FORM FOR COMMENT FOR 2014 NATIONAL ELECTRICAL CODE®

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Type or print **legibly**. Use a separate copy for each comment. Limit each comment to a **SINGLE** section. All comments **must be received by NFPA by 5 p.m., EDST, Wednesday, October 17, 2012**, to be considered for the 2014 National Electrical Code. Comments received after 5:00 p.m., EDST, Wednesday, October 17, 2012, will be returned to the submitter.

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Date 15 OCT 2012 **Name** JOHN C. WILES, JR. **Tel. No.** 575-646-6105

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Please indicate organization represented (if any) PV INDUSTRY FORUM

1. Section/Paragraph 690.11

2. Comment on Proposal No. (from ROP): 4-246a

3. Comment recommends (check one): ☐ new text ☒ revised text ☐ deleted text

4. Comment (include proposed new or revised wording, or identification of wording to be deleted): [Note: Proposed text should be in legislative format; i.e., use underscore to denote wording to be inserted (inserted wording) and strike-through to denote wording to be deleted (~~deleted wording~~).

Modify the text of 4-246a as shown:

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

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

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

5. Statement of Problem and Substantiation for Comment: (Note: State the problem that would be resolved by your recommendation; give the specific reason for your Comment, including copies of tests, research papers, fire experience, etc. If more than 200 words, it may be abstracted for publication.)

The comment limits the arc-fault protection requirements in PV-DC systems to series arcs by re-inserting existing language from the 2011 NEC.

The PV Industry Forum Task Group welcomes the 4-246a proposed changes in clauses (1)-(3) to simplify language and to remove prescribed methods, thereby allowing alternate methods. We recommend however that arc-fault protection should be limited to series arcs and not include parallel arcs at this time for the following reasons:

- Parallel arc-fault protection technology has significant implementation implications and needs further development: Parallel arc-fault protection technology has much greater implications for the industry than series arc-fault technology, effectively requiring module level control or string/array short-circuiting. Module level methods have been developed and tested in limited settings, but still have complex control, communication, field-reliability, and therefore safety considerations that are of concern, especially for larger systems. String/array short-circuiting methods are known to have caused thermal overheating in modules, and possibly will be avoided altogether. We acknowledge and encourage the progress being made in parallel arc-fault protection technology, particular with detection, but believe that more research is needed on mitigation/implementation techniques before protection should be mandated by code.

- Industry data being collected in the United States and Germany, among others, indicates that PV failures leading to fire are overwhelmingly initiated by ground faults and series arcs, not parallel arcs. Where parallel (line-line) faults have occurred, they have been precipitated by ground faults or series arcs. This data corroborates the experience of Industry Forum participants, IEC experts, and others throughout the industry.

- The CMP is already (appropriately) tackling the important sources of failure:
  - Ground-fault protection: The CMP has approved PV Industry Forum proposals addressing known deficiencies in PV ground-fault protection, the most important of which is 690.5.
  - Series-arc fault protection (expanded): We support proposal 4-251, which extends (series) arc-fault protection to all systems rather than building systems only, for the reasons described in the 4-251 proposal substantiation. Fires have occurred in building and ground mount systems alike as a result of series arcs, and protection is needed.
  - Although parallel arcing faults are rare, they are even less likely to occur with improved ground fault protection and series AF protection which would detect and mitigate those faults before they progress to a parallel arc fault.

- By approving proposals 4-246a and 4-251 together, we believe the CMP is inadvertently extending module level control requirements to all systems, including ground mounted systems. This would have significant implications for the PV industry, and is not justified given the points described above.

6. Copyright Assignment

(a) X I am the author of the text or other material (such as illustrations, graphs) proposed in the Comment.

(b) ☐ Some or all of the text or other material proposed in this Comment was not authored by me. Its source is as follows:
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Signature (Required) John C. Wiles, Jr.

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