlet intended for the direct connection of a lampholder or luminaire. A switched receptacle would not meet this requirement. The code does not require a receptacle outlet on a typical stair landing.

Answer is no a receptacle outlet is not a lighting outlet and the landing has nothing to do with this issue. Code reference 210.70(A)(2)(a) and Article 100 Definitions for Lighting Outlet.

- 27. We are installing a transformer vault in a large apartment building. The vault will be venting into an areaway made of concrete with a large metal grate over the opening. The inspector says we can't do that. What is wrong with this installation?**

Answer: The answer is direct venting is required without using flues or ducts by SPS 316.450(2) unless the State of Wisconsin grants a variance for such an installation. Areaways are another form of a flue or duct if it is transmitting hazardous gases.

- 28. Can a meter base be closer than 3 ft. to a window? Our Utility says the meter base must be three feet from a window. I cannot find it in the code.**

Answer: It is not addressed in the NEC. NEC 230.9(A) requires service entrance conductors must be kept a minimum of 3 feet from the sides or bottom of a window that is designed to be opened. There is nothing in the NEC that addresses meters or meter enclosures. It appears the NESC (National Electrical Safety Code used by the utilities) and PSC 114 (which applies to Wisconsin utilities) have similar requirements for overhead service laterals, but nothing about meter socket enclosures. If the utility has a rule about meter placement it would be something you could ask for. Answer: there is no restriction in the NEC about the clearance of a meter socket to a window, check with the utility.

- 29. GFCI protection for personnel required for sump pumps and sewage ejector pumps located outdoors as part of an installation at a dwelling? Some inspectors say GFCI protection is not required because of possible nuisance tripping and the damage such an incident could pose. Section 210.8(A) requires GFCI protection for personnel for all 125-volt, single-phase, 15- and 20-ampere receptacles in location specified in (1) through (8). This includes (3) for Outdoors. Does the NEC require GFCI protection for receptacles (for cord-and-plug connected pumps) or for breakers serving sump pumps and sewage ejector pumps located Outdoors? If the answer is NO, what is the Code justification for the answer?**

Answer: SPS 316.300 addresses wiring of private sewage systems. (a) Wiring methods. All effluent pump circuit wiring shall comply with the approved wiring methods as specified in NEC 300 and all of the following requirements:

- 1. Effluent pumps shall be supplied by a separate branch circuit supplying no other loads.*
- 2. Alarm wiring may not be connected to the pump circuit.*

3. All aboveground cables and flexible cords shall be enclosed to protect against physical damage.

4. The neutral conductor may not be common to both alarm and pump circuits.

5. Where the wiring enclosure for the alarm and pump circuit is located outside the pump chamber, any openings into the pump chamber for circuit wiring shall be sealed or plugged to prevent the passage of gas or vapor into the wiring enclosure.

Note: This prohibits use of a multi-wire branch circuit to supply both the alarm and pump.

Note: See NEC 430.102 for location of disconnects.

(b) Ground-fault circuit protection. A single receptacle located at the pump chamber that has an alarm or pump connected to it does not require ground-fault circuit-interrupter protection. The answer is no, the code reference is SPS 316.300(1)(a) & (b).

30. Where can we find a code section that prohibits the attachment of a male plug on the end of a section of NM for a garbage disposal? I have a reference site that points to Table 400.4 which doesn't list NM. Or would it be Article 334 - "closely follow the building surface, "securing and supporting"?"

Answer: NEC 422.16(B) allows for plug connection only when connected to flexible cord. Also, SPS 316.110, plugs are only listed for use on flexible cord see Attachment Plugs, Fuseless (AXUT) on page 81 in the 2014 UL White Book. See the Guide Information for AXUT under the heading Terminals which states "Terminals of appliance couplers, appliance and flatiron plugs, attachment plugs, cord connectors and cable taps are intended for use with stranded copper conductors of the type used in flexible cord." Answer is NEC 422.16(B); SPS 316.110; UL White Book AXUT

31. A 400A service is made up of two 200A main breaker panelboards that are connected together by nipples. Can the service conductors pass through one of the cabinets to supply the other panelboard?

Answer: Maybe, without more information we can only speculate. Here are some thoughts. Per NEC 230.7 says conductors other than service conductors shall not be installed in the same service raceway or service cable. Since the two 200 ampere main breaker panelboards are service equipment the conductors in that enclosure is permitted, but the nipple connecting the two panelboards that the service entrance conductors go through cannot have other conductors installed within.

It is permitted to have service conductors supply each service equipment enclosure per 230.40 Exc. 2. The 200A main circuit breaker in each service panel would comply with 408.36. However, if the service conductors "pass through" the first panelboard bus with feed through lugs, the first panel would not comply with 430.30, the load of the first and second panel would exceed the rating of the first panel. If the service conductors enter and exit the panelboard via dual lugs on the main circuit breaker, proper spacing per

408.55 would be required for the dual conductors. In addition, 230.7 states conductors other than service conductors shall not be installed in the same service raceway or service cable. Since the two 200 ampere main breaker panelboards are service equipment the conductors in that enclosure is permitted, but the nipple connecting the two panelboards that the service entrance conductors go through cannot have other conductors installed within, except for ground conductors and bonding jumpers.

230.40 Number of Service-Entrance Conductor Sets.

Each service drop, set of overhead service conductors, set of underground service conductors, or service lateral shall supply only one set of service-entrance conductors. Exception No. 2: Where two to six service disconnecting means in separate enclosures are grouped at one location and supply separate loads from one service drop, set of overhead service conductors, set of underground service conductors, or service lateral, one set of service-entrance conductors shall be permitted to supply each or several such service equipment enclosures.

408.36 Overcurrent Protection. In addition to the requirement of 408.30, a panelboard shall be protected by an overcurrent protective device having a rating not greater than that of the panelboard. This overcurrent protective device shall be located within or at any point on the supply side of the panelboard.

408.30 General. All panelboards shall have a rating not less than the minimum feeder capacity required for the load calculated in accordance with Part III, IV, or V of Article 220, as applicable.

408.55 Wire-Bending Space Within an Enclosure Containing a Panelboard. The enclosure for a panelboard shall have the top and bottom wire-bending space sized in accordance with Table 312.6(B) for the largest conductor entering or leaving the enclosure. Side wire-bending space shall be in accordance with Table 312.6(A) for the largest conductor to be terminated in that space.

Answer is maybe, more information is needed.

- 32. Can I use 1/2-inch flexible metal conduit to fish in receptacle outlets in an existing building? I used 12-AWG THWN wire with fittings on the outside of the flex and I only put two wires in each run. Now I was told I have to pull in a ground wire. Is this right?**

Answer: Yes, you can use flexible metal conduit to fish a circuit in 348.10, 348.30(A) Exception No. 1. You can use it as the equipment grounding conductor in accordance with 250.118(5) if it is 6 feet or less and 20 amperes per 348.60. Likely the inspector was correct as it likely exceeds 6 feet and or 20 amperes. Answer is yes for fishing and probably for EGC. Code references are 348.10; 348.30(A) Exception No. 1; and 348.60.

- 33. Can I use Type NM cable to connect recessed fluorescent fixtures in a suspended lay-in ceiling in a retail store? Section 334.30(B)(2) seems to permit this. This is very confusing to many of us on the job.**

Answer: Maybe, 334.10 & SPS 316.334 & 334.30(B)(2); if the store is a type III, IV or V construction, [types of construction must be marked on the building's approved plans or approval letter.] SPS deletes the 334.12(A)(2) prohibition. Then NEC 334.30(B)(2) would need to be met where it states you need less than 4.5' from last point of support to the equipment. Without more information on the installation, the answer is maybe and the code references are NEC 334.10; SPS 316.334 and NEC 334.30(B)(2).

- 34. We are installing string lights in the entrance and lobby areas of a 14,000 seat auditorium. The inspector rejected the job saying the website says these are festoon lights. They are listed and the engineer says that if they are approved outdoors, they are ok for indoor use. Who is right?**

Answer: So far the inspector is right, but this is still a work in progress. The lights are listed in the manufacturer's website as festoon lighting. NEC 100 Definitions: Festoon Lighting. A string of outdoor lights that is suspended between two points. NEC 225.6(B) declares Overhead conductors for festoon lighting shall not be smaller than 12 AWG unless the conductors are supported by messenger wires. In all spans exceeding 40 ft., the conductors shall be supported by messenger wire. The messenger wire shall be supported by strain insulators. Conductors or messenger wires shall not be attached to any fire escape, downspout, or plumbing equipment. The statement is if it ok outdoors it must ok indoors. What about the USE cable without the dual rating? Cannot be used indoors. So far the manufacturer has not produced documentation that this product is approved for indoor use. It appears this time the inspector is correct. NEC 100; NEC 225.6(B); SPS 316.110.

- 35. If I have a raceway under a building, or encased in concrete on an outside wall beneath grade on an exterior wall, would I have to seal the raceway where it enters the building? If so, would I have to seal each end?**

Answer: Yes, 300.5(G) requires it to be done at one or both ends.

- 36. Can I install a receptacle for the basin in a bathroom near the floor as long as it is within 3' of the basin? The basin is a free-standing type and does not have a countertop associated with it.**

Answer: NEC 210.52(D) is the Code section where we find this answer. This section of the NEC was revised in the 2008 version to include language which requires the receptacle to be no more than 12" below the countertop surface. In this situation with no countertop, this measurement would be taken from the top rim of the sink, so depending on your definition of "near the floor", your installation may or may not meet the Code requirement of being within 12" of the countertop, we are thinking your receptacle will most likely be too low to meet this requirement!!! Code reference is NEC 210.52(D).

37. When changing a service from the house to the detached garage, how is the service on the detached garage to be grounded? How is the grounding handled at the house where this will now be a subpanel? The home has a copper water line supplying water to the home.

Answer: Article 250.24 (A) p. 104, 250.32(A)(B) p.109, 250.50 p. 111, 250.52 p. 111, 250.53 p. 112 & SPS 316.250. Article 250.24 (A) requires a grounding electrode conductor to be installed at detached garage. Article 250.24(A)(1) requires the connection for the grounding electrode to be made at any accessible point from the load side of the service drop or service lateral to and including the terminal or bus to which the grounded service conductor is connected at the service disconnecting means. Article 250.50 requires any of the electrodes present to be bonded together for a complete system. Where none of the grounding electrodes exist then one or more of the electrodes specified in Article 250.52(A)(4) through (A)(8) shall be installed. SPS 316.250 requires an additional electrode to be installed. For the sub panel at the house Article 250.32(A) requires buildings or structures supplied by feeders or branch circuits to have a grounding electrode or grounding electrode system installed according to Part III of Article 250. The grounding electrode conductor shall be connected according to 250.32 (B) or (C). 250.32(B)(1) requires the equipment grounding conductor to be run with the supply conductors and be connected to the building or structure disconnecting means and to the grounding electrodes. The equipment grounding conductor shall be used for grounding and bonding of equipment, structures or frames required to be grounded or bonded and shall be sized according to 250.122. Any installed grounded conductor shall not be connected to the equipment grounding conductor or to the grounding electrodes. Answer: Reverse what you do when you go from a house to an outbuilding. Code references are NEC 250.24; 250.50 and 250.32.

38. What are the working clearances requirements for a fire alarm control panel, does 110.26 requirements apply?

Answer: Yes, NEC 110.26 Access on working space shall be provided and maintained about all electrical equipment to permit ready and safe operation and maintenance of such equipment. Working space for equipment operating at 600 volts, nominal, or less to ground and likely to require examination, adjustment, servicing, or maintenance while energized shall comply with the dimensions of 110.26(A)(1), (A)(2), and (A)(3) or as required or permitted elsewhere in this Code. Answer is yes and 110.26 is very clear on this subject.

39. Do the identification requirements for branch circuits also apply to 120 volt control wiring circuits if they are in the same raceway?

Answer: No. This address's the branch circuit. 210.5 Identification for Branch Circuits. 210.5 (C) Identification of Ungrounded Conductors. Ungrounded conductors shall be identified in accordance with 210.5(C)(1), (2), and (3). (1) Application. 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.

(2) Means of Identification. The means of identification shall be permitted to be by separate color coding, marking tape, tagging, or other approved means.

(3) Posting of Identification Means. 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.

This addresses control wiring. 725.30 Class 1, Class 2, and Class 3 Circuit Identification. Class 1, Class 2, and Class 3 circuits shall be identified at terminal and junction locations in a manner that prevents unintentional interference with other circuits during testing and servicing. Answer is no, code references are 210.5; 725.30

40. Would a cord connected projector be allowed in an attic of a church above the drywall ceiling? Attic is accessible from a walkway.

Answer: Yes, the installation would most likely be allowed. NEC 400.7 is the section for uses permitted and 400.8 is the use not permitted for flexible cords. 400.7(A)(6) allows cords for utilization equipment for frequent interchange, 400.7(A)(8) allows cords where appliances are installed and the cord is for the ready removal for maintenance and repair. NEC 400.8 use not permitted does not prohibit this specific installation either. If the cord was installed thru the drywall ceiling, then 400.8(2) would prohibit this, as well as 400.8(5) would prohibit the cord from being installed in a concealed location. This specific installation has the cord installed within the accessible attic, therefore it appears to be visible, accessible and not concealed and therefore can be inspected periodically for possible damage. Answer is yes, code reference is 400.7 & 400.8

41. I have a LED trim with the LED driver which is listed to either fit into a recessed can light housing or is acceptable to be installed into a 4" box. If I install this trim and driver into a 4" box in a clothes closet, will this be considered as a recessed luminaire or a surface mounted luminaries for clearances as described in 410.16(C)?

Answer: I would say if you are installing it mounted to a 4 in. box, then it is surface mounted and you have to follow the NEC 410.16(C)(1) and use the 12 in. requirement. It would be up to the AHJ. I believe the Code anticipated a surface mounted luminaire to have a larger profile that protrudes from the ceiling more, perhaps more likely to be subjected to mechanical abuse while placing a box up on a shelf in the closet. In this case the profile is the same recessed or surface mounted and has a lens so it seems like it could be considered the same as recessed. NEC 410.16(C)(1). Answer: surface mounted. Code Reference: 410.16(C).

42. I am wiring a home in which a cabinet has been installed in a bathroom, the cabinet has been prewired with a receptacle inside one of the pull out drawers. Does this receptacle count for the receptacle required by the NEC for the bathroom sink?

Answer: No, NEC 210.52(D) requires 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. The receptacle outlet shall be located on a wall or partition that is adjacent to the basin or basin countertop, located on the countertop, or installed on the side or face of the basin cabinet not more than 300 mm (12 in.) below the countertop. Receptacle outlet assemblies listed for the application shall be permitted to be installed in the countertop. NEC 400.8 states unless specifically permitted in 400.7, flexible cords and cables shall not be used for the following: (1) As a substitute for the fixed wiring of a structure.
Answer: No, code references are 210.52(D) and 400.8(1). We would also like to see the listing of the cabinet that would allow such an installation.

43. I am installing a new 600 amp 120/208 volt overhead electrical service, the service equipment consists of 1 600 amp tap box in the center, with a 400 ampere fused service disconnect to the left and a 400 ampere 2 position meter stack cabinet to the right of the tap box. All of the equipment is connected together with bus bars. Am I allowed to install the grounding electrode conductors into the utility tap box which will be sealed? The only grounding electrode present at the building is copper water pipe located on the opposite end of the building. Am I required to install 1 or more grounding electrode conductors to the new electrical service, and where will these need to be terminated?

Answer: NEC 250.24(A)(1) states the grounding electrode conductor connection shall be made at any accessible point from the load end of the service drop or service lateral to and including the terminal or bus to which the grounded service conductor is connected at the service disconnecting means. This permits the connection to any portion of the service equipment buss if the utility will not allow the connection in the sealed tap box. 250.53(D)(2) requires a supplement grounding electrode if water piping per NEC 250.52(A)(1) is the only electrode available. SPS 316.250(2) requires two ground rods to be used to supplement the water grounding electrode. The supplemental grounding electrode is permitted by NEC 250.52(D)(2) to be connected to any of the following locations:

- (1) Grounding electrode conductor*
- (2) Grounded service-entrance conductor*
- (3) Nonflexible grounded service raceway*
- (4) Any grounded service enclosure*

Code references are NEC 250.24(A)(1); 250.53(D)(2); SPS 316.250(2)

44. I have an existing building where I am upgrading the electrical service. The building is masonry and wood frame walls. The roof system is steel bar joists which are supported by steel beams which are then supported by the concrete footings. Is it required to bond to the steel bar joists? The basement ceiling is spancrete, which is supported with 2 steel I beams. Would these 2 steel beams in the basement be required to be bonded to the electrical service?

Answer: The steel bar joists and the 2 steel beams in the basement do not appear to meet the requirements of being a grounding electrode as described in NEC 250.52(A)(2). Remember that using NEC 250.52(A)(2) states: the metal frame of building where the steel member is in 10 feet

of direct contact with earth, or the hold down bolts are connected to the concrete encased electrode are what constitutes an electrode. NEC 250.104(C) indicates that bonding exposed structural metal that is interconnected to form a metal building frame and is not intentionally grounded or bonded and is likely to become energized shall be bonded to the service equipment enclosure; the grounded conductor at the service; the disconnecting means for buildings or structures supplied by a feeder or branch circuit; the grounding electrode conductor, if of sufficient size; or to one or more grounding electrodes used. The steel described in the question does not create a metal frame of a building, they are structural components. So unless the steel component is likely to become energized, the answer is no. They do not need to be bonded. Code references: NEC 250.52(A)(2) & NEC 250.104(C).

- 45. I have installed approximately 50 - 4' fluorescent light fixtures in a retail store and have direct wired the factory supplied cord into a 4" square junction box. The Inspector has required me to install an attachment plug on to the end of cord, he is citing NEC 410.62(C)(2).**

Answer: What is the question, sounds as if the inspector is correct, but the code section should be NEC 410.62(C)(1)

- 46. I have installed a main distribution panel (MDP) which supplies many feeders and branch circuits. I have installed a metal wireway above the MDP and have used 4 PVC conduits, 20" in length, to connect the MDP to the wireway. Can I install only 1 equipment grounding conductor thru only 1 of the PVC conduits in order to ground the metal wireway? The conduits exiting the wireway to supply the loads are all metal conduits, IMC or EMT.**

Answer: NO, 300.3(A) through (C) applies. NEC 300.3(A) requires all circuit conductors, the grounded conductor and the equipment grounding conductor to be contained in the same raceway. However, in this case it seems the PVC nipples containing several circuits could be bypassed, but the code does not address this. You could use one EGC in each nipple sized to the largest overcurrent device protecting the enclosed circuits as required 250.122(C). For example if you had 4 circuits in one conduit and the largest was protected by a 200 amp CB then Table 250.122 would require a 6 AWG copper or 4 AWG aluminum. The answer is no, code reference is 300.3(A) through (C)

- 47. Can NM cable be used outside for temporary wiring? How about if I put it in a PVC sleeve?**

Answer: No. Look at 334.12 (B)(4) Uses Not Permitted. (B) Types NM and NMS. Types NM and NMS cables shall not be used under the following conditions or in the following locations: (4) In wet or damp locations. NEC 300.9 says where raceways are installed in wet locations abovegrade, the interior of these raceways shall be considered to be a wet

location. Insulated conductors and cables installed in raceways in wet locations abovegrade shall comply with 310.10(C).

310.10 (C) Wet Locations. Insulated conductors and cables used in wet locations shall comply with one of the following:

(1) Be moisture-impervious metal-sheathed

(2) Be types MTW, RHW, RHW-2, TW, THW, THW-2, THHW, THWN, THWN-2, XHHW, XHHW-2, ZW

(3) Be of a type listed for use in wet locations

Answer is no. Code Reference 334.12(B)(4)

48. I have read about the photovoltaic systems now requiring AFCI protection, how do these devices work and where are they required to be installed within the PV system, on the roof at the panels or in the inverter. If installed within the inverter, how does the AFCI detect a fault ahead of the device?

Answer: 690.11 Arc-Fault Circuit Protection (Direct Current).

Photovoltaic systems with dc source circuits, dc output circuits, or both, operating at a PV system maximum system voltage of 80 volts or greater, shall be protected by a listed (dc) arc-fault circuit interrupter, PV type, or other system components listed to provide equivalent protection. The PV arc-fault protection means shall comply with the following requirements:

(1) The system shall detect and interrupt arcing faults resulting from a failure in the intended continuity of a conductor, connection, module, or other system component in the dc PV source and dc PV output circuits.

(2) The system shall require that the disabled or disconnected equipment be manually restarted.

(3) The system shall have an annunciator that provides a visual indication that the circuit interrupter has operated. This indication shall not reset automatically.

Answer: DC PV arc fault protection is designed to detect and interrupt unintended arcs, in other words, the function must be able to differentiate intended arcs such as those which may be created by switching devices and unintended arcs such as those that may be created due to a break in a conductor. The Code does not specify where the function is to be located. It may be located somewhere in the system or in the inverter.

Functionality currently on the market is located in inverters. If located within an inverter, the function is only able to interrupt series arcs, i.e. those in series with the inverter, not parallel arcs, i.e. those in parallel with the inverter. The function looks for characteristics in the arc signature that are unique to unintended arcing. There is no code reference for this answer.

49. Can Municipalities enact stricter licensing requirements than what the State has adopted, in other words by local Ordinance, can the Municipalities require nonprofits or Manufacturing facilities to obtain permits and have licensed electricians install all wiring? After reading the new Law and exemptions, it appears

some groups don't have to comply with the new licensing law – what's up with that!!!

Answer: The municipalities may only require state licensed persons/companies obtain the permits for the electrical work. Municipalities may license some but not all of those categories that are exempt by S.S. 101.861(4). State of Wisconsin Law that is referenced is S.S.101.861(1) & (2).

50. It appears the grounding electrodes are now allowed to be installed in many cases without being continuous, they can now be spliced. When and where can these grounding electrode conductors be spliced? What is the rationale behind the changes over the last few Code cycles for this change?

Answer NEC 250.64(C) says grounding electrode conductor(s) shall be installed in one continuous length without a splice or joint. If necessary, splices or connections shall be made as permitted in (1) through (4):

(1) Splicing of the wire-type grounding electrode conductor shall be permitted only by irreversible compression-type connectors listed as grounding and bonding equipment or by the exothermic welding process.

(2) Sections of busbars shall be permitted to be connected together to form a grounding electrode conductor.

(3) Bolted, riveted, or welded connections of structural metal frames of buildings or structures.

(4) Threaded, welded, brazed, soldered or bolted-flange connections of metal water piping.

The changes to splicing grounding electrode conductors was prompted by improved equipment and methods that maintain the integrity of the ground/fault path required to keep electrical system safe and intact. Code reference is NEC 250.64(C)

51. Are receptacles installed for a countertop in a dining room required to be GFCI protected? The counters are not within the kitchen, and 1 counter is actually used as a desk area.

Answer: No. 210.8(6) it only requires GFCI protection in the kitchen to serve countertop surfaces. There is no requirement for GFCI protection for receptacles in a dining room unless they are within 6' of a sink that is not in the kitchen. The answer is no and the code reference is NEC 210.8(6).

52. Are remote controlled light switched allowed in dwelling units, bedrooms and other habitable rooms? The switches being installed are battery operated with a control device mounted up within the ceiling light box, therefore the battery operated switch could easily be removed.

Answer is no unless the switch has some sort of permanency. 210.70 says lighting outlets shall be installed where specified in 210.70(A), (B), and (C). (A) Dwelling Units. In dwelling units, lighting outlets shall be installed in accordance with 210.70(A)(1), (A)(2), and (A)(3).

(1) Habitable Rooms. At least one wall switch-controlled lighting outlet shall be installed in every habitable room and bathroom.

Exception No. 1: In other than kitchens and bathrooms, one or more receptacles controlled by a wall switch shall be permitted in lieu of lighting outlets.

Exception No. 2: Lighting outlets shall be permitted to be controlled by occupancy sensors that are (1) in addition to wall switches or (2) located at a customary wall switch location and equipped with a manual override that will allow the sensor to function as a wall switch. There are battery operated switches that are fastened to the wall and are not easily movable like the remote control type. These would be permitted if located at a customary wall switch location. So the answer is no unless there is some sort of permanency. The code reference is 210.70(A)(1)

- 53. I have seen metal halide fixtures at some gas stations changed out to LED fixtures. Is it allowed to leave the 30 amp circuit breaker which supplied the previous metal halide fixtures with mogul base (heavy duty lampholders) installed for the new LED retrofit luminaires? It would appear 210.23(B) would not allow this 30 ampere circuit to remain in place for the retrofitted LED luminaires.**

Answer: No. NEC 210.23(B) doesn't permit a 30A branch circuit for that application.

- 54. I have a local food vendor with a portable trailer which has been wired by the owner of the food business and they use a portable generator to supply power for the 120 volt receptacles and lights. The generator is set away from the trailer and a flexible cord is used to connect power to the trailer. Is there any special grounding requirements to properly ground the metal frame and metal siding of this trailer and are ground rods required whenever this trailer is used at different events?**

Answer: No and no. It appears this is a NEC 552 Park Trailer. We would question the owner wiring this, but that is not the issue in question. NEC 250.34 deals with portable and vehicle-mounted generators. (A) Portable Generators. The frame of a portable generator shall not be required to be connected to a grounding electrode as defined in 250.52 for a system supplied by the generator under the following conditions:

(1) The generator supplies only equipment mounted on the generator, cord-and-plug-connected equipment through receptacles mounted on the generator, or both, and

(2) The normally non-current-carrying metal parts of equipment and the equipment grounding conductor terminals of the receptacles are connected to the generator frame. There are no special requirements for grounding this type of setup. We would verify the

type of equipment being used is suitable for the use and installed properly. The answer to the question is no and no and the code reference would be NEC 250.34(A)(1).

- 55. I have been told in the past that the fire alarm control panel (FACP) power supply is considered by the State of Wisconsin as an “emergency circuit”. Therefore this power supply to the FACP (with back up battery) must be installed per NEC 700.10(B) and be wired in a wiring methods prescribed in SPS 316.700(1)(a). Is this true? I would like to install nonmetallic sheathed cable to supply power to the FACP, but the local AHJ insists this must be in a raceway or MC cable.**

Answer: The local inspector is correct for the code articles that are stated. NEC 700.10(B) & SPS 316.700(1)(a).

- 56. We plan on using Milbank recreation vehicle pedestals for the expansion to the park. Each pedestal has a 50, 30, and 20 amperes breaker mounted on a feed-thru buss. Is each pedestal considered a “separate structure” and does each require connection to ground rods?**

Answer: No, Article 551.76 p.501 Exposed non-current-carrying metal parts of fixed equipment, metal boxes, cabinets, and fittings that are not electrically connected to grounded equipment shall be grounded by an equipment grounding conductor run from the service equipment or from the transformer of a secondary distribution system. The equipment grounding conductors must be sized in accordance with 250.122 and shall be permitted to be spliced by a listed means. The arrangement of the grounding connections must be made where the removal or disconnection of any device or receptacle does not interrupt the grounding continuity. Answer is no, code reference is 551.76

- 57. I plan to use 2 AWG aluminum SER cable for the 100-ampere feeders to each apartment in a multi-family dwelling? The length of the home run varies but is under 100-feet. The last 4-foot of the run is through an insulated wall cavity. If the voltage is 120/240, single phase, can I still protect the feeders at 100-amperes? If the voltage is 120/208, single phase, can I protect the feeders at 90-amperes by using the exception to 310.15(A)(2)?**

Answer: Yes NEC 310.15(A)(2) states: Where more than one ampacity applies for a given circuit length, the lowest value shall be used. The exception says: Where two different ampacities apply to adjacent portions of a circuit, the higher ampacity shall be permitted to be used beyond the point of transition, a distance equal to 10 ft. or 10 percent of the circuit length figured at the higher ampacity, whichever is less. Since the amount of the cable that is to be insulated meets this requirement, the higher ampacity is permitted. NEC 310.15(B)(7) permits 100 amperes to protect #2 SE aluminum conductors installed

in a 120/240 volt 3-wire feeder for a dwelling unit and NEC 310.15(B)(16) permits #2 aluminum SE cable to be protected at 90 amperes on a 120/208 volt system. So the answer is yes, and the code references are NEC 310.15(A)(2); 310.15(B)(7); and 310.15(B)(16).

58. The new Orion F-bay fixtures I plan to use for warehouse lighting have a “platform” connection. The manufactured “cord-whips” come with a 3- or 5-pin connector. The connector plugs into a factory mounted socket on the back of the ballast compartment. The other end of the cord is intended to connect to the outlet box with suitable strain relief and run into the outlet box. If I mount the boxes directly above the fixture, would this connection meet 410.62(C)(1)?

Answer: Yes, provided all the requirements of NEC 410.62(C)(1) which are: A luminaire or a listed assembly shall be permitted to be cord connected if the following conditions apply:

(1) The luminaire is located directly below the outlet or busway.

(2) The flexible cord meets all the following:

a. Is visible for its entire length outside the luminaire

b. Is not subject to strain or physical damage

c. Is terminated in a grounding-type attachment plug cap or busway plug, or is a part of a listed assembly incorporating a manufactured wiring system connector in accordance with 604.6(C), or has a luminaire assembly with a strain relief and canopy having a maximum 152 mm (6 in.) long section of raceway for attachment to an outlet box above a suspended ceiling. The answer is yes and the code reference is NEC 410.62(C)(1)

59. The new single family home I just inspected has a NFPA 13D sprinkler system. The sprinklers are supplied with water through a couple of water tanks in the basement and a pump package. The pump package is factory wired enclosure that contains the pump, controller, flow and pressure switch and alarm module. Does this package need to meet Article 695? What is the correct listing for the pump package? The manufacturer’s instructions indicated that it only needs to be connected to an individual branch circuit.

Answer: Such installations must be approved by the State.

60. I need to relocate an emergency feeder due to expansion of a large assembly occupancy. The feeder was not required to be fire-rated at the original time of construction. Does the relocated feeder have to be a FHIT rated system or are we grandfathered in?

Answer: Assembly occupancies are covered in Article 518. 518.3(C) states the emergency system is covered in Article 700. If this is covered by 700.10(D) exceeds 1000 persons or is over 75 feet in height, then feeder circuit must meet one of the requirements in 700.10(D)(1) 1 through 5.

(1) Be installed in spaces or areas that are fully protected by an approved automatic fire suppression system

(2) Be a listed electrical circuit protective system with a minimum 2-hour fire rating
Informational Note: UL guide information for electrical circuit protective systems (FHIT) contains information on proper installation requirements to maintain the fire rating.

(3) Be protected by a listed thermal barrier system for electrical system components with a minimum 2-hour fire rating

(4) Be protected by a listed fire-rated assembly that has a minimum fire rating of 2 hours and contains only emergency wiring circuits.

(5) Be encased in a minimum of 50 mm (2 in.) of concrete
Item 2 would be the UL cat. FHIT system.

As for this issue, no it's not grandfathered. This is a new installation and must meet current codes. The answer is no. Code references are 518.3(C) and 700.10(D)(1)

61. The lift pumps in the basement of an office building are located in sealed pits. The rigid conduit is specified to connect the sealed top of the pit to the controller cabinet. The power and control cords pass through about 8-feet of the rigid conduit to directly connect to the controller. Are cords permitted to run through conduit? How do I provide a seal or do I even need one?

Answer: Yes, Yes. 400.8(6), 501.140(A)(3) & (B), 505.17 allows conduit to be used to protect and sleeve the cord for a pump like this. If the pit is considered a hazardous location, then a seal off in compliance with 501.15 would need to be used. If the pit is not a hazardous location, then a conduit seal that would prevent liquid or moisture from transferring out of the pit would be needed. This could be accomplished using duct seal. Check with the AHJ for a clarification. Code references 400.8(B); 501.140(A)(3) & (B)

62. A refrigerated warehouse uses ammonia as the refrigerant. I have to install gas detection and purge ventilation in the compressor room. Can I connect the purge ventilation to the emergency generator? Do I need a separate transfer switch and distribution system?

Answer: NEC 700.2 defines emergency systems as those systems legally required and classed as emergency by municipal, state, federal, or other codes, or by any governmental agency having jurisdiction. These systems are intended to automatically

supply illumination, power, or both, to designated areas and equipment in the event of failure of the normal supply or in the event of accident to elements of a system intended to supply, distribute, and control power and illumination essential for safety to human life. Ventilation to purge ammonia from a compressor room would not fall into this category as the room is required to have multiple access locations. Though the ammonia could be dangerous, it would be contained within a confined space and in a refrigerated system. The code does not recognize this as a system that would be permitted to be connected to an emergency generator. The answer is no, the code reference is NEC 700.2 and IBC 2700.

63. I would like to use PVC conduit to directional bore some new feeders under a concrete yard. The conduit comes on a reel and is softer than conventional PVC. Do I need special fittings to connect it to the enclosures on each end? Can I use it above ground or do I need to transition to conventional PVC on each end?

Answer: Let us assume this question is referring to the HDPE type conduit which is covered by NEC Article 353, as the question does not specify the exact type of conduit being used. NEC 353.48 requires the joints between lengths of conduits and where the HDPE conduit is terminated at boxes, shall be made by an approved method. The informational note indicates an approved method to connect HDPE together can be heat fusion, electrofusion or mechanical means. UL White book category "EZX" covers HDPE, and indicates approved methods to join HDPE conduits together are by using threaded couplings, drive on couplings, or a butt fusing process. UL 651A is the standard which covers this product. Typical PVC glue are not acceptable for HDPE conduit, there is an epoxy type glue which must be used in order to properly join these together. HDPE and PVC conduit are typically not of the same O.D. dimension, therefore transitioning from HDPE to schedule 40 or 80 PVC must be accomplished with fittings provided by the HDPE Manufacturers. NEC 353.12 prohibits HDPE from being used where exposed or cannot be installed within a building, therefore it must be transitioned to an approved raceway before emerging from the earth or entering a building. Answer is yes special fittings are required and yes a transition to conventional PVC is required. Code references are NEC 353.48 and 353.12.

64. The plumber placed the sump pump directly beneath my panel. Can I access the panel by standing on the lid? It seems pretty strong.

Answer: Article 110.26(A) and Table 110.26 p.38 Depth of the working space is determined by the conditions listed in Table 110.26(A)(1) and in no case should be less than 3 ft. in front of the panel. 110.26(2) requires the width of the working space in front of the panel to be the width of the electrical equipment or 30 inches whichever is greater and the equipment door or hinged panels shall permit a 90 degree opening. 110.26(A)(3)

requires a clear height from grade, floor, or platform to a height of 6 ½ feet or the height of the equipment, whichever is greater. Equipment associated with the electrical installation located above or below the electrical equipment shall be permitted to extend not more than 6 inches beyond the front of the equipment. This answer would be an AHJ call as to whether or not the cover provides protection for the person standing on it, as well as if there is a tripping hazard associated with the installation. NEC 110.26 are the code references, but this truly is a field decision depending on the material the cover is constructed of.

- 65. I need to supply a building built on piers. The meter cabinet is on the outside. I plan to run conduit under the floor deck to the electrical room in the center of the building. Do I need Service Equipment at the meter location? The architect plans to enclose the piers with permanently mounted panels with stucco like finish.**

Answer: Yes. The piers and stucco-like panels are no different than the foundation walls of a building. The same hazards exist for these service entrance conductors that have entered the foundation of the building. Damage to these conductors could pose a fire hazard. Once the service entrance conductors pass the piers they are within the building and must follow the rules in NEC 230 and SPS 230. If they are encased in 2 inches of concrete, they would not be within the building. The answer is yes, code references would be SPS 316.100(2) for the definition of the building.

- 66. A mini-split system has one compressor and two “heads”. One head supplies conditioned air for an elevator equipment room. The other head supplies an adjacent office. Is this arrangement permitted by the Code?**

Answer: No. Wisconsin IBC code SPS 364.3006.2 requires heating and cooling equipment in elevator equipment rooms to be totally independent of other systems. The answer is no. Code reference is SPS 364.3006.2.

- 67. I have a bathroom that has laundry equipment in it. I know the receptacles in this room need GFCI protection. Would AFCI protection be required because this room is also part laundry room?**

Answer: No, NEC 210.12 defines the locations that require AFCI protection. Bathrooms are not on this list. Therefore AFCI protection is not required. If the laundry was in its own room or part of a mud room, then AFCI would be required. The answer is no and the code reference is NEC 210.12.

- 68. 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: Securing and supporting of raceways, cable assemblies, boxes etc. is covered by NEC 300.11(A). As long as the cable is installed as permitted in 300.11(A) with independent support wires or as permitted in the grid ceilings installation instructions as indicated in the exceptions to NEC 300.11(A)(1) & (2), you should be OK. Answer: Follow manufacturer's instructions. Code Reference NEC 300.11(A).

69. Our county fairgrounds is proposing sites for park trailers for the annual horse show. Do you see any reason we can't feed 4 sites from one pedestal? Assuming the pedestal has (4) 30A and (4) 20A GFI receptacles on it. I don't see any kind of spacing requirement in the code.

Answer: Park trailers are found in NEC 552, however the requirements of 551 Part VI address where park trailers and RV's are parked for temporary connections. NEC 551.71 states 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). NEC 551.77 indicates where provided on back-in sites, the recreational vehicle site electrical supply equipment shall be located on the left (road) side of the parked vehicle, on a line that is 5 ft. to 7 ft. from the left edge (driver's side of the parked RV) of the stand and shall be located at any point on this line from the rear of the stand to 15 ft. forward of the rear of the stand. For pull-through sites, the electrical supply equipment shall be permitted to be located at any point along the line that is 5 ft. to 7 ft. from the left edge (driver's side of the parked RV) from 16 ft. forward of the rear of the stand to the center point between the two roads that gives access to and egress from the pull-through sites. The left edge (driver's side of the parked RV) of the stand shall be marked. The answer is no. The intent is to reduce the possibility of damage to the cables from site to site. NEC 551.71 & 551.77

70. I installed track lighting in a store. The inspector says we do not comply with the lighting energy code. We installed all LED heads on the track. It doesn't draw much current, what's the problem?

Answer: The problem is we must also follow the building code. Wisconsin has adopted the International Energy Conservation Code. WI IECC code # SPS 363.0505(2) states: Substitute the following for the requirements in IECC section 505.5.1.4: The wattage of line-voltage lighting track and plug-in busway which allows the addition or relocation of

luminaires without altering the wiring of the system shall be the volt-ampere rating of the branch circuit feeding the luminaires or an integral current limiter controlling the luminaires, or the higher of the maximum relamping rated wattage of all of the luminaires included in the system, listed on a permanently factory installed label, or 30 W/linear foot. The exception allows a method of reducing the allowable load on the track by the use of current limiters. This keeps the track from having more heads installed than meets the Energy Conservation Code. So the answer is limit the length of track or use current limiters. Code Reference is WI IECC #SPS 363.0505(2)

71. Is a receptacle needed at all windows in a commercial building?

Answer: No, NEC 210.62 & Article 100 will assist us in answering this question. NEC 210.62 requires receptacles be installed for show windows, other windows in commercial buildings would not require receptacles. NEC 210.62 on page 58 of the 2011 NEC requires at least 1 receptacle outlet be installed within 18" of the top of the show window for each 12 linear feet or major fraction of 12', measured horizontally at the windows maximum width. The question which arises many times is which windows are considered "show windows", the definition is located in Article 100 on page 32. A show window is defined as "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". In most commercial retail type occupancies where a window, can or is used for marketing their products, then receptacles are required in these window, this many times becomes a local AHJ call on which windows are required to have these receptacles installed. So the answer is no and the code reference is NEC 210.62.

72. I found an LED conversion kit for a recessed incandescent can I want to use in a closet. Are these things legal? What are the clearances for this can in a closet?

Answer: Yes. UL White Book "IFAR" & 410.16(C)(2) States clearance would need to be 6" from the 'closet storage space for a completely enclosed light source. 410.16(C)(3) may allow LED to be in the space if identified for that use. Classified retrofit products are available but need to be checked for compliance to that particular luminaire. The answer is yes and the code reference is NEC 410.16(C)(2) and White Book IFAR

73. 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: Not enough information. Is it a dwelling unit? What is the connected load? Are there zoning restrictions? What is the layout? There are way too many variables to make an accurate assessment. No Answer, No Code Reference

74. My foreman informed me you were looking into whether or not we will need to rewire the current X-ray machines at Dental Health. After a few weeks of not being able to find this manual or instructions online; can we run a ground from the X-Ray to the metal j-box that sits behind the unit? The dental equipment supplier has stated this model was discontinued 15-20yrs ago so we will not be able to find any info.

Answer: Article 517.78(C) p. 456 Article 517.13 (B) p. 443 Article 517.78 (C) requires all non-current carrying metal parts of x-ray equipment to be connected to an equipment grounding conductor in a manner specified in Part V of Article 250 as modified by 517.13(A) and (B). Article 517(B)(1)(c) requires an insulated grounding conductor to be installed with the branch circuit conductors in the wiring methods provided in 517.13(A) for all non-current-carrying conductive surfaces of fixed electrical equipment likely to become energized that are subject to personal contact, operating at over 100 volts. This equipment requires the equipment grounding conductor and the approved grounding method for the wiring method used to establish the grounding paths. The answer is a metal path from the wiring method to the equipment as well as the equipment grounding conductor must connect to the equipment. Code reference is NEC 517.68(C); 517.13 (A) & (B);

75. The NEC defines a Panelboard, but no definition for Load Center. Can you explain the differences with this equipment?

Answer: A load center is a panelboard. It is tested in accordance with UL 67, Category Code QEUY, the same as a panelboard.

Reference: Manufacturer Information

Some of the functional differences may include:

Load centers are typically smaller in width & height

Load centers are typically not available above 240V

Panelboards are typically factory assembled to custom specifications. Load centers are typically assembled by the installer.

Panelboards are typically offer enclosure types other than NEMA 1 or 3R.

Panelboards typically have no exposed screws and standard recessed handle/lock.

Load centers typically accept only plug-in circuit breakers.

Panelboards are generally considered to be suitable for commercial, institutional and industrial applications, the load center is typically targeted for residential and light commercial applications.

There is no code section to reference to. Check UL 67 & Category Code QEUY

76. When doing a residential service most guys I know bury the grounding electrode conductor, extending outside the home to a ground rod, about the depth of a

standard shovel spade head. Nobody can find a reference in Art.250 that clearly states the depth for a single grounding electrode conductor to be buried. Can you give a code reference for this depth? Table 300.5 col. 1 seems a bit excessive to most people.

Answer: 250.64 has the requirements for the installation of the grounding electrode conductor and Table 300.5 is not applicable to the installation or the bury depth of this conductor. CMP 5 has received many proposals for specific burial depths and have rejected all proposals with the substantiation that the present installation requirements in 250.64(B) already cover this question. 250.64(B) has the requirements for the securing and protecting of the grounding electrode conductor. 250.64(B) States: A 4 AWG or larger copper or aluminum grounding electrode conductor shall be protected where exposed to physical damage. A 6 AWG grounding electrode conductor that is free from exposure to physical damage shall be permitted to be run along the surface of the building construction without metal covering or protection where it is securely fastened to the construction; otherwise, it shall be in rigid metal conduit, intermediate metal conduit, rigid nonmetallic conduit, electrical metallic tubing, or cable armor. Grounding electrode conductors smaller than 6 AWG shall be in rigid metal conduit, intermediate metal conduit, rigid nonmetallic conduit, electrical metallic tubing, or cable armor. Final answer is a #4 is typically required to protect the GEC from the shovel or other similar digging tools in order to comply with 250.64(B). Answer is there is no required burial depth and there is no code reference for this answer.

77. Attached is the link to owner's manuals for Lifespan Fitness treadmills.

On page 7 of the 3000 series it states the machines are to be plugged into a non GFI circuit. I did not check all of the manuals, but the same was true for a recent service issue we were called to. The treadmill this person purchased tripped the ground fault breaker installed. We tried changing the breaker to a standard breaker with a GFI receptacle, and it still trips. Does the specification in the owner's manual override the code? Can the state write an exception? This is the third instance of either a GFI or Arc fault tripping for treadmills, all in different municipalities. In each case, customers have contacted the manufacture- and in each case they were told to plug into non GFI and non AFCI circuits. I am fairly certain in each case, there are cords run to that type of circuit.

Answer: No and no, SPS 316.110 states Listed or labeled equipment shall be installed or used, or both, in accordance with any instructions included in the listing or labeling, provided the instructions, listing or labeling do not conflict with this chapter. The manufacturer cannot override the code. The answer is no and no and the code reference is NEC 210.12(A) & SPS 316.110.

78. I installed a condensate pump for a split system installed above a suspended ceiling. The inspector says I can't put the receptacle above a suspended ceiling. How do I make this a legal installation?

Answer: NEC 400.8 states unless specifically permitted in 400.7, flexible cords and cables shall not be used for the following:

(2) Where run through holes in walls, structural ceilings, suspended ceilings, dropped ceilings, or floors

(5) Where concealed by walls, floors, or ceilings or located above suspended or dropped ceilings

The condensate pump may be piped to a different location not above a suspended ceiling or the pump could be brought below the suspended ceiling as long as the cord does not go through and above the suspended ceiling. There may be other options also. Code reference is NEC 400.8

79. The inspector red-tagged my raintight in use cover. The manufacturer says I can mount it sideways without having the hinge on the top. What gives?

Answer: There are raintight in use covers that are permitted to have different mounting configurations. This would be an SPS 316.110 issue. Always read the manufacturer's instructions on how to properly install electrical equipment. The answer is, follow the manufacturer's instructions unless these instructions violate the Code. SPS 316.100

80. We have a 7.2kw car charging station for our EV. It indicates that a 2 pole 40 amp breaker is needed with #8 AWG conductors. In the instructions (since I only have a 100 ampere service on my house) it says we are permitted to "dial down" the amperage to 15 or 20 amperes if our service is not adequate. Can I install a 15 or 20 amp circuit to this car charger?

Answer: Yes SPS 316.110 the manufacturer has had this equipment listed. It is permissible to follow the manufacturer's instructions provided they do not violate the Code. To "dial down" the amperage on these units you must remove the cover and physically change the setting. It would create the same situation as an individual removing a 15 ampere breaker and replacing it with a 30 ampere breaker. Answer is yes, code reference is SPS 316.110

NOTICE: The answers to these questions are the consensus of Wisconsin Chapter – International Association of Electrical Inspectors – Education Committee.

Final approval of actual installations are subject to the interpretation of the Authority Having Jurisdiction and/or the State of Wisconsin Department of Safety and Professional Services – Electrical Division