

NEC CODE QUESTIONS

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1. In 1 & 2 family dwellings in Wisconsin, smoke alarms are required in each sleeping room and outside each sleeping room as well as one per floor. The building inspector is complaining that the box in the rough-in stage should be identified by spray paint or some means so he can identify which boxes are for the smoke detectors. Does this come from NFPA 72?

Panel Response: This requirement does not come out of NFPA 72. It apparently is a local rule or opinion. A smoke alarm is not a fire alarm as in Article 760, and is not subject to the requirements of 760.10

2. Can I use EMT thinwall conduit in a free stall barn?

Panel Response: Nothing in Article 358 would prohibit the use of EMT in a free stall barn. Yes, **But!** 358.12(1) It is not a code violation, My opinion not a good idea.

The NEC does permit EMT except where subject to Severe Physical Damage. One of my inspectors raised Race horses and he said you really don't want to put any electrical where a horse can kick or reach it or they will tear it up. So I would recommend no electrical period but if it cannot be avoided use IMC or RMC

3. When a Ufer ground is installed, is a supplemental electrode required? If one is required do I need 2 rods and do they have to be 6' min. away from each other and the foundation? (Since this is also used as an electrode) Can the #4 grounding electrode conductor be run through bored holes in the 2x10's to the panel?

Panel Response: A supplemental grounding electrode is only required for a water pipe electrode according to Article 250.53(D)(2). A #4 grounding electrode conductor may be run through bored holes.

The only grounding electrode that is required to be supplemented in any manner is the metallic water pipe defined by 250.52(A)(1). This is clearly stated in 250.53(D)

250.53(D) Metal Underground Water Pipe. Where used as a grounding electrode, metal underground water pipe shall meet the requirements of 250.53(D)(1) and (D)(2).

(1) Continuity. Continuity of the grounding path or the bonding connection to interior piping shall not rely on water meters or filtering devices and similar equipment.

(2) Supplemental Electrode Required. A metal underground water pipe shall be supplemented by an additional electrode of a type specified in 250.52(A)(2) through (A)(7). Where the supplemental electrode is a rod, pipe, or plate type, it shall comply with 250.56. The supplemental electrode shall be permitted to be bonded to the grounding electrode conductor, the grounded

service-entrance conductor, the nonflexible grounded service raceway, or any grounded service enclosure.

Exception: The supplemental electrode shall be permitted to be bonded to the interior metal water piping at any convenient point as covered in 250.52(A)(1), Exception.

The concrete encased electrode (Ufer ground) as well as all the other electrodes in 250.52(A) (2) to (A)(4) are sufficient to stand alone. The rod, pipe and plate electrodes in 250.52(A)(5) and (A)(6) only have to be supplemented if the resistance is greater than 25 Ohms as stated in 250.56. The spacing requirements for additional electrodes only applies to rods, pipes and plates where a second electrode is required due to not meeting the 25 Ohm requirement.

As for the 4 AWG grounding electrode conductor, it is permitted to run this through bored holes in the wood framing members or along building surfaces without additional protection unless subject to physical damage. The determination on if the specific installation would be subject to physical damage is up to the AHJ and based on each installation's site conditions.

250.64(B) Securing and Protection Against Physical Damage. Where exposed, a grounding electrode conductor or its enclosure shall be securely fastened to the surface on which it is carried. 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.

4. Is it required to have a gem box inside of a wall for a battery back up fixture on a wall, or can it be directly-wired with flexible metal conduit?

Panel Response: If the luminaire is intended to be direct wired, it would not require a box, but could be connected with a flexible conduit.

NEC 700.12 (F) Unit equipment shall be permanently fixed in place (i.e., not portable) and shall have all wiring to each unit installed in accordance with the requirements of any of the wiring methods in Chapter 3. Flexible cord-and-plug connection shall be permitted, provided that the cord does not exceed 900 mm (3 ft) in length. This is found in UL White Book under product category FTBR on page 84

5. I need to splice a 2-wire #18 thermostat wire. Does this splice need to be accessible? This is in a garage that is going to have a fire rated ceiling installed over the splice.

Panel Response: In general, no.

This is most likely a Class 2 circuit under Article 725. Section 725.3 says only referenced sections of Article 300 apply, and since Section 300.15 is not referenced (the Section that requires a box at splice points) then no box nor accessibility is required. If an installer decides to install a box, then the requirement for accessibility in 314.29 would require it to be accessible, plus since it's a fire-rated ceiling then 300.21 would require the box to fire-rated for the ceiling.

6. Can someone clarify code section 200.7(C) (2)? Does this mean that the white conductor in a 14/3 Romex cannot be used for the return conductor to the light? I see this used all the time for the return conductor. It is typically not re-identified and usually at the end of the line (single gang box with a 3-way switch installed) where the feed is on the opposite end and the light feed is in the same junction box (in the middle of the run) as the 14/3 to the switch. If it can't be used as the return, can it be used as a traveler instead and re-identified to meet code?

Panel Response: The white conductor can only be used as the supply to the switch. If you use the white conductor as the return to a switched outlet, you end up with two white conductors to connect to the fixture (one that is the grounded conductor and one from the loop). You do have to re-identify the white conductor that is used as the return at each point where it is accessible. Why would you use it as a traveler in a 14/3, just use it to supply the switch.

7. Record-keeping computer stations are being installed within patient bedrooms at a large hospital. There is a PC, a monitor, and a printer all connected to a listed, re-locatable power tap with surge protection for the electronics. The UL white book states that re-locatable power taps have not been investigated for use in patient care areas. What are we supposed to do?

Panel Response: It was reported that at least one manufacturer has a re-locatable power tap for use with hospital equipment.

UL now lists re-locatable power taps under UL 1363 for patient care areas. For example, Leviton makes listed Hospital Grade Tamper Resistant re-locatable power taps.

8. Do I have to adjust conductor ampacity per NEC table 310.15(B)(2)(a) for more than 3 current-carrying conductors in a raceway service mast? This mast is on the line side of the utility meter.

Panel Response: YES 310.15(B)(2)(a) Page140 First off what is the service point? The point of connection between the facilities of the serving utility and the premise wiring. This is where the NEC begins, at the connection of the utility or other sources of power. This means that the service, both on the line side and the load side must follow the rules of the NEC. SECTION 310.15(B)(2) does not discriminate between services, feeders, or branch circuits. Yes, you would have to adjust for parallel service conductors in the same raceway on the line side of the meter. One could use parallel raceways with 3 or less current-carrying conductors in each raceway with no adjustment.

The 2008 NEC may require additional adjustments if conduit is in direct rays of the sun . 310.10 currently has a FPN suggesting an adjustment

9. Portable MRI trailers are traveling from location to location. The electric services to power these machines are all different. Are there any proposals for the 2008 code cycle to standardize configurations?

Panel Response: The Panel was not aware of any such proposals.

10. Can a grounding electrode conductor be run through the small ¼ inch hole in a service panel without being clamped?

Panel Response: This question was answered No, using reference 312.5(B)&(C). After considerable debate, the consensus was that 312.5 did not apply to this scenario and the manufacturers put ¼” holes in the panels for this use.

11. Is a bonding bushing required to be installed on an offset nipple where one end is screwed into a Myers hub mounted on the main disconnect enclosure and the other end installed into the bottom of a meter socket? These are service entrance conductors from the bottom of the meter to the top of the main disconnect (line side).

Panel Response: Probably, in order to not use one, the hub and offset nipple would need to be listed for grounding and would need to be wrench tight. Wrench tight is probably not feasible when using the offset to line up holes.

For the question as posed, the meter socket and the service disconnect enclosure are being assumed as bonded by connection to the grounded circuit conductor (neutral) in each enclosure. Having said that, if the hub is listed for grounding and bonding including the required markings, then the hub is one means identified in 250.92 to bond raceways and enclosures. The offset nipple would be considered “bonded” by being screwed into the hub and made up wrench tight similar to if rigid metal conduit was screwed into the hub. If the offset nipple is not screwed in tight, then the requirements for threaded fitting make up in 250.92 for service raceways is not being met. Under the above assumption, bonding of the service raceway is only required at one end and is to ensure an effective ground fault current path in the event a service conductor faults within the raceway.

12. The local sheet metal shop fabricates pull and junction boxes as well as wireways for us. Can we use a non-listed J-box, wireway or auxiliary gutter for equipment grounding? Are wireways listed for grounding?

Panel Response: No, 250.118 Types of Equipment Grounding Conductors

The equipment grounding conductor run with or enclosing the circuit conductors shall be one or more or a combination of the following:

- (13) Other listed electrically continuous metal raceways and listed auxiliary gutters.
- (14) Surface metal raceways listed for grounding.

376.10 Uses Permitted

The use of metal wireways shall be permitted in the following:

- (1) For exposed work
- (2) In concealed spaces as permitted in 376.10(4)
- (3) In hazardous (classified) locations as permitted by 501.10(B) for Class I, Division 2 locations; 502.10(B) for Class II, Division 2 locations; and 504.20 for intrinsically safe wiring. Where installed in wet locations, wireways shall be listed for the purpose.
- (4) As extensions to pass transversely through walls if the length passing through the wall is unbroken. Access to the conductors shall be maintained on both sides of the wall.

376.12 Uses Not Permitted

Metal wireways shall not be used in the following:

- (1) Where subject to severe physical damage
- (2) Where subject to severe corrosive environments

Wireways are found under the Category ZOYX page 309 in the UL white book

Proposal 8-151 376.6 Metal wireways and assoc. fittings shall be listed. Exception: one of a kind and custom made wireways and fittings not be required to be listed.

Proposal 8-157a new 376.100 Construction

13. I was told that I could not plug one extension cord into another on a construction site. The NEC does not seem to prohibit this practice. Where do I find such information?

Panel Response:

Fire Code 605.5.1 Power supply.

Extension cords shall be plugged directly into an approved receptacle, power tap or multiplug adapter and, except for approved multiplug extension cords, shall serve only one portable appliance.

NFPA 1 (Life Safety Code)

11.1.5.3.1 Extension cords shall be plugged directly into an approved receptacle, power tap, or multiplug adapter and shall, except for approved multiplug extension cords, serve only one portable appliance

UL 817. Sect. 23.14 is the requirement for the tag to be applied to all “Cord Sets and Power Supply Cords”. One of the sentences required on the tag is: “Do Not Plug One Extension Cord Into Another” so Section 110.3(B) would apply.

Also, under **UL 1363, Relocatable Power Taps**, known to everyone other than UL as a “plug strip” is also prohibited from being “daisy-chained”

14. In a residential garage, on a sub-panel installation of 4- two wire branch circuits I say that the minimum feeder ampacity should be 60Amps, based on the fact that the disconnecting means must be rated at 60 Amps by code. My co-worker says that it is based on the computed load and could be 40Amps or 50Amps.

Panel Response: 225.5 requires that the feeder conductor size be based on Article 220. The requirement in 225.39(D) states that the disconnecting means must be rated at least 60 amperes. This could be a combination of the branch circuits (e.g. 4 – 15A branch circuits).

Article 100 – Disconnecting Means definition

15. I noticed that my Dentist’s exam rooms have hospital grade receptacles. Are they required?

Panel Response: No, they are required in patient bed locations only. NEC 517.18(B). However, the manufacturer of the equipment may specify a hospital grade receptacle, in this case they would be required.

16. Can a 20-ampere single receptacle be installed on a 15-ampere circuit?

Panel Response: YES 210.21(B) (1) Is titled Single Receptacle on an individual branch circuit. It states that a single receptacle on an individual branch shall have an ampere rating not less than that of the branch circuit.

17. I am currently designing an electrical system for a funeral home that also contains living quarters. The chapel is designed to hold more than 100 people, and is not divided from the rest of the building by fire-rated walls, the construction material is wood studs. The NEC prohibits the use of romex, but I am unclear as to whether I can install non-metallic flexible conduit. It is also unclear if the entire building will need to be run in conduit or just the chapel area.

Panel Response: The only portion of the building requiring metallic conduit is the portion that is required to be of rated construction according to the building code. NEC 518.4,

18. Is it acceptable to splice equipment grounding conductors together in a service panel and then pigtail one conductor to connect to them to the neutral bar?

Panel Response: Yes, this is permissible.

19. Why are some panelboards listed for tandem (mini) breakers and some are not? Can you explain the listing requirements or testing that is done for the panelboards in order for them to be acceptable to have tandem breakers installed?

Panel Response: UL Standard 67 is the governing document for panelboards, it depends on the design of the panelboard.

UL 67, Standard for Panelboards and NEC 408. 35 allows a maximum of 42 poles for overcurrent devices such as circuit breakers within any single panel enclosure. A two or three-pole breaker in this case is not considered as one circuit breaker but a breaker using two or three of the allotted poles. Panelboard manufacturers are permitted to design and submit for testing various combinations of branch circuit breakers, full size on a pole space or ½ size (slim line) for two overcurrent devices on the same pole. The design that the manufacturer wishes to use for that particular panelboard is up to them as long as the most device poles that can be installed is 42 or less. This means, for example, that there are panels with provisions for 12 full size single pole breakers or up to 24 “slim line” breakers occupying the same bus area. When the listing investigation is done, the testing is with all these combinations that are allowed to determine compliance with the provisions in UL 67. If the use of the “slim line” breakers is allowed in the listing, then appropriate markings are required on the panelboard for the installer and inspector. If the panel is not marked for use with “slim line” breakers, then none are allowed. Also if there are limits on where such breakers can be installed, the panel markings and installation

instructions are required to provide that information. For more details see the UL marking guide for Panelboards and the guide card information under CCN QEUY in the UL White Book

It should be noted that a proposal for the 2008 NEC has been accepted at this stage to remove the 42 overcurrent device limitation from the NEC and that could open the way for panels with unlimited numbers of overcurrent devices.

20. Does the metal faucet on a hydromassage tub need to be bonded the same as the circulating pump motor when the tub is supplied with plastic water pipes?

Panel Response: No, this is not required. NEC 680.74

680.74 Bonding

All metal piping systems and all grounded metal parts in contact with the circulating water shall be bonded together using a copper bonding jumper, insulated, covered, or bare, not smaller than 8 AWG solid.

The bonding requirement for hydromassage bathtubs requires interconnection between metal piping systems and metal parts associated with the water recirculation system only at the hydromassage bathtub location. As is the case this section does not require the installation of a bonding conductor from the hydromassage bathtub pump motor to where there is no metal piping or metal parts in the vicinity of the hydromassage bathtub.

21. When a utility company such as AT&T or DTE energy install equipment on the ground on public/easement, should the AHJ be enforcing the National Electric Code or does the utility enforce the NESC and “self police” their work?

Panel Response: Section 90.2(B)(5)(b) says that if the installation by a utility is in a legally-established easement, then the installation is not covered by the NEC. Who would then regulate the installation would be up to the local authority by rule or ordinance.

22. Is it allowed by code in a residential setting with a 200A panelboard to measure the required 30" from the right side of the panelboard edge facing you and be 30" from the wall to the left of the panelboard?

Panel Response: Yes. 110.26(A)(2) requires that there be 30" of clear space. It does not require that this space be centered. For this question, you need to be sure that the door can open at least 90 degrees.

23. The 6-disconnect rule for commercial services require that the disconnects be grouped. Is there any maximum distance between disconnects?

Panel Response: There is no definitive verbiage in the NEC to define “group”, it is up to the AHJ. Generally consensus is that the grouping must be obvious and close enough to touch.

24. In NEC Art. 514 PVC conduit is run under 2' of cover to the dispenser location with the transition to rigid conduit at the last 2' of underground. Is there anything special that has to be done at the transition point? Is the required equipment grounding conductor all that is required?

Panel Response: 514.8 exception no. 2 states ---Where rigid nonmetallic conduit is used, threaded rigid metal conduit or threaded steel intermediate metal conduit shall be used for the last 2 foot of the underground run to emergence or to the point of connection to the above ground raceway, an equipment ground shall be included to provide continuity of the raceway and for grounding of non current-carrying metal parts. After stubbing up with metal conduit a seal-off is required to be the first fitting out of the earth and be within 18 in. of the enclosure 501.15(A)(1). Not needed with diesel.

25. Is there a section of any code (NEC, Life Safety etc.), which would require mandatory night lighting? Not emergency lighting, but general-purpose night lighting in commercial & industrial applications.

Panel Response: Egress lighting is required in NFPA 101.

26. Where service conductors are increased in size due to voltage drop, is the grounding electrode conductor required to be increased in size?

Panel Response: Yes, the grounding electrode conductor is based on the service conductors. NEC 250.66

27. How do I know if a recessed luminaire can be installed in an hourly fire-rated assembly?

Panel Response: The luminaire must be rated for use in a fire rated assembly. Each construction with a fire resistance rating has the details on what the basic construction is, materials to be used and what devices or equipment such as luminaires are suitable within that assembly for a given fire resistance rating. The luminaire will either be generally described, such as “ xx number of 2x4 fluorescent luminaires per 100 square feet of suspended ceiling”, or may be specific to a manufacturer or model type for a specific fire resistive construction. There are no general markings on the luminaire for use in any type of fire resistive construction. The only way to be sure is to consult the fire resistance directories either on line or on the CD provided by UL.

28. Art. 230 of the NEC only allows one service drop to a building. If the service size is large and the installer decides to parallel conductors and use the 6-disconnect rule do the conductors have to be joined at the weather head on the building? The two or more service drops are joined at the utility pole load end. If they are not electrically joined at the building end could this be considered more than one service to the building?

Panel Response: Because the location of the service point is generally determined by the utility, the service-drop conductors and the service-lateral conductors may or may not be part of the service covered by the NEC. For these types of conductors to be covered, they must be physically located on the premises wiring side of the service point. If the conductors are located on the utility side of the service point, they are not covered by the definition of service conductors and are therefore not covered by the NEC.

There is nothing that prohibits parallel of service drop conductors

29. A sprinkler pipe has been installed above the meter stack in an eight unit multifamily dwelling. There is a 100-Ampere breaker located beneath each meter. Does the pipe violate the dedicated equipment space requirement of NEC Section 110.26 (F)? What if there were no breakers in the meter stack?

Panel Response: If the stack does have overcurrent devices in it, I believe it can be called a switchboard or panelboard by the definitions in Article 100. If so, then the sprinkler pipe must be at least 6 feet above the top of the equipment, plus have leak protection as required in 110.26(F)(1)(b).

If the breakers are not in the equipment, then I don't believe it meets the definition of a switchboard, panelboard, distribution board or MCC as listed in 110.26(F) and thus the dedicated equipment space does not apply.

30. Why does the new exception to NEC Section 210.63 eliminate the requirement for a 15-or 20- ampere- rated receptacle within 25-feet of air conditioning equipment at one- and two-family dwellings?

Panel Response: It doesn't. The receptacle can be omitted for the service of evaporative coolers (swamp coolers). If you have an HVAC unit, the receptacle is still required.

IMC - EVAPORATIVE COOLER. A device used for reducing the sensible heat of air for cooling by the process of evaporation of water into an airstream.

31. Does an outdoor hot tub need a disconnect as per 680.12? Does it need a general-purpose receptacle as per 680.22(3)? This is to be installed at a single-family residence outside on a deck. Also this is a manufactured home, if that makes a difference.

Panel Response: An outdoor hot tub does NOT need an emergency shut-off or control switch per 680.42 but an indoor or outdoor hot tub needs a disconnecting means for the equipment per 680.12.

680.12 Maintenance Disconnecting Means.

One or more means to disconnect all ungrounded conductors shall be provided for all utilization equipment other than lighting. Each means shall be readily accessible and within sight from its equipment.

Does it need a general-purpose receptacle as per 680.22(3)? Yes. 680.22 is in Part II

IV. Spas and Hot Tubs

680.42 Outdoor Installations.

A spa or hot tub installed outdoors shall comply with the provisions of Parts I and II of this article, except as permitted in 680.42(A) and 680.42(B), that would otherwise apply to pools installed outdoors.

The fact that this is a manufactured structure does not change the disconnect means or receptacle requirements.

32. Where in the 2005 code does it state that romex cannot directly feed the dishwasher (romex in wall wired directly to the dishwasher junction box) or is it just a protection issue and needs to be sleeved in flex from wall to the dishwasher junction box?

Panel Response: 334.12

It does not state that a dishwasher cannot be connected directly by romex. In fact that is the way mine used to be with no sign of physical damage. The problem may be the excessive amount of amount of NM cable and still doing a workmanship like job.

How about a cord?

Most Dishwashers or garbage disposals come with a hard usage cord that is plugged into a receptacle.

NEC 422.16(B)(2)(4) permits a receptacle to be located in the space occupied by the appliance or adjacent thereto. (5) states that the receptacle must be accessible.

The receptacle is a part of the wiring method and must not be permanently closed in by the structure or finish of the building. If the receptacle is located behind the dishwasher, then the cord and plug cannot be used as the disconnecting means since it is not readily accessible. In this case the unit (dishwasher) switch is permitted as the disconnecting means, as long as it has a marked OFF position

33. When did grounded 3-prong receptacles become required by code?

Panel Response: The 1956 edition of the NEC is the first time they are required.

34. We have a 3-foot section of EMT between two cabinets. Is additional support required on the raceway?

Panel Response: Yes, support is required. NEC 350.30. This relates to a proposal that was accepted for the 2008 NEC. Each wiring method requires securing and support within 3 feet. 350.30 states: EMT shall be installed as a complete system in accordance with 300.18 and shall be securely fastened in place and supported in accordance with 358.30(A) and (B).

(A) States: EMT shall be securely fastened in place at least every 3 m (10 ft). In addition, each EMT run between termination points shall be securely fastened within 900 mm (3 ft) of each outlet box, junction box, device box, cabinet, conduit body, or other tubing termination.

There are 2 exceptions one for fishing and one where the bar joists are up to 5 feet apart.

35. I noticed that the speaker wire they sell at the hardware store comes with and without listings although they appear to be the same wire. What is the difference?

Panel Response: Listed means that it has been evaluated to a standard. Although it appears to be the same, they could have different characteristics, such as fire retardant.

While the speaker wire in question may appear to be the same, unless the UL listing mark is on the wire and also on the packaging (reel or wrapper), the wire is not “listed” and there is no follow-up program in place to ensure production is in accordance with the UL report and the standard. The manufacturer applying the listing mark must do so at the point of manufacturing so there is a location for follow-up inspections to be completed. A manufacturer that has UL listing files makes their own choice about the application of the UL mark and having that production under the appropriate surveillance program. Manufacturers are perfectly free to distribute products without markings, but these products can not be assumed under any circumstances to be listed or to be in compliance with the applicable standards as evidenced by third party labeling.

If an unmarked product is identified in the field, the only means to get that mark applied after leaving the factory is through an UL Field Inspection or an UL Field Evaluation. If UL marks are found to be applied after the product leaves the manufacturer without UL being directly involved in the field, a field report should be completed for investigation.

36. What is the code on low bay lighting? Is it required to have a cord and plug or is this an option? If I use a cord (or if one is required) what is the min./max. length and does it have to be hard usage and terminate in a male plug cap, or can I hard wire and daisy chain? Also does it need to be a single receptacle?

Panel Response: 410.30 (C) Electric-Discharge Luminaires (Fixtures)

(1) Cord-Connected Installation A listed luminaire (fixture) or a listed assembly shall be permitted to be cord connected if the following conditions apply:

(1) The luminaire (fixture) 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 (fixture)

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 (fixture) assembly with a strain relief and canopy

Section 410.30(C)(1)(2)(c) was expanded for the 2005 Code to include a listed manufactured wiring system connector as part of the fabricated assembly. This revision helps to clarify that a manufactured wiring system connector is permitted to be used to supply electric-discharge luminaires in place of a grounding type attachment plug.

Section 410.30(C)(1) applies to listed cord-and-plug-connected electric-discharge luminaires, The supply cord is not permitted to penetrate a suspended ceiling, because the cord is required to be continuously visible along its entire length.

240 (b) 2) Fixture Wire Fixture wire shall be permitted to be tapped to the branch circuit conductor of a branch circuit in accordance with the following:

(1) 20-ampere circuits - 18 AWG, up to 15 m (50 ft) of run length

(2) 20-ampere circuits - 16 AWG, up to 30 m (100 ft) of run length

(3) 20-ampere circuits - 14 AWG and larger

(4) 30-ampere circuits - 14 AWG and larger

37. Section 334.10 allows NM cable in multifamily dwellings and other structures of any height provided they are of Types III, IV, and V. construction. How many floors or how high can these Types of construction go?

Panel Response: The absolute maximum for either Type 3,4 or 5 buildings is 5 stories. The maximum number of stories for each type is listed in Table E.2 of Annex E on page 727 of the '05 NEC. There is also further information on this in NFPA 220.

38. When facing the bathroom sink, the receptacle is on the wall to your right less than three feet from the sink but physically behind you. Does this comply with Section 210.52 (D) of the NEC?

Panel Response: If I am facing the sink and the receptacle is on the wall to my right, then how can it be physically behind me? If it is simply farther back on the side wall, then it does comply because it is within 36" and is on an adjacent wall.

39. I was told, "When wiring transfer switches, the utility conductors must go on top and the generator conductors on the bottom". I searched and searched but could not find anywhere in the NEC that made this statement. It would seem to me that it is a matter of personal preference and/or popular consensus but not an NEC requirement. This person made the comparison of a disconnect switch with a transfer switch and added "by the NEC, a disconnect must have its line on top and load at bottom, because the handle must be in the up position." One cannot rely on a transfer switch as a means of disconnect. This is why there must be a disconnect on both the utilities line and the generators line before the transfer switch.

Panel Response: Transfer Switches that are SUSE rated would be required to have integral OC protection or OC protection provided ahead of the switch.

The statement may refer to fused switches that have "Line" and "Load" terminals clearly marked as a safety requirement, so the switch blades are not energized, 404.6(C)

One alternative installation would be a back-fed circuit breaker-type disconnect device. Circuit breakers do not have a "Line" and "Load" terminals and can be fed either from the panel bus or the screw-terminal.

40. I would like to know if I could use 14/2 NM cable for the switch leg of a furnace safety switch, which also will include the fire-o-matic fused safety? These will be wired in series with the white feeding the fire-o-matic first then the safety switch. I will re-identify the white wires as hot conductors with black tape.

Panel Response: Yes and no these devices sounds like something that the manufacture would have provided with the equipment. NM would be allowed to be sleeved down to the furnace

disconnect switch. The white wire cannot be used for a ungrounded conductor 200.6 These other devices are an integral part of the listed furnace.

41. When a local utility sells it's high voltage lines and substation to a holding company from out of state, are they considered a utility and then exempt under Section 90.2(B)(5)?

Panel Response: The panel believes that it is still a utility. The definition may depend on the public service commission.

42. Where a grounding electrode conductor is connected to a concrete-encased electrode, what is the minimum size conductor that may be used?

Panel Response: According to Article 250.66, a #8 copper conductor would be the smallest, depending on the service size. The maximum required conductor from a concrete encased electrode is #4 copper.

43. A shopping complex is receiving a facelift with new sheetrock and stucco for the front surfaces supporting the existing signs, some of which do not have listing labels. The signs are removed and re-installed. Do the non-labeled signs need to be replaced or re-evaluated and relabeled?

Panel Response: This is a call for the AHJ. If the Authority Having Jurisdiction is enforcing the NEC, then section 600.3 would require that all electric signs be listed by a testing laboratory recognized by the AHJ. So in the case above the signs with no marks would require replacement with listed signs or to have a Field Evaluation completed.

For the signs that have listing marks, they are acceptable to be removed and then reinstalled. The only reason for any re-inspection by the listing agency would be because of modifications completed in the field after the time of manufacture ring, even by the sign manufacturer, or because of other factors such as damage or apparent hazards from the construction where the AHJ suspects the sign no longer complies with the listing or the standard.

44. A single, GFCI protected, grounding-type, twist-lock receptacle for a swimming pool pump is located between 5 and 10 feet from the inside wall of the pool, as allowed by 680.22(A)(1). The listed pool pump motor comes with a 2 ½ -foot cord and a standard, straight-blade 120v 15A cord cap. Is it permissible to cut off the molded cord cap to install a twist-lock male cord end?

Panel Response: 680.22 Area Lighting, Receptacles, and Equipment
(A) Receptacles

(1) Circulation and Sanitation System, Location Receptacles that provide power for water-pump motors or for other loads directly related to the circulation and sanitation system shall be located

at least 3.0 m (10 ft) from the inside walls of the pool, or not less than 1.5 m (5 ft) from the inside walls of the pool if they meet all of the following conditions:

- (1) Consist of single receptacles
- (2) Employ a locking configuration
- (3) Are of the grounding type
- (4) Have GFCI protection

UL WCSX Pumps investigated for permanently installed pools are so identified and are additionally marked "Do Not Use With Storable Pools" . Permanently installed pool pumps are intended to be permanently connected to the water circulation system and they may be permanently wired or provided with a 3 ft nondetachable power supply cord terminating in a grounding type attachment plug. The attachment plug may be of the locking or nonlocking type. Units provided with locking type attachment plugs are intended to be installed at least 5 ft from the inside walls of the pool and are marked accordingly. Units provided with a nonlocking type attachment plug are intended to be installed at least 10 ft from inside walls of the pool and are marked accordingly

45. Section 450.13 (B) of the NEC allows dry-type transformers 600 volts nominal or less and not exceeding 50 KVA to be installed in hollow spaces of buildings not permanently closed in by structure, provided they meet the ventilation requirements of 450.9 and separation from combustible material requirements of 450.21(A). Does this change if the space is above a suspended ceiling and used for return air on the heating and ventilation system of the building? How does Section 300.22(C)(2) of the NEC relate to this type of installation when the metal enclosure for the transformer is ventilated?

Panel Response: Section 300.22(C)(2) says “equipment with a metal enclosure... shall be permitted to be installed in such other space unless prohibited elsewhere in this *Code*” It does not address the ventilation issue, so since it is not specifically prohibited, I would say it is allowed.

46. Can you explain Figure 210.52 of the NEC? Is an additional receptacle required in the space behind the appliance if the distance is greater than the X dimension or can the receptacle(s) close to the appliance serve the space?

Panel Response: No. It only requires that you include the space in your wall calculations. There may or may not end up being a receptacle in that space.

47. Are the splice plates on aluminum cable tray required to have an anti-oxidant such as Penetrox applied to them in a Class 1 Division 2 area?

Panel Response: There is no requirement in the NEC that anti-oxidant paste. An informal, on-site survey of aluminum cable tray manufacturers at the meeting found that manufacturers do not recommend the use of anti-oxidant paste on cable tray sections when installed.

48. We see a few liquid gas storage tanks that hold about 500 gallons of gas and have an electric pump mounted on the top. Inquiring minds want to know how this pump is to be wired. This is usually considered a temporary installation and sometimes is relocated to a new site. The pump has a 6-foot cord on it and will occasionally be plugged into an existing outlet via an extension cord.

Panel Response: My mind wants to know is there such a thing as a class 1 div 2 extension cord? If there were do you think the inspector would let you use it?

The only thing here that is temporary is the storage tanks and the listed attachment plug, cord and pump. A permanent receptacle identified for the location shall be installed for each location and then the class 1 div 1 pump and cord identified for the location may be plugged in. The receptacle may be out of the classified area. On page 235 400.8(1) page does not allow cords to be used for fixed wiring.

Page 358 501.145 states receptacles and attachment plugs shall be of the type providing for a grounding conductor of a flexible cord and shall be identified for the location.

49. Is a closet located within a bedroom considered a separate room or does it need to be protected by the bedroom AFCI device? Would a door separating the closet from the bedroom make any difference in the ruling?

Panel Response: The closet is the “bedroom closet” and is part of the bedroom. It should be on the AFCI protected circuit.

50. I have a 4 unit apartment building, I am planning on installing 4 service disconnect switches with a 400 ampere service. Can I install 2 disconnect switches below the meters and install the other 2 service disconnects inside the apartment units? I have been told this is not acceptable and that all 4 service disconnects must be grouped together outside at the meter location or that all the service disconnects must be located in each unit.

Panel Response: I like your inspectors interpretation. 230.72 requires the disconnects to be grouped in one location, 230.40 Exception No. 1: permits A building to have one set of service-entrance conductors for each service, as defined in 230.2, run to each occupancy or group of occupancies. But I don’t believe that allows you to mix the two rules.

51. Is a mobile home feeder assembly required to be 4/0-4/0-4/0-2/0 Aluminum or is 4/0-4/0-2/0-2 aluminum permitted? They are both rated at 200A. I thought you needed a full size neutral and grounding conductor for a mobile home? Is there ever a reason when you are allowed to downsize a neutral and grounding conductor? If there isn't why do they make this cable combination?

Panel Response: NEC 550.10(A) indicated the feeder assembly can be a 4-wire cord with a cord cap not exceeding 50 Amps or by a permanent feeder. 550.10(I) is the first to then address the

permanent feeder and provides two wiring methods, overhead with a mast and weather head and feeder conductors sized in accordance with Article 230. The additional provision here is the required equipment grounding conductors and the color-coding. The other option is to provide a raceway to under the mobile home where a suitable junction box and underground wiring method can be installed. The manufacturer is to provide instructions on the installation of the j-box and also the required conductor sizes. NEC 550.18 provides the requirements to calculate the mobile home load in place of the calculations in Article 220. If not connected by cord then the minimum ampacity is to be 100 Amps for the panel and the supply feeder but is to also have the minimum ampacity as calculated for the loads served.

550.10 Power Supply.

(A) Feeder. The power supply to the mobile home shall be a feeder assembly consisting of not more than one listed 50-ampere mobile home power-supply cord with an integrally molded or securely attached plug cap or a permanently installed feeder.

Exception No. 1: A mobile home that is factory equipped with gas or oil-fired central heating equipment and cooking appliances shall be permitted to be provided with a listed mobile home power-supply cord rated 40 amperes.

.....

(I) Mast Weatherhead or Raceway. Where the calculated load exceeds 50 amperes or where a permanent feeder is used, the supply shall be by means of either of the following:

(1) One mast weatherhead installation, installed in accordance with Article 230, containing four continuous, insulated, color-coded feeder conductors, one of which shall be an equipment grounding conductor

(2) A metal raceway or rigid nonmetallic conduit from the disconnecting means in the mobile home to the underside of the mobile home, with provisions for the attachment to a suitable junction box or fitting to the raceway on the underside of the mobile home [with or without conductors as in 550.10(I)(1)]. The manufacturer shall provide written installation instructions stating the proper feeder conductor sizes for the raceway and the size of the junction box to be used.

Article 550 has no other provisions for the feeder or specifications for feeder cable assembly ratings, therefore Chapters 1 to 4 would apply as provided in Section 90.3 along with the manufacturer's instruction.. There is no added provisions on sizing the supply equipment grounding conductor other than that required in Article 250. Assuming that the load calculated is 200 Amps as stated in the question, the permanent feeder to the mobile home, overhead or underground would be a minimum of 4/0 Al for the ungrounded conductors, a suitable size for the grounded circuit conductor (neutral) based calculated ampacity and an equipment grounding conductor 4 AWG Al. Either of the cable assemblies identified in the question would be acceptable depending on the calculated neutral load when using the second assembly.

The question is with regard to the feeder installed between the last service-rated disconnect and the mobile/manufactured home panelboard.

*Yes, the 4/0-4/0-2/0-2 aluminum cable is permitted per NEC 550.33(B) providing it has a capacity not less than the loads served.

*No, NEC 550.33 does not modify NEC 220.61 feeder load calculation with regard to this feeder and it doesn't modify the minimum sizing of equipment grounding conductors per NEC 250.122.

*Yes, the neutral conductor may be sized based on the calculated unbalanced load per NEC 220.61 and the equipment grounding conductor is sized based on the feeder overcurrent protective device per NEC 250.122.

*NEC Table 310.15(B)(6) permits the 4/0 ungrounded conductors to serve a 200-ampere single-phase dwelling feeder. After calculating the unbalanced load for this feeder it is unlikely that it will exceed the 150-ampere conductor capacity permitted by NEC Table 310.15(B)(6) for the 2/0. The #2 equipment grounding conductor is adequately sized for up to a 300-ampere overcurrent device per NEC Table 250.122.

I found that Southwire and Alcan (there may be others) specifically make this cable combination for mobile home feeders and it is a type USE-2, RHH, and RHW-2. It consists of 4-insulated color coded conductors as required by NEC 550.33(A). Southwire manufactures a 4/0-4/0-4/0-2/0 for use as a mobile home feeder as well. In any case, load calculations are suppose to be performed to properly size conductors, after that you may choose which cable best fits the load served. The NEC does not prohibit exceeding the minimum requirements and remember that the equipment-grounding conductor must be insulated.

52. A 600-amp service is being installed. The installer has chosen to use a self-contained meter base with parallel conductors. He has provided multi-barrel lugs for the load side. Is this considered a tap? If so do the new “can’t round up” rules apply?

Panel Response: 240.2 Definitions Tap Conductors. As used in this article, a tap conductor is defined as a conductor, other than a service conductor, that has overcurrent protection ahead of its point of supply that exceeds the value permitted for similar conductors that are protected as described elsewhere in 240.4.

Service Conductors. The conductors from the service point to the service disconnecting means. 230.42 Minimum Size and Rating

(A) General The ampacity of the service-entrance conductors before the application of any adjustment or correction factors shall not be less than either (A)(1) or (A)(2). Loads shall be determined in accordance with Article 220. Ampacity shall be determined from 310.15.

312.6 Deflection of Conductors

Conductors at terminals or conductors entering or leaving cabinets or cutout boxes and the like shall comply with 312.6(A) through (C).

53. Can I secure NM cable with bent-over nails?

Panel Response: No. Section 334.30 requires NMC to be supported by staples, cable ties, straps, hangers or similar fittings designed and installed so as to not damage the cable. A bent-over nail is certainly not “designed” to not damage the cable. If the inspector likes bent-over nails, then 90.4 would allow him/her to accept the nails.

54. I have been seeing a standard residential-grade light switch used in a handy box for the furnace disconnect in place of the SSU-type device. Are there any rules for the switch such as motor-rated or heavy duty?

Panel Response: 422.32 says the disconnect must comply with Part IX of Article 430.

The requirements of 430.109 would apply to the furnace since it is a motor load. Assuming that it is a 2HP or less motor, 430.109(C)(2) would allow an AC only general use snap switch to be used where the motor FLC is not more than 80% of the switch rating.

55 Electrical nonmetallic tubing (ENT) can be installed for service entrance conductors for services 600-volt or less. Is there a maximum length permitted?

Panel Response: Sections 230.43(6), 230.70(A)(1). There is no maximum length specified in Section 230.43(6) where the permission to use ENT as a wiring method is found. Section 230.70(A)(1) requires that the service disconnect means be nearest the point of entrance of the service conductors which will limit its length. Only state or local amendments will dictate the maximum overall length of this wiring method the NEC does not.

56. Is a supplemental electrode required when you establish a Grounding Electrode System at another building like a detached garage? Does it need a 2nd ground rod if the 25 ohms is not met?

Panel Response: 250.32(A) Page 99

A supplemental electrode is not required and does not need to be 25 ohms or less. If there is more than one branch circuit, a grounding electrode is required if there are no other electrodes in the second building an electrode from 250-50 (A)(1-7) shall be installed.

A grounding electrode system is required at each building or structure served. [250.50] If water pipe, building steel, concrete encased electrode or a ground ring is not available, other grounding electrodes such as a ground rod or plate can be installed. If a ground rod or plate is installed, compliance with 250.56 must be assured. If a single ground rod or plate has a connection resistance of more than 25 ohms, an additional electrode must be installed. At that point, the resistance of the connection does not have to meet the 25-ohm rule.

57. The disconnect for the elevator controller must be capable of being locked in the open position. Can this be a circuit breaker with a breaker lock installed?

Panel Response: Yes, 620.51(A) permits the use of a circuit breaker for this purpose. It appears that there will be some important changes relating to this in the 2008 NEC regarding the use of a permanently installed means to comply with this requirement.

58. Is it permissible to switch a receptacle in the dining room?

Panel Response: Yes, this is allowed according to Article 210.52.

59. Is it permissible by code to use an undersized neutral (#4) in a feeder for a mobile home? The reason I ask is because the supply house gave me #2-2-4-6 cable instead of the usual #2-2-2-4 and I didn't notice it until the cable was pulled in to the conduit.

Panel Response: *See answer to question #51, difference size conductors but same issue. Note: NEC 300.5(C) (Underground cables Under Buildings) and NEC 300.3(A) require the raceway.

60. I can use a little help with the NEC 25' tap rule. I am being told by a licensed engineer that the tap conductors can enter an ATS on the normal side and continue from the load side to the fused disconnect. I feel this is a violation to section 240-21(B)(2)(b) due to the fact that the tap conductors will terminate in the ATS, not in the fused disconnect. Am I off base?

Panel Response: This would appear to be a violation. However, if the transfer switch is the service disconnect, the overcurrent device is permitted to be located immediately adjacent thereto according to Article 230.91. There is not enough information with the question, it becomes a call by the AHJ.

61. NM cables in a residential occupancy are run on top of the trusses. They are considered supported but do they still need to be stapled every 5'?

Panel Response: Article 334.30 requires securing and supporting by staples, cable ties, straps, hangers or similar fittings not exceeding 4 ½ feet. This means that they must be secured on the trusses.

62. Can the required disconnecting means for a 120V air handler / remote AC be a 15A single pole switch mounted to the unit as in furnace applications? Or do I need a disconnecting means on the unit if the panel is in sight of the unit?

Panel Response: Lets look at the first question would a 15A switch be permitted as the required disconnecting means. Short answer is refer to my comments on question # 54. And for those of you that may have been asleep or reside in the state of Wyoming, if the switch complies with Part IX of Article 430, than it would be permitted to serve as the required disconnecting means. For the second question referencing 422.32 if the panel were in sight from the unit an additional disconnecting means would not be required.

63. Can plastic boxes be used in a fire-rated ceiling?

Panel Response: Yes, 314.27(A), UL White Book under the Category Code of (QCMZ) pg.193-194 provided that the box is used in accordance with the specific fire rating design found in the UL Fire Resistance Directory: i.e.: 1 hour/2 hour rating based on the "company classification."

The UL fire resistance directory should be consulted to match the correct structural design with the correct box especially if it is supporting a luminaire. QBPZ

64. Can I use the same conductor for the equipment grounding conductor and the grounding electrode conductor to the waterline located near a sub panel for a feeder? I believe you must install a separate conductor for the grounding electrode conductor as this serves a much different purpose than does the equipment grounding conductor and this should not be installed with the feeder conductors.

Panel Response: A separate conductor is required for each purpose. The equipment-grounding conductor is sized from Table 250.122 based on the rating of the overcurrent protection on the supply side of the feeder. The grounding electrode conductor is required to be sized from Table 250.66 based on the size of the derived ungrounded conductors and connects to a grounding electrode.

65. After I enter a rated elevator equipment room with low voltage fire alarm cable, do I have to run the cable in conduit?

Panel Response: Yes, 620.21 requires conductors run in machine rooms to be installed in a raceway. NEC 760.54(F) and 760.52(B)(3) also require fire alarm cables to be run in a raceway where used in hoistways.

66. For a service, is there a maximum number of sub panels and maximum size (amperage) of each? Example: 200A service and client wants 2-100A subs off of this. Can this be done this way and meet code?

Panel Response: Yes, if the products listing and labeling instructions allow it per NEC 110.3(B).

67. Is there a requirement in the code like in Article 550 that addresses a maximum distance from the building to have a disconnect? I would like to have a pole-mounted service and then feed the building, which is 200' away. There will be a main breaker in the panel closest to the point of entrance inside the building. The service is on the pole and a feeder to the building. The service at the building is treated as a sub-panel with isolated neutral, 4 wires and also a grounding electrode system. Or in other words how far can the service disconnecting means be from the building?

Panel Response: *No, other Articles do not provide a specific distance of “not more than 30-feet from the exterior wall of the mobile home it serves” for the service rated disconnect as found in NEC 550.32(A).

The only code Sections that come close are NEC 700.12(B)(6), NEC 701.11(B)(5), and NEC 702.11 (Outside Generator Sets). Where the generator has a readily accessible disconnecting means and is “located within sight” (see Def. Article 100) from the building, an additional disconnect at the building is not required for the feeder.

NEC 225.32 (Outside Branch Circuits and Feeders) is most common and requires a service rated disconnect to be located inside nearest the point of entrance or outside. “Outside” is typically enforced as immediately outside. There are Exceptions, #1 where under single management with documented safe switching and other requirements, #2 for buildings falling under NEC 685 (Integrated Electrical System), #3 for lighting towers or poles, and #4 for poles or structures used only for sign support.

NEC 553.4 (Floating Buildings) requires a service rated disconnect to be located adjacent to but not in or on the building or floating structure.

NEC 555.7 (Marinas and Boatyards) requires the service rated disconnect for a building located on a floating dock or marina to be located adjacent but not on or in the floating structure.

*The building in question is supplied by a feeder and has a service rated disconnect located compliant with NEC 225.32 therefore, the Utility service/feeder supply disconnect may be located without restriction of distance from the building.

68. If a fusetrone-type fuse is installed to properly protect a refrigeration compressor in a grocery store, am I required to install a fusestat adapter to protect against possible over-fusing in the future?

Panel Response: Article 240.51(B) allows Edison base fuses for replacement only, where no evidence of tampering exists. New installations require Type S fuses according to Article 240.53.

69. Has anyone heard of SER being listed as not needing to be protected from physical damage?

Panel Response: No, it must be protected from physical damage. NEC 230.50, 300.4

70. A 480v 3 ϕ generator is installed as a standby source for a 4160 v service. When selecting the maximum overcurrent protection for the 480 to 4160 step-up transformer, which table applies? 450.3(A) is for transformers over 600 volts and 450.3(B) is for transformer 600 volts and less.

Panel Response: Both, assuming the transformer is not installed in a supervised location, and use circuit breakers as the OCPD's.

As an example-, first- lets take a 150 KVA transformer / 480v (831) will give us a FLA of 180 Amps.

STEP 1. (Primary Side) Table 450.3(B) (primary OCP) = 125% $180 \times 1.25 = 225$ Ampere (which is a standard size therefore Note 1 is not applicable).

STEP 2. (Secondary Side) Table 450.3(A) (secondary OCP assuming less than a 6% impedance transformer) = 300%

150 KVA / 4160 (7205) = 20 FLA x 300% = 60 Ampere (which also a standard size therefore Note 1 is not applicable.

CAUTION; We have only provided protection of the transformer, we must also provide proper protection for the conductors as required by Article 240.

71. I have a situation where an EGC will not fit on the neutral bar in the service equipment. I have tried to find a listed and same manufacturer add-on grounding lug kit to no avail. Except for the Article 110 listing requirement issue, is there anything wrong with installing a bolt-on lug of proper size and bolting it to the side of the panel with a nut and bolt?

Panel Response: Section 250.12, Clean Surfaces, UL White Book (AALZ) pg. 7 “Field Modifications.” Compliance with Section 250.12, Clean Surfaces would be required as well as corrosion protection for the enclosure once the paint is removed. Mounting on the side of the enclosure is required to permit access through out its life as opposed to the back where no access would be permitted. A bolt, locking washer, and nut with at least two full threads of engagement for securing to the enclosure.

It is not known by UL if this modification will perform at the same standards as when the equipment left the manufacturers facility. This installation falls within the purview of the AHJ to approve the installation.

72. Are grounding electrode conductors permitted to be paralleled? Could two No. 1/0 copper conductors be used in place of a 3/0 for the grounding electrode conductor of a service over 1100 kcmil?

Panel Response: The grounding electrode conductors could be installed in parallel but each of the conductors would need to be full size based on Table 250.66.

73. Can a main disconnect for elevator power be locked in the "on" or closed position? Before rescuing stranded riders, firefighters have to open the main disconnect. If an elevator is malfunctioning causing an emergency, it might be necessary to open the disconnect quickly and the key might not be readily available. Does the NEC address this?

Panel Response: No. 620.51 permits automatic opening of the power supply in certain instances. This would not be possible if the disconnect were locked in the closed position.

74. If an appliance garage is installed on a counter top is a receptacle required in the garage?

Panel Response: No, however spacing must be maintained on the counter top. If a receptacle is installed in the appliance garage, it must be on the 20-amp small appliance circuit and be protected by a GFCI. NEC 210.8

75. A doublewide mobile home has a 7.7 KW rated cook top fed with 10/2 Romex and a 20A 2-pole breaker. The calculation came up with 32.83A, 7700W divided by 240V=32.8A. I also did it like this: 7000.7W divided by 240V=29.16A. What is the correct way to do this calculation?

Panel Response: *The correct way is 7.7 KW divided by 240-volts = 7700-watts divided by 240-volts = 32.08-amperes.

*NEC 550.12(D)(2) and NEC 550.18(B)(4) require a branch circuit conductor rated for a minimum 100% of the nameplate amperes. NEC Article 550 does not modify NEC 240.4(D) therefore the #10 copper conductor (30-amperes) is inadequate, rather a minimum #8 copper conductor/cable or #8 aluminum type conductor/SE cable is required.

76. Is it acceptable to terminate two circuits on a single circuit breaker?

Panel Response: Two conductors may be terminated on a circuit breaker if the manufacturers instructions allow more than one conductor.

77. I have a customer that wants to switch a paddle fan/light combo with 2 switches at each entrance to the room (so that the fan or light can be switched separately at each entrance). If I use a 14/2 and 14/3 for travelers and neutral between switch boxes and feed one end and take a 14/3 to the fan/light combo does this meet code? The 14/3 will be used for travelers and neutral and the 14/2 for the other set of travelers.

Panel Response: No, all conductors of the circuit must be in the same raceway or cable according to Article 300.3. This installation could be accomplished using 2 3-wire conductors.

78. We are finding air-conditioners installed that do not have the maximum rating of the branch-circuit short-circuit and ground-fault protective device on the nameplate. What should we do with these units?

Panel Response: 440.4(B) Multimotor and Combination-Load Equipment. Multimotor and combination-load equipment shall be provided with a visible nameplate marked with the maker's name, the rating in volts, frequency and number of phases, minimum supply circuit conductor ampacity, the maximum rating of the branch-circuit short-circuit and ground-fault protective device, and the short-circuit current rating of the motor controllers or industrial control panel. The ampacity shall be calculated by using Part IV and counting all the motors and other loads that will be operated at the same time. The branch-circuit short-circuit and ground-fault protective device rating shall not exceed the value calculated by using Part III. Multimotor or combination-load equipment for use on two or more circuits shall be marked with the above information for each circuit.

79. The State of Michigan is considering the adoption of the 2005 NEC and amending Section 334.10 to allow NM cable in Types I and II construction. Aside from the fact that NM cable is

not submitted to as strict a vertical flame test, is there any other concerns or hazards using NM cable in walls of Types I and II construction?

Panel Response: Annex E pg. 726, 300.4(B)(1), 334.10(A)(2) & 334.12(9). The issue of physical damage to Type NM cable should always be a concern. Type I & II construction are non-combustible, either concrete, precast, masonry or steel framing for structural support. Interior walls are rated noncombustible such as with steel studs and gypboard or masonry. Depending on the basic types of construction ratings are 1-4 hours. That said, steel stud wall framing can utilize listed bushings or grommets (DWMU pg 56 UL 2239 “Hardware for the support of Conduit, Tubing and Cable”) in the metal studs for protection of the cable to meet the protection requirements. NM cable is permitted in masonry block installations, but it is not permitted to be embedded in poured cement, concrete or aggregate.

UL 719 Construction Section 4 General

- 4.1 Only materials that are acceptable for the particular use shall be employed in a cable.
- 4.2 A cable shall be one of the following types and shall comply in all respects with the applicable requirements for construction details, test performance, and marking.
- 4.3 Type NMC cable is required to comply with a flame test and to be resistant to moisture, fungi, and corrosion and also to have some degree of inherent protection against mechanical abuse.
- 4.4 Type NM cable is required to comply with a flame test, to be resistant to moisture, and to have some degree of inherent protection against mechanical abuse.
- 4.5 Each of the materials used for the insulation, spacers, fillers, jacket, and other nonmetallic parts of a Type NMC cable shall be resistant to fungi, moisture, and corrosion.

80. I inspect an auto salvage parts business; the building they use to dismantle the automobiles has the auto lifts and other typical tools you would find in an automotive repair facility. In this facility the vehicle’s gas tanks are removed before they are brought into the building. Would this area still need to be classified as a hazardous location in accordance with NEC 511.3? Would the 120 volt, 15 and 20-ampere receptacles need GFCI protection in accordance with 511.12?

Panel Response: I think the answer is “Yes” and “Yes.”

511.1 Scope. These occupancies shall include locations used for service and repair operations in connection with self-propelled vehicles (including, but not limited to, passenger automobiles, buses, trucks, and tractors) in which volatile flammable liquids or flammable gases are used for fuel or power.

81. We installed the duplex receptacle in the pit of an elevator as required. We also installed a single receptacle on the same circuit ahead of the GFCI protection for the sump pump located in the elevator pit. Is this acceptable?

Panel Response: Yes. You installed a ground-fault circuit-interrupter TYPE duplex receptacle in the hoistway pit as required by 620.24(C) and 620.85 and you installed single receptacle without ground fault protection for the sump pump as permitted by 620.85.

82. Has 8/2 Romex with a #10 bare ground wire ever been allowed to feed a range receptacle? I saw this installation today, in a modular home that was built in 1979 and the manufacturer of the home installed the Romex. Isn't this supposed to be a 4-wire circuit? Was this ever allowed in a regular stick built house? All I have seen in my area is SEU used for this purpose and the neutral is bare. Bottom line this is installed and they need to replace the range with a new one. So can this be used with a 3-wire cord with the stove ground link attached to the range and the bare #10 used as the neutral and ground for the circuit?

Panel Response: No, 8/2 NM Cable with a #10 bare ground to feed a range receptacle has never been allowed according to my research. SE Cable with a covered ground has in the past been a legal installation. In an existing installation it is up to the AHJ to accept the installation.

83. Does PVC conduit have to be a certain length before an expansion joint is required in a horizontal run of 2" PVC under a mobile home?

Panel Response: *Yes, the requirement for Expansion Fittings is found in NEC 352.44. PVC conduit is required to be secured within 3' of boxes, cabinets, elbows, or other terminations and supported at intervals found in NEC Table 352.30(B). Supported means that it can move between the 2 – secured points. Where the overall straight length of PVC is expected to expand or contract 1/4" or greater an expansion fitting is required.

*Expansion characteristics for PVC conduit is found in NEC Table 352.44(A).

Examples: There is 1/4" of expansion/contraction found in 10' of PVC conduit where there is a 62 – degree F temperature change or, there is a minimum 1/4 - inch expansion/contraction per 5' of conduit where there is a 123 – degree F temperature change. You must calculate which length expansion joint is needed for the straight length of conduit.

84. I have a building with a utility-supplied 1200-ampere electrical service, 277/480 volt, 3-phase, 4-wire. This same building has a separate feeder from another building on the same property, which is supplied through an optional standby generator and appropriate transfer switch. Is it allowable to have these two different power supplies to the same building? They need the optional standby system for reliability of computer systems when normal power is interrupted.

Panel Response: Article 230.2 (A)(4) allows such an installation.

85. Can Romex be installed in outdoor conduit when its ambient is not exceeded? Does it comply with 334.10(A) when it is normally dry 95% of the time in most geographic locations?

Panel Response: NM Cable may not be used in a wet location. Conduit installed outdoors is a wet location according to the definition.

86. Are HVAC rooftop units considered electrical equipment? Would they require 3 feet of clearance on all sides of the unit? Where in the code would I find this?

Panel Response: Yes, clearance would only be required on the sides of the equipment that would require safe operation and maintenance of such equipment, Section 110.26 Equipment. A general term including material, fittings, devices, appliances, luminaires (fixtures), apparatus, and the like used as a part of, or in connection with, an electrical installation.

110.26 Spaces About Electrical Equipment.

Sufficient access and working space shall be provided and maintained about all electric equipment to permit ready and safe operation and maintenance of such equipment. Enclosures housing electrical apparatus that are controlled by a lock(s) shall be considered accessible to qualified persons.

87. Can luminaires be mounted to nonmetallic device boxes?

Panel Response: Section 314.27(A)&(B), (QCMZ) UL White Book pg. 194. The answer is yes they can be used, but only in accordance with their design, marking and the weight limitations specified on the product carton, or installation instructions and the NEC.

88. Is the steel beam supporting the wooden floor joists in a residence required to be bonded?

Panel Response: No, unless it is deemed likely to become energized. NEC 250.104(C)

250.104(C) Structural Steel. Exposed structural steel that is interconnected to form a steel building frame and is not intentionally grounded and may become energized shall be bonded to the service equipment enclosure, the grounded conductor at the service, the grounding electrode conductor where of sufficient size, or the one or more grounding electrodes used. The bonding jumper(s) shall be sized in accordance with Table 250.66 and installed in accordance with 250.64(A), (B), and (E). The points of attachment of the bonding jumper(s) shall be accessible.

89. The local high school is making their swimming pool deeper by cutting the bottom out, including the bonding grid, thus increasing the depth and creating a diving well to comply with new swimming pool codes. The contractor says they will be using non-conductive, encapsulated (epoxy coated) steel rebar and it does not require connection to the bonding grid. I believe it must still be bonded. Who is correct?

Panel Response: NEC 680.26(B)(1) states that if reinforcing steel is effectively insulated by an encapsulating nonconductive compound at the time of manufacture and installation, it shall not be required to be bonded. Note that it says at the time of installation. If the insulation has been compromised then it must be bonded. If the new encapsulated rebar is being tied to any existing non-encapsulated rebar it should be bonded through the tie wires.

90. An island in a kitchen is not fastened to the structure and could be moved. Does it require a receptacle?

Panel Response: Yes, it would be required to have a receptacle unless it is on wheels and easily movable. NEC 210.52(C)(2).

91. What types of wiring methods are acceptable for use in an animal facility (horses, cows, pigs)? Can UF cable be used in areas not accessible to the animals? Can EMT be used in these types of facilities or is PVC conduit and nonmetallic boxes the required wiring method?

Panel Response: First you must determine if the location where the wiring or equipment being installed is located in a NEC 547.1(A) Excessive Dust and Dust with Water, (B) Corrosive Atmosphere, or an area where neither of the afore mentioned conditions exist.

*Where either of the conditions of NEC 547.1(A) or (B) exist the wiring methods found in NEC 547.5(A) apply, which permits the use of UF, NMC, copper SE, jacketed MC, RNMC, or other cables suitable for the location.

Where the conditions of NEC 547.1(A) or (B) do not exist NEC 547.3 permits other Chapter 3 wiring methods.

*Yes, UF cable is permitted.

*Yes, where the conditions of NEC 547.1(A) or (B) are not present. Many electricians prefer to stay nonmetallic rather than chance possible corrosion.

92. Section 680.72 of the NEC says that if a hydromassage bathtub is installed in a bedroom, the bedroom is considered a bathroom for the installation of luminaires (lighting fixtures), switches, receptacles and other electrical equipment not directly associated with the hydromassage bathtub. Does this mean that all receptacles in the bedroom are required to be GFCI-protected and fed from a 20-ampere branch circuit?

Panel Response: Yes

93. We installed the wiring to a hot tub that is located three feet from the aluminum siding on a house. How can we bond the metal siding as required by Section 680.26?

Panel Response: According to Article 680.26(B)(5), if the metal parts are within 5' of the waters edge, they must be bonded. How would you do it? Probably bolt a lug to the siding and run at least a #8 copper conductor from the equipment bonding conductor.

94. We are using ENT on a job and pulling multiple 20-Ampere circuits in each raceway. Do we need a separate equipment-grounding conductor for each circuit?

Panel Response: NO

362.60 Grounding. Where equipment grounding is required, a separate equipment-grounding conductor shall be installed in the raceway.

250.122 Size of Equipment Grounding Conductors.

(C) Multiple Circuits. Where a single equipment-grounding conductor is run with multiple circuits in the same raceway or cable, it shall be sized for the largest overcurrent device protecting conductors in the raceway or cable.

95. What does a 15-minute finish rating mean when applied to 518.4(C)? Does the 15-minute finish rating only apply to wood construction? Do the walls, floors and ceilings all need the 15-minute finish rating before ENT or RNC can be used?

Panel Response: See the FPN for definition of Finish rating found below 518.4 which is extracted from the UL Fire Resistance Directory Category BXUZ

Definition:

A finish rating is established for assemblies containing combustible (wood) supports. The finish rating is defined as the time at which the wood stud or wood joist reaches an average temperature rise of 250°F or an individual temperature rise of 325°F as measured on the plane of the wood nearest the fire. A finish rating is not intended to represent a rating for a membrane ceiling. The requirements for finish ratings are not included in ANSI/UL 263.

The test wall is a 10 x 10 wood frame with thermocouples between the wood studs and gypsum board. It applies to wood frame construction only.

The 250 deg. is the average of all TC's and 325 deg. is spot temperature reading. The Finish Rating is the time elapsed once fire is applied to reach the required temperatures indicated and in the location of the test wall.

Yes, only to wood frame construction.

The finish rating would be required on the wall membranes that protect the ENT or RNC wiring method, regardless of orientation.

96. The condominium project we are wiring has utility closets that contain the central heating gas furnaces for the respective dwelling unit. A person cannot enter the closet and service work is done through the doorway. Is an additional lighting outlet required in these closets, or are the bedroom lighting outlets adequate?

Panel Response: The room light will probably be adequate. The service person may use a trouble light if needed.

97. When you have several separately-derived systems entering a building at different locations around that building, do you have to identify each disconnect as it enters that premise, and post notification of the presence and location of all service entrances?

Panel Response: Yes. 230.2(E) requires a permanent plaque or directory at each service location denoting all other services, or any combination of branch circuits, feeders and services.

The NEC does not specify that this requirement applies to separately derived systems however the intent of 230.2(E) does apply.

98. When extending an existing bedroom circuit are we required to now protect the existing circuit with an AFCI?

Panel Response: Yes, 210.12(B), changes have been made and the new code requirements would apply to those areas that are affected. If the change were purely a repair or single new component replacement then it would be an AHJ call, but I would not require it.

99. Is each pedestal (containing a 30 and 20-ampere receptacle) in a RV facility required to have a ground rod installed? Are these pedestals classified as structures?

Panel Response: *Yes, where the pedestal also contains the site disconnecting means and overcurrent protection for the receptacles, NEC 551.75.

*Yes, in this case NEC 250.32(A) and NEC 250.32(B)(1) apply.

100. Can intrinsically safe conductors be installed in the same raceway with non-intrinsically safe wiring?

Panel Response: No, Article 504.30 prohibits this practice.

101. Why is a #8 solid Cu conductor required from the wet-niche fixture to the deck j-box when a stranded Cu conductor could be installed much easier?

Panel Response: The panel's opinion was that solid conductors are more resistant to corrosion.

102. What is the difference between a "Non-incendive circuit" and an "Intrinsically Safe" circuit?

Panel Response: 500.2 Nonincendive Circuit. A circuit, other than field wiring, in which any arc or thermal effect produced **under intended operating conditions** of the equipment is not capable, under specified test conditions, of igniting the flammable gas-air, vapor-air, or dust-air mixture.

FPN: Conditions are described in ANSI/ISA 12.12.01-2000, Nonincendive Electrical Equipment for Use in Class I and II, Division 2, and Class III, Divisions 1 and 2 Hazardous (Classified) Locations.

504.2 Intrinsically Safe Circuit. A circuit in which any spark or thermal effect is incapable of causing ignition of a mixture of flammable or combustible material in air under prescribed test conditions.

FPN: Test conditions are described in ANSI/UL 913-1997, Standard for Safety, Intrinsically Safe Apparatus and Associated Apparatus for Use in Class I, II, and III, Division 1, Hazardous (Classified) Locations.

The key difference is a nonincendive circuit is designed to not produce energy levels sufficient enough to cause an explosion under normal operating conditions, on the hand an Intrinsically Safe Circuit is designed to not produce energy levels sufficient for and explosion under normal “or” abnormal conditions.

Subsequently, in order to qualify for either of the prescribed systems, compliance with the applicable requirements in the respective articles must be adhered to.

103. A NEMA 3R panelboard is used for a temporary service. There are open knockouts on the side. Can a standard knockout closure be used to close this opening?

Panel Response: UL White Book (AALZ) pg 6. The panelboard was listed as NEMA 3R, to maintain the integrity of the enclosure for a wet location; a gasket type K.O. filler plate would be required, especially if mounted outdoors and subject to the criteria of the listing category.

104. When a re-bar is protruding from a footing or a foundation to be used as a connection point for the grounding electrode system, does that connecting point have to be accessible? For instance: what if the re-bar would be enclosed by a finished wall of the structure?

Panel Response: If the connection is out of the concrete, it must be accessible.

250.68 Grounding Electrode Conductor and Bonding Jumper Connection to Grounding Electrodes.

(A) Accessibility. The connection of a grounding electrode conductor or bonding jumper to a grounding electrode shall be accessible.

Exception: An encased or buried connection to a concrete encased, driven, or buried grounding electrode shall not be required to be accessible.

105. Are residential stairways required to contain lighting fixtures?

Panel Response: Yes. NEC 210.70(A)(2)(a) requires lighting outlets in stairways.

106. I am using an old service panel as a splice box for the existing circuits. New phase conductors will be installed from the new panel to the old for each circuit. Can I use a # 3 AWG conductor as a common neutral for the five 20-Ampere circuits in this old 100-ampere panel now used as a splice box?

Panel Response: No, 2005 NEC 210.11(A), for the number of branch circuits required to serve the load. Next 215.4(A)&(B), feeders with a common neutral, only two or three sets of 3-wire feeders are allowed. Also 300.3(B), states that all conductors of the same circuit and 300.20 for induced currents in metal raceways if used. When the old panel is used as a junction box it must have a cover per 314.25 and 314.28(C).

107. Some rural utilities require the main disconnects on their poles. Are two ground rods required when one has a resistance greater than 25 ohms? Does the service equipment at the house also require ground rods?

Panel Response: *Yes, NEC 250.24(D) requires the grounded service conductor to be connected to an electrode at the service-equipment. NEC 250.56 requires a rod electrode with a resistance to earth greater than 25-Ohms to be augmented one additional rod electrode.

*Yes, the service is one structure and the house is the second building. NEC 225.31 and NEC 225.36 require a service rated disconnect at the house to disconnect the supply. NEC 250.32(A) and (B) require the connection of the grounded conductor or where installed, the equipment grounding conductor to an electrode system.

108. If an existing sump pump receptacle is now located within a remodeled bedroom, is it required to be AFCI protected?

Panel Response: Article 210.12 requires AFCI protection for all 15 and 20 amp 125 volt circuits in bedrooms. It is commonly interpreted that the code is not retroactive. This is a call by the AHJ.

109. What are the requirements for fluorescent fixtures in a commercial woodworking shop?

Panel Response: This could be a class II area. If it is not declassified by such means as dust collection systems, the fixtures would need to be listed for use in a Class II area.

110. A range branch circuit is calculated and installed at 40 amps. The range installed is rated at 13KW. Does the wiring need to be changed?

Panel Response:

This question cannot be answered with only the information provided.

Assuming we are dealing with a household range. The answer is YES the branch circuit would be required to be changed.

210.19(A)(3) Household Ranges and Cooking Appliances. Branch-circuit conductors supplying household ranges, wall-mounted ovens, counter-mounted cooking units, and other household cooking appliances shall have an ampacity not less than the rating of the branch circuit and not less than the maximum load to be served. For ranges of 8¾ kW or more rating, the minimum branch-circuit rating shall be 40 amperes.

STEP 1: 13KW range at 240 Volts = 54 Amperes .

Note: See Article 220 for computing load calculations

111. Why does listed and labeled electrical equipment come from the manufacturer with grounding lugs installed on painted surfaces which must be removed and cleaned to meet NEC compliance?

Panel Response: If the ground lug or ground buss has been assembled at the factory by the manufacturer, then that installation method was part of the listing process and it complies with the standard, NEC 250.12 is not applicable.

The lug or ground buss, attachment methods have been evaluated for mounting on a painted surface using the mounting bolts as a ground fault path.

Should this be a field installation, NEC 250.12 is a required step for approval by the AHJ for the installation. A clean surface for proper contact is required.

112. Does the code allow a service-supplied AC system to be grounded at more than one accessible point on the line side of the service disconnect using separate grounding electrode conductors and rods? An example would be a connection at the meter base and the service disconnect. Code reference is 250.24 (a) (1).

Panel Response: 250.24 Grounding Service-Supplied Alternating-Current Systems.

(A) System Grounding Connections. A premises wiring system supplied by a grounded ac service shall have a grounding electrode conductor connected to the grounded service conductor, at each service, in accordance with 250.24(A)(1) through (A)(5).

(1) General. The 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.

113. Can a split-bolt be used to connect the grounding electrode to a concrete encased re-bar?

Panel Response: Yes. NEC 250.70 permits connection to the grounding electrode by listed clamps. The UL White Book lists split-bolt connectors for concrete encasement.

114. Can you connect 120v receptacles in a store to the same branch circuit that supplies the lighting?

Panel Response: Yes, provided the lighting circuit is at a 120 volt potential. NEC 210.19

115. Can an air conditioner be supplied from the panelboard in a mobile home?

Panel Response: *Yes, Where wiring is installed by the manufacturer the installation requirements are found in NEC 550.20(B). Where not installed by the manufacturer, the air conditioning branch circuit wiring may be connected to the factory installed panelboard (where calculated load permits) or to the additional circuit spaces located within the home service equipment per NEC 550.32(D).

116. What is the difference between a surge arrester and a transient voltage surge suppressor? What are the applications for each device?

Panel Response: A surge arrester is intended to afford protection against surge related damage to secondary distribution wirings systems and equipment connected to it and are intended for installation in accordance with Article 280. Transient Voltage Surge Suppressors (TVSS) are intended to limit the maximum amplitude of the transient voltage surges on power lines to specified values. TVSS must be installed on the load side of the Service Disconnect and are intended for installation in accordance with Article 285. UL Lists surge arrestors under the category Surge Arrestors (OWHX) located on page 75 in the 2005 White book and TVSS are Listed under the category Transient Voltage Surge Suppressors (XUHT) located on page 137 in the white book.

117. Can listed fire alarm systems be installed in standard EMT now that red-colored EMT is available?

Panel Response: There is no requirement in the NEC for colored conduit. Fire alarms may be installed in ordinary EMT.

118. What is the height of the dedicated space above the panelboard in the basement of a dwelling?

Panel Response: 110.26(F) 6' or structural ceiling whichever is lower

(F) Dedicated Equipment Space. All switchboards, panelboards, distribution boards, and motor control centers shall be located in dedicated spaces and protected from damage.

Exception: Control equipment that by its very nature or because of other rules of the Code must be adjacent to or within sight of its operating machinery shall be permitted in those locations.

(1) Indoor. Indoor installations shall comply with 110.26(F)(1)(a) through (F)(1)(d).

(a) Dedicated Electrical Space. The space equal to the width and depth of the equipment and extending from the floor to a height of 1.8 m (6 ft) above the equipment or to the structural ceiling, whichever is lower, shall be dedicated to the electrical installation. No piping, ducts, leak protection apparatus, or other equipment foreign to the electrical installation shall be located in this zone.

Exception: Suspended ceilings with removable panels shall be permitted within the 1.8-m (6-ft) zone.

(b) Foreign Systems. The area above the dedicated space required by 110.26(F)(1)(a) shall be permitted to contain foreign systems, provided protection is installed to avoid damage to the electrical equipment from condensation, leaks, or breaks in such foreign systems.

(c) Sprinkler Protection. Sprinkler protection shall be permitted for the dedicated space where the piping complies with this section.

(d) Suspended Ceilings. A dropped, suspended, or similar ceiling that does not add strength to the building structure shall not be considered a structural ceiling.

119. Which code section covers direct burial phone and cable lines for a residential application? What is minimum burial depth?

Panel Response: If it is the service drop from the telephone utility company then 90.2(B)(4) applies and is not under the purview of the NEC. Since the voltage and energy levels are low, there is no recommended burial depth indicated in Article 800, or specific language to take you Article 300 and Table 300.5. If...the system is network powered broadband, then Table 830.47 could be applied.

120. Does the individual occupant of a multi-family dwelling have to have access to all the branch circuit overcurrent devices in the dwelling or just those for his own unit? What about common-area circuits?

Panel Response: Just for their own unit.

225.35 Access to Occupants. In a multiple-occupancy building, each occupant shall have access to the occupant's supply disconnecting means.

Exception: In a multiple-occupancy building where electric supply and electrical maintenance are provided by the building management and where these are under continuous building management supervision, the supply disconnecting means supplying more than one occupancy shall be permitted to be accessible to authorized management personnel only.

230.72(C) Access to Occupants. In a multiple-occupancy building, each occupant shall have access to the occupant's service disconnecting means.

Exception: In a multiple-occupancy building where electric service and electrical maintenance are provided by the building management and where these are under continuous building management supervision, the service disconnecting means supplying more than one occupancy shall be permitted to be

240.24 Location in or on Premises.

(B) Occupancy. Each occupant shall have ready access to all overcurrent devices protecting the conductors supplying that occupancy.

Exception No. 1: Where electric service and electrical maintenance are provided by the building management and where these are under continuous building management supervision, the service overcurrent devices and feeder overcurrent devices supplying more than one occupancy shall be permitted to be accessible to only authorized management personnel in the following:

(a) Multiple-occupancy buildings

121. The project is the installation of a service panel. A 1-inch water pipe has been installed directly above the panel. What can I do?

Panel Response: NEC 110.26(F)(1)(a) does not permit water piping in an area 6 feet above the panel or to a structural ceiling, whichever is lower. If you're an AHJ, tag the job and have the piping relocated. If you're the installer, notify the project supervisor.

122. Section 410-8(d) (3) allows recessed incandescent fixtures to be installed in clothes closets, provided the lamp is completely enclosed and a minimum clearance of 6 inches between the fixtures and the nearest point of a storage space. Can a recessed incandescent fixture be installed without being completely enclosed in a clothes closet, such as a large closet where the clothes are at least 8 feet away from the fixture?

Panel Response: No, only if totally enclosed. NEC 410.8(D)(3)

Questions were answered by the following panels. Most questions were as submitted by the panel members, with some comment taken from notes.

CODE PANEL NO. 1 – MIKE FORISTER, MODERATOR

Mark Earley	- 1, 9, 17, 25, 33, 41, 49
Richard Loyd – CMP 5 & 8	- 2, 10, 18, 26, 34, 42, 50
Chuck Mello – CMP 5	- 3, 11, 19, 27, 35, 43, 51
Don Offerdahl – CMP 9	- 4, 12, 20, 28, 36, 44, 52
Dick Owen – CMP 3	- 5, 13, 21, 29, 37, 45, 53
Jim Pauley – CMP 2	- 6, 14, 22, 30, 38, 46, 54
Marcus Sampson – CMP 15	- 7, 15, 23, 31, 39, 47, 55
John Stacey – CMP 6	- 8, 16, 24, 32, 40, 48, 56

CODE PANEL NO. 2 – ROB FORISTER, MODERATOR

Monte Ewing – CMP 19	- 51, 59, 67, 75, 83, 91, 99, 107, 115
Alan Manche – CMP 10 & 20	- 52, 60, 68, 76, 84, 92, 100, 108, 116
Dave Mercier – CMP 7	- 53, 61, 69, 77, 85, 93, 101, 109, 117
Tom Moore – CMP 11	- 54, 62, 70, 78, 86, 94, 102, 110, 118
Donald Shields -	- 55, 63, 71, 79, 87, 95, 103, 111, 119
Phil Simmons – CMP 5	- 56, 64, 72, 80, 88, 96, 104, 112, 120
Charlie Trout – CMP 12	- 57, 65, 73, 81, 89, 97, 105, 113, 121
Ray Weber – CMP 2	- 58, 66, 74, 82, 90, 98, 106, 114, 122