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Additional submitted attachment is included below.

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Gary H. Fox, PE
55 Ina Ct
Alamo, CA 94507
CA PE License No. E10953
alamofox@sbcglobal.net

Comments concerning Nonresidential Compliance Manual Section 8, Electrical Power Distribution.

1. Page 8-4, in section 8.2, there is a sentence that states the definition of “service” from section 100.1. The text then continues to restate the changed service metering requirement, “Each electrical service or feeder shall have a permanently installed metering system...”

Comment: There is no clarification provided for the definition of “feeder.” The definition for “feeder” in the National Electric Code (NEC) is, “All circuit conductors between the service equipment, equipment, the source of a separately derived system, or other power supply source and the final branch-circuit overcurrent device.” If this is the only available definition, the commission is indicating that permanent meters must be installed throughout a facility distribution system between the utility service and the branch circuits. The examples that follow, in particular Example 8-4, do not indicate that such extensive metering is required. Therefore, it is imperative that the Compliance Manual provide the definition of “feeder” as it is intended and as it relates to these requirements, since it appears to deviate from the definition provided in the NEC.

2. Page 8-6, Example 8-3, under Complying with 130.5(a), “It is permitted to utilize the metering system provided by the utility company as long as the metering system can indicate instantaneous kW demand...”

Comment: The term “provides” is recommended to replace the term “indicates.” “Indicates” can imply a visual display. It is not clear whether the utility energy records that are made available to their customer via the web is acceptable. Such records provide the ability to determine energy usage over various periods, as well as maximum demand information. In addition to replacing the word “indicates,” it would be beneficial to state here that utility energy records obtainable via the web are also a suitable data source.

3. Page 8-6, Example 8-3, under Complying with 130.5(a), “...and kWh for a utility defined period.”

Comment: This needs to be changed to “user-definable period” to agree with the new wording of the code.

4. Page 8-6, Example 8-4, under Complying with 130.5(a), “No, it is only required to have one service electrical metering for each service in accordance with §130.5(a).”

Comment: This compliance statement is at odds with the NEC definition of “feeder” as noted above. As commented previously, the intent behind the meaning of “feeder” must be clarified.

5. Page 8-7, Example 8-5. “I have a building with multiple tenant spaces and each individual tenant space are served by separate and individual feeders. There is an individual meter for each of the feeders. Do I have to install a separate meter at the building service to fulfill the §130.5(a) requirement?
Complying with §130.5(a) For the above building, it is not necessary to install a separate metering system for the service, as long as there are individual meters for all the feeders and all the meters meet the metering functionality requirement based on the building service size and in accordance to §Table 130.5-A.”

Comment: The example can be construed to apply to a couple of different situations. The difference is whether the tenant energy is measured for billing purposes by a submeter owned by the landlord who has a master meter agreement with the utility, or is the tenant load billed using a dedicated utility-owned meter? The latter is the most common. In such situations, the dedicated feeder is supplied from a service disconnect. This being the case, the term "feeder" should be replaced with the term "service disconnect." It is also important to note that the meter required for 130.5(a) does not necessarily need to be installed or can be installed at the service disconnect, but could also be installed on the mains of the panel immediately downstream of the service disconnect. This is necessary because most multiple-tenant service equipment is not designed to accommodate user metering on the enclosure. Another good reason to locate a meter downstream is that the tenant may not have easy access to the electrical room containing his service disconnect, but he does have access to the distribution or branch panel connected downstream of the service disconnect.

6. Page 8-10, “Electrical meters provided by utility companies, that are capable of indicating instantaneous kW demand and kWh for a defined period...”

Comment: A web search failed to identify a smart meter available that can "indicate...kWh for a defined period." The meters I am familiar with indicate accumulated kWh. However, the user can determine the kWh for a defined period if they are able to read the accumulated kWh from the meter at the beginning and ending of the desired period, and calculate the difference. In addition, it is questionable why the term "indicate" is used rather than "provide," in light of the discussion above where the utility metering system is capable of providing kWh usage over a defined period, and this should be compliant with the code and a permanent meter not required. This discussion does not address the other service metering requirements, i.e. maximum kW and energy per rate

period, which most utility meters do not “indicate” and further explanation on this point is needed. Note that PG&E's page on smart meters states that only meters for Net Metering on Time Of Use tariffs will indicate energy per rate period.

7. Page 8-16, method 2, “This method must permit permanent measurement ...”

Comment: Please expand on this point. What is meant by “permit permanent measurement?” Why does this method require permanent measurement to be permitted but not method 1?

8. Page 8-16, method 3, “Up to 10 percent of the disaggregated connected load is permitted to be from any other disaggregated load types specified in Table 130.5-B of the Energy Standards.”

Comment: Is the exception relevant to this method? Does this suggest that 10 % of the building load need not be measured?

9. Page 8-17 and 18, Example 8-7.

Comment: Please add more detail to this example to show how it “permits permanent measurement” as noted in the Method 2 description above.

10. Page 8-19, Example 8-8, Split bus system.

Comment: This example is not practical. Commonly available panelboard box widths do not provide the wire bending space required by the NEC to allow a split bus panel design as shown here. No such "panels" are known to be available. Perhaps this might be possible in a switchboard design if the incoming cables are terminated in an adjacent section.

11. Page 8-19, Example 8-9, “Can a panelboard with provisions allowing branch circuit energy monitoring be allowed...”

Comment: It is not clear which method this example is intended to illustrate. If it is intended to be an example for Method 3, another word than “provisions” should be used, as “provisions” implies that the measurement system is not installed yet. Recommend rewording this as, “Can a panelboard provided with branch circuit energy monitoring and connected to an energy measurement system be allowed...”

12. Page 8-30, Example 8-9.

Comment: Cases #1 and #2 are not complete. The diagram is noted with phrases “Feeder with” and “Branch circuit with.” Only Case #3 has voltage drop percentages included.