

# FORM FOR PROPOSAL FOR 2014 NATIONAL ELECTRICAL CODE®

## INSTRUCTIONS — PLEASE READ CAREFULLY

Type or print **legibly** in **black** ink. Use a separate copy for each proposal. Limit each proposal to a **SINGLE** section. All proposals **must be received by NFPA by 5 p.m., EST, Friday, November 4, 2011**, to be considered for the 2014 National Electrical Code. Proposals received after 5:00 p.m., EST, Friday, November 4, 2011, will be returned to the submitter. If supplementary material (photographs, diagrams, reports, etc.) is included, you may be required to submit sufficient copies for all members and alternates of the technical committee.

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Please indicate organization represented (if any) PV INDUSTRY FORUM

1. Section/Paragraph 690.14

2. Proposal Recommends (check one): ☐ new text ☒ revised text ☐ deleted text

3. Proposal (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~~).]

It is proposed that Section 690.14 be restructured and revised to improve clarity and intent. This proposal is for 690.14(C). 690.14(C) contains information duplicated in 690.13 and is modified as shown below. The original *2011 NEC* 690.14 and an overview of the entire 690.14 revision have been attached in the substantiation. Additional proposals are provided on a subsection-by-subsection basis to allow comparisons with proposals submitted by others.

**(C) Requirements for Disconnecting Means.** ~~Means shall be provided to disconnect all conductors in a building or other structure from the photovoltaic system conductors.~~

**G (1) Location.** The dc photovoltaic disconnecting means shall be installed at a readily accessible location either ~~on the~~ outside of a building or structure or inside nearest the point of entrance of the system conductors. The disconnecting means shall comply with 690.17.

*Exception: The location of the PV system disconnecting means for the dc PV source and output circuits ~~Installations that comply with 690.31(E) shall be permitted to be in a location that is have the disconnecting means located~~ remote from the point of entry of the system conductors.*

The ~~photovoltaic~~ PV system disconnecting means shall not be installed in bathrooms.

Informational Note #1: The readily accessible location requirement for the dc PV system disconnecting means and the requirement that it be at the point of entry of the conductors implies that the PV system conductors remain outside the building until the first disconnect is reached. The exception, when met, allows these conductors to be routed through the building to the dc disconnecting means location that is still required to be readily accessible, but no longer is required to be at the point of penetration.

Informational Note #2: The interior of a locked building is considered readily accessible by first responders in emergency situations.

**(2) (D) Marking.** Each dc photovoltaic system disconnecting means shall be permanently marked to identify it as a dc photovoltaic system disconnect.

**(3) (E) Suitable for Use.** Each dc photovoltaic system disconnecting means shall be suitable for the prevailing conditions. Equipment installed in hazardous (classified) locations shall comply with the requirements of Articles 500 through 517.

**(4) (F) Maximum Number of Disconnects.** The dc photovoltaic system disconnecting means shall consist of not more than six switches or six circuit breakers mounted in a single enclosure, in a group of separate enclosures, or in or on a switchboard.

**(5) (G) Grouping.** The ~~photovoltaic~~ dc PV system disconnecting means shall be grouped with the ~~other~~ disconnecting means for other services connected to the building or structure to comply with 690.14(C). A ~~photovoltaic~~ dc PV disconnecting means shall not be required at the photovoltaic module or array location. A dc PV disconnecting means shall be permitted at the array location if that location complies with 690.14 (C) or 690.14(H).

*Exception: The disconnecting means for multiple PV systems on a single building or structure shall not be required to be grouped together where the requirements of 705.10 are met.*

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

The introductory information in 690.14(C) is deleted since it duplicates 690.13 and the information in subsection (1) is elevated to (C) with revisions.

Subsections (2) through (5) are renumbered as (D) through (G) with revisions.

690.14(C) Removed old 690.14(C) since the requirement is addressed in 690.13. The introduction used to be 690.14(C)1. No change in language; just location.

Exception: The exception was modified so that it pertains only to the dc outputs for modules and arrays. **See related proposal for 690.31(E).**

Informational Note #1 has been added because of the continuing inability of PV installers to realize that these disconnecting means requirements (added to the *2002 NEC* at the request of the Technical Correlating Committee) affect the routing of the conductors from the PV array to the inverter. This FPN gives information to improve understanding of the requirement and the exception.

Informational Note #2. Normally a locked house does not permit ready access as defined in Article 100. However first responders have ready access to disconnecting means inside a locked house by using master keys and fire axes.

690.14(D). Previously 690.14(C)(2). Used the abbreviation PV

690.14(E). Previously 690.14(C)(3). Used the abbreviation PV

690.14(F). Previously 690.14(C)(4). Used the abbreviation PV

690.14(G). Previously 690.14(C)(5). Revised to be consistent with 690.14(F) and to indicate that PV disconnecting means may be required in areas normally considered not readily accessible in some situations (e.g. flat roofed buildings with ready access).

The Exception is needed for installations where there are multiple, widely-spaced PV systems on a large commercial building and it is not feasible to group either the dc or ac disconnects from all systems in a single location. Examples include warehouses, malls, and apartment complexes.

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### **2011 NEC Original:**

**690.14 Additional Provisions.** Photovoltaic disconnecting means shall comply with 690.14(A) through (D).

**(A) Disconnecting Means.** The disconnecting means shall not be required to be suitable as service equipment and shall comply with 690.17.

**(B) Equipment.** Equipment such as photovoltaic source circuit isolating switches, overcurrent devices, and blocking diodes shall be permitted on the photovoltaic side of the photovoltaic disconnecting means.

**(C) Requirements for Disconnecting Means.** Means shall be provided to disconnect all conductors in a building or other structure from the photovoltaic system conductors.

**(1) Location.** The photovoltaic disconnecting means shall be installed at a readily accessible location either on the outside of a building or structure or inside nearest the point of entrance of the system conductors.

*Exception: Installations that comply with 690.31(E) shall be permitted to have the disconnecting means located remote from the point of entry of the system conductors.*

The photovoltaic system disconnecting means shall not be installed in bathrooms.

**(2) Marking.** Each photovoltaic system disconnecting means shall be permanently marked to identify it as a photovoltaic system disconnect.

**(3) Suitable for Use.** Each photovoltaic system disconnecting means shall be suitable for the prevailing conditions. Equipment installed in hazardous (classified) locations shall comply with the requirements of Articles 500 through 517.

**(4) Maximum Number of Disconnects.** The photovoltaic system disconnecting means shall consist of not more than six switches or six circuit breakers mounted in a single enclosure, in a group of separate enclosures, or in or on a switchboard.

**(5) Grouping.** The photovoltaic system disconnecting means shall be grouped with other disconnecting means for the system to comply with 690.14(C)(4). A photovoltaic disconnecting means shall not be required at the photovoltaic module or array location.

**(D) Utility-Interactive Inverters Mounted in Not-Readily-Accessible Locations.** Utility-interactive inverters shall be permitted to be mounted on roofs or other exterior areas that are not readily accessible. These installations shall comply with (1) through (4):

- (1) A direct-current photovoltaic disconnecting means shall be mounted within sight of or in the inverter.
- (2) An ac disconnecting means shall be mounted within sight of or in the inverter. The requirements in 690.14(D)(1) and (D)(2) provide for servicing disconnects at the inverter.
- (3) The ac output conductors from the inverter and an additional ac disconnecting means for the inverter shall comply with 690.14(C)(1).
- (4) A plaque shall be installed in accordance with 705.10.

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**Here are all sections of the proposed 690.14 presented without showing the deletions.**

**690.14 AC and DC Photovoltaic Disconnecting Means.** The direct current (dc) PV system disconnecting means shall comply with (A) through (G). The alternating current (ac) PV disconnecting means for PV systems or AC PV modules shall comply with (H) and (I).

**(A) Disconnecting Means.** The dc disconnecting means shall not be required to be suitable as service equipment and shall comply with 690.17.

**(B) Equipment.** Equipment such as photovoltaic source circuit isolating switches, overcurrent devices and blocking diodes shall be permitted on the PV side of the dc PV disconnecting means.

**(C) Location.** The dc photovoltaic disconnecting means shall be installed at a readily accessible location either outside of a building or structure or inside nearest the point of entrance of the system conductors. The disconnecting means shall comply with 690.17.

*Exception: The location of the PV system disconnecting means for the dc PV source and output circuits that comply with 690.31(E) shall be permitted to be in a location that is remote from the point of entry of the system conductors.*

The PV system disconnecting means shall not be installed in bathrooms.

Informational Note #1: The readily accessible location requirement for the dc PV system disconnecting means and the requirement that it be at the point of entry of the conductors implies that the PV system conductors remain outside the building until the first disconnect is reached. The exception, when met, allows these conductors to be routed through the building to the dc disconnecting means location that is still required to be readily accessible, but no longer is required to be at the point of penetration.

Informational Note #2: The interior of a locked building is considered readily accessible by first responders in emergency situations.

**(D) Marking.** Each dc photovoltaic system disconnecting means shall be permanently marked to identify it as a dc photovoltaic system disconnect.

**(E) Suitable for Use.** Each dc photovoltaic system disconnecting means shall be suitable for the prevailing conditions. Equipment installed in hazardous (classified) locations shall comply with the requirements of Articles 500 through 517.

**(F) Maximum Number of Disconnects.** The dc photovoltaic system disconnecting means shall consist of not more than six switches or six circuit breakers mounted in a single enclosure, in a group of separate enclosures, or in or on a switchboard.

**(G) Grouping.** The dc PV system disconnecting means shall be grouped with the disconnecting means for other services connected to the building or structure to comply with 690.14(C). A dc PV disconnecting means shall not be required at the photovoltaic module or array location. A dc PV disconnecting means shall be permitted at the array location if that location complies with 690.14 (C) or 690.14(H).

*Exception: The disconnecting means for multiple PV systems on a single building or structure shall not be required to be grouped together where the requirements of 705.10 are met.*

**(H) Utility-interactive Inverters Mounted in Not Readily-Accessible Locations,** Utility-interactive inverters shall be permitted to be mounted on roofs or other exterior areas that are not readily accessible. These installations shall comply with 690.14(H) (1) through (5):

- (1) A dc PV disconnecting means shall be mounted within sight of or in each inverter.
- (2) An ac disconnecting means shall be mounted within sight of or in each inverter.
- (3) An additional disconnecting means complying with 690.14 (I) shall be installed on the ac output circuit of the inverter(s).
- (4) A plaque shall be installed in accordance with 705.10.

**(I) AC PV Disconnect.** The main service disconnect(s) on a building or structure shall be permitted to serve as the ac PV disconnect for utility-interactive inverters or ac PV modules connected to the load side of the service disconnect.

Where connections, as permitted by 705.12(A), are made on the supply side of the service disconnect, the PV systems shall be considered parallel power production systems as permitted by 230.2 and shall be permitted an additional six ac PV disconnects per PV system as allowed by 230.71. These ac disconnecting means shall comply with the location requirements of 690.14(C).

Disconnecting means in the ac output circuit of each utility-interactive inverter shall be required where the individual inverter does not have an internal ac output disconnect and where the inverter is not within sight of the main service disconnect.

AC disconnecting means shall be permitted at each inverter.

The disconnecting means shall comply with 690.17.

**5. Copyright Assignment**

- (a) ☒ I am the author of the text or other material (such as illustrations, graphs) proposed in the Proposal.
- (b) ☐ Some or all of the text or other material proposed in this Proposal was not authored by me. Its source is as follows: (please identify which material and provide complete information on its source)

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**Signature (Required)**

*John L. Wilco, Jr.*

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