690.31(B) **Methods Permitted.**

[ROP 4–284a, ROP 4–285, ROP 4–287, ROP 4–301. ROP 4–295, ROP 4–296, ROP 4–300]

Current Draft Text:

(B) Identification and Grouping. PV source circuits and PV output circuits shall not be contained in the same raceway, cable tray, cable, outlet box, junction box, or similar fitting as conductors, feeders, branch circuits of other non-PV systems, ~~or inverter output circuits~~ unless the conductors of the different systems are separated by a partition. PV system conductors shall be identified and grouped as required by 690.31(B)(1) through (4). The means of identification shall be permitted by separate color coding, marking tape, tagging, or other approved means.

Recommendation: Strike the inserted text and retain the 2011 language.

Substantiation: The panel was in error in accepting the proposal 4-194. The original language of 690.31(B) provides protections specific to the unique nature of PV sources by limiting conductors, feeders or branch circuits of **non-PV** systems within the same raceway, cable tray, cable, outlet box, junction box, or similar fitting as PV source and output circuits, because a typical person servicing a non-PV circuit expects it to be deenergized after opening all OCPD at the service panel, whereas PV source and output circuits may remain energized whenever the sun is shining. This proposal attempts to layer additional theoretical protections against the potential risk to equipment due to a double fault condition. However, the proposed inclusion of “or inverter output circuits” is contrary to the specific nature of solar inverters, places an unrealistic burden on installers and inspectors, and does not provide the safety the submitter intends.

300.3(C)(1) allows conductors of ac and dc circuits to occupy the same equipment wiring enclosure, cable, or raceway, provided all conductors have an insulation rating equal to at least the maximum circuit voltage applied to any conductor within the enclosure, cable, or raceway. Inverters have, by definition, both AC and DC inputs and outputs, and multi-mode inverters may have multiple inputs and outputs. Many manufacturers have developed balance of system components with both AC and DC circuit routing and OCPD to accommodate these multiple inputs and outputs, and enable safe and practical installation of listed inverters. This proposal would call into question whether those products could be installed as designed and intended. Adequate provisions currently exist to ensure safety in photovoltaic systems – Chapter 3 provides the wiring methods required for safety, 690.15, 16 and 17 require that devices be identified if energized from multiple sources, and 690.4(E) requires service on these systems to be performed only by qualified persons.

The 2011 NEC handbook includes commentary which clarifies the intent of this section by specifically stating this “does not permit the alternating-current branch-circuit conductors that supply an exterior luminaire installed near a roof-mounted PV array to share the same raceway or cable with the conductors of PV source circuits or PV output circuits. Conductors directly related to a specific PV system, such as those in dc and ac output power circuits, may be contained in the same raceway as PV source and output conductors, providing they meet the requirements of 690.4(B)(1) through (B)(4) and 300.3(C).”