Submitted by Wiles

690.47(D). ROP 4-315

Change the proposed text as follows

**(D) Additional Electrodes for Array Grounding.**
Grounding electrodes shall be installed in accordance with 250.52 at the location of all ground- and pole-mounted photovoltaic arrays. The electrodes shall be connected directly to the array frame(s) or structure. The dc grounding electrode conductor shall be sized according to 250.166. Bonding this grounding electrode to other grounding electrodes in the system is not required. Additional electrodes are not permitted to be used as a substitute for equipment bonding or equipment grounding conductor requirements. **[ROP 4–315]**

Rationale: Adding the sentence shown removes any confusion in this area. The required equipment-grounding conductor connects all grounding electrodes together. An additional bonding connection between electrodes which may be hundreds or thousands of feet apart is not required or warranted, and will create parallel paths of currents in the equipment-grounding conductor. This requirement now follows practice established in 250.54 and in 250.32

A note to CMP-4. The panel actions as published in the Draft NEC and the panel statements are not consistent and are confusing. The original proposal did not include roof top installations. The panel actions added roof top installations. The panel statement said that roof top installations were not to be included. The draft NEC follows the original proposal, not the panel actions, and does not include roof top installations.

We agree with the panel statement and the draft NEC. Do not include roof-top installations.

First Solar Response:

1. Is the re-introduction this paragraph requiring auxiliary grounding electrodes for the purposes of lightning protection for ground mounted PV arrays?

2. If yes to number 1 above, this requirement could be interpreted to require literally thousands of grounding electrodes, grounding electrode conductors, termination of

the GEC, testing and maintenance for large scale PV arrays. As was stated in the ROP #4-238 Log #2509 NEC-P04 for the 2011 NEC cycle, mandating the installation of lightning protection equipment is beyond the scope of NFPA-70.

3. There has been no evidence to support the need for lightning protection of ground mounted PV arrays in the United States. The cost-benefit analysis is heavily weighted against the addition of the extra equipment.

4. As these large, ground mounted arrays are not occupied structures, there is no argument that lightning protection of said arrays is a life safety requirement.

5. In addition, there is no evidence to suggest that there have been fires that resulted from lightning strikes for ground mounted arrays.

6. First Solar does not support the re-entry of this language if the term “shall” in the first sentence is not changed to “may”

Wiles Comment: This additional grounding requirement may have been viewed as equivalent to the Sec 250.32 requirements for a ground rood at each separate structure where power is located to maintain a local near zero potential with the earth. Ground mount array poles and beams may meet this requirement if they meet the requirements of 250.52.