



Canadian Standards Association
Mississauga, Ontario
To the Part I Committee

Subject No. 3121

Chair: M.S. Anderson

Date: October 4, 2004

Title: Disconnecting Means, Rule 50-012(3)

Submitted by: Pat Cusack, ARISE Technologies Corporation, 321 Shoemaker Street, Kitchener, Ontario, N2E 3B3, Tel 519 725 2244, Fax 519 725 8907 on June 2, 2003

Proposal: Alter Sbrule 50-012 (3) as follows:

50-012(3) Any photovoltaic output circuit rated greater than 50 volts shall have means to disable and isolate it.

Reason for Request: Modules always have voltage available when illuminated, although the hazard is limited because the current is inherently limited. The only method available to disable the module is to cover it with an opaque material, as discussed in Appendix B. The statement that “any portion of a photovoltaic output circuit operating at more than 30 V, means shall be provided to disable that portion” implies that this makes it safe. If the portion so disabled is connected to a non-disabled portion, a small hazard can still exist should someone attempt to isolate it. The complete output circuit must be disabled (or covered) to make it safe.

Given that the complete circuit must be disabled and isolated, the disconnecting means specified in subrule (1) is sufficient. The same should be adopted in subrule (3) for the pv output circuit, in addition to the other equipment.

There is no rationale as to why 30 V was used in the original subrule. The new source circuit rating definition makes the choice of 30 V dubious. The use of values in Rule 16-200(a) and (b) as specified in Rule 50-000, and the choice of 30 V (from the limit in Rule 16-200(1)) is less obvious or relevant than the choice of 50 V. Other rules within the code use 50 V as a demarcation for applying grounding and guarding.

The current rule specifies “photovoltaic output circuit operating at more than 30 V.” There is no definition of what “operating at 30 V” means. It is usually taken to mean the nominal rating of circuit. A photovoltaic system intended to charge a 24 volt battery will normally operate in the range of 20 to 28 volts, with open circuit voltage up to 43. volts, and be rated at 125% of 43 volts. Replacing “operating at 30 V” with “rated greater than 50 V” removes confusion.

Supporting Information: The voltage rating of the photovoltaic source circuit was redefined in the 2002 version of the CE Code to be 125% of the open circuit voltage of the photovoltaic source circuit (Rule 50-006). It was originally equal to the open circuit rating. When this was

done, the voltage in subrule (3) of 50-012 should have been changed to 125% of 30 volts, or 37.5 volts, or the voltage limit should have been eliminated. 37.5 volts is not used anywhere else in the code, so another value should be used.

The European Community's Low Voltage directive regards 50 V as the threshold where shock becomes a concern.

Rule 10-102 for grounding Two-Wire Direct Current Systems uses 50 V as a lower limit. Rule 10-114 also uses 50V. Rule 28-012 Guarding uses 50 V as the lower limit required for guarding exposed live parts. It is reasonable to apply the guarding principle to "static generators" such as photovoltaic systems operating at greater than 50 V.

Chair's Comments: I support the proposal and would like to add that this change is consistent with the requirements of the NEC.

Subcommittee Deliberation: Nine members voted, all in agreement, two with comments which were reviewed at a recent meeting with the majority of the Subcommittee

Subcommittee Recommendation: Accept the proposal as written.