



UNITED STATES  
CONSUMER PRODUCT SAFETY COMMISSION  
WASHINGTON, DC 20207

**Memorandum**

Date: October 22, 2002

TO : Jacqueline Elder  
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THROUGH: Hugh McLaurin *Hm*  
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SUBJECT : CPSC Staff Proposals for New GFCI Requirements in the *National Electrical Code* to Reduce the Risk of Electrocution for Consumers

One strategic goal of the U.S. Consumer Product Safety Commission (CPSC) is to reduce the death rate from consumer product-related electrocutions by 20% over the ten-year period 1994 to 2004. While progress toward this goal is encouraging (a reduction of 30% over the first five years of the ten-year period<sup>1</sup>), a recent internal evaluation of the program to reduce electrocutions indicates that additional lives can be saved and recommends continuing efforts to upgrade codes and standards to protect consumers from electric shock. The latest estimate (for the year 1999) is that there were 170 consumer product-related electrocutions in the United States. Appliances, household wiring, power tools, and lamps are among the products identified.

While the specific products involved in electrocution events vary widely, from microwave ovens and air conditioners to extension cords and vending machines, broad electrocution protection for almost all of these products can be achieved by greater application of a proven electrocution prevention device, the ground-fault circuit interrupter (GFCI). The GFCI was introduced over 30 years ago. Since that time CPSC staff has successfully promoted new model code requirements that provide additional GFCI protection at the high-risk electrical outlets in homes and require GFCIs to be incorporated into several specific products. Today, the *National Electrical Code (NEC)*, NFPA 70, requires receptacle outlets in dwellings for bathrooms, kitchen counters, unfinished basements, crawl spaces, garages, and outdoors to provide GFCI protection. The GFCI is incorporated either into the outlet device itself, or as an integral part of the circuit breaker that supplies electricity to the outlet. The *NEC* also includes GFCI requirements for high-pressure washers and hot tubs. For cord-connected appliances that

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<sup>1</sup> CPSC Report "1999 Electrocutions Associated with Consumer Products", Prowpit Adler, CPSC, July 2002.

require an electric shock protective device, the GFCI is generally located within the attachment plug or along the power cord.

At this time, it is appropriate to consider a code change to require that all general-use electrical receptacle outlets accessible to consumers in homes and public places are provided with GFCI technology based on the following factors:

- the success of GFCIs in playing an important role to reduce electrocutions,
- GFCI design improvements that resulted from the upgraded Underwriters Laboratories (UL) safety standard requirements for GFCIs that make them more reliable, and
- lower costs for GFCIs associated with greater production quantities.

The attached set of proposals is intended to accomplish this objective. In addition, a proposal for GFCI protection for electric vending machines is included because this product is associated with seven reported electrocutions in CPSC data records, four of which were investigated by CPSC and reviewed by CPSC electrical engineering staff. Two CPSC investigations involved the deaths of children, ages 9 and 10, when they came in contact with vending machines. CPSC staff recently met with the trade association representing manufacturers of vending machines to share the CPSC data and inform them of CPSC staff interest in the code change. The industry representatives indicated a willingness to consider actions to address these electrocutions.

Substantiation is given for each proposal, including references to CPSC investigations of electrocutions that have occurred to innocent victims, including children, in areas where GFCIs would have likely prevented the death, but are not presently required in the model code.

In addition to submitting these proposals to the National Fire Protection Association in accordance with the procedures to revise the *NEC*, we recommend that CPSC publicize this submission and enlist the support of outside parties to advocate the change. The *NEC* Committee, which includes CPSC technical staff in non-voting status, is instrumental in the adoption of code changes. The Committee has representation from all segments of the electrical community (manufacturers, industry trade associations, authorities at local, state and federal levels, electrical contractors, unions, testing laboratories, utilities, academicians and professional societies), and a consensus of the committee members is required to adopt a change.

Most proposed changes to the *NEC* are routinely submitted by CPSC staff as part of the ongoing voluntary standards activities that address fire and shock hazards to consumers. However, in this instance, it may be appropriate to advise the Commission of the proposed change covered herein due to the significance of the action sought.