U.S. CONSUMER PRODUCT SAFETY COMMISSION
WASHINGTON, D.C. 20207
December 15, 1998

Ms. Camille A. Alma
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Underwriters Laboratories Inc.
1285 Walt Whitman Road
Melville, New York 11747-3081

**Re:** Request for Comments on Discussion Items Regarding the Proposed First Edition of the Standard for Arc Fault Interrupters, UL 1699

Dear Ms. Alma

This letter will serve as the U.S. Consumer Product Safety Commission (CPSC) staff comments to the meeting report of the UL 1699 Industry Advisory Group (IAG) dated October 19, 1998.

**Terminology** - The CPSC staff agrees with identifying the devices as arc-fault circuit-interrupters (AFCIs). The staff believes that the terminology should be consistent with the National Electrical Code (NEC) to minimize confusion.

**Glossary** - The CPSC staff agrees with revising the name of the devices to branch/feeder AFCIs. The staff also agrees with the revision of the definition that will state "it is intended to be installed at or near the panel board."

**Test Circuit** - The CPSC staff agrees with Underwriters Laboratories (UL) test circuit proposal, sections 14A.1, 14A.2, and 14A.3, from the ADDENDUM TO THE UL 1699 IAG MEETING AGENDA FOR DISCUSSION AT THE UL 1699 IAG MEETING SEPTEMBER 14 & 15, 1998.

As stated in our June 4, 1998 comment, the CPSC staff believes that two test buttons on a combination GFCI/AFCI can be confusing for consumers who are not educated about the different types of protection afforded by conventional circuit breakers, GFCIs, and AFIs. However, if present technological limitations necessitate the use of two test buttons, we would reiterate that the critical issue in the testing of multi-function safety devices is the effectiveness of the failure message and the way it is communicated to the consumer. The consumer needs to know why the test is conducted, how to interpret the results and how to respond to the situation. Similarly, in tripping situations, the consumer needs to know what tripped the circuit and what to do about it.

The CPSC staff also believes that the device should be prevented from permanently closing following a test failure, or minimally, the device should incorporate a visual indicator of performance (LED or lamp clearly indicating a test failure). We believe that it is critical that the consumer be aware that the device is functioning properly. In some cases, it is believed that tripped GFCIs may not be tested by the consumers (only reset). In these cases, the new requirement would force testing and prevent a consumer from using a non-functional device.

Although in "Consumer Experience with Ground Fault Circuit Interrupters (GFCIs) – Results of a National Survey in June 1985", it was reported that 50 percent of the respondents were not aware of the need to test the GFCI on a regular basis. The CPSC Human Factors staff believes that this new requirement will not discourage consumers testing the safety device. It is believed that consumers will test safety devices when convenient (when visible or when reminded) independently from the perceived outcome of the test.

Additionally, CPSC incident product safety assessments support the need for self-testing devices with performance indicators as opposed to devices that rely on the behavior of consumers.

Both auto self-test and the non-reset of a non-functional device have been presented to the CPSC staff. We believe that these new technologies are available and will improve consumer's safety. They should be incorporated now or in the near future.

For additional comments, see the CPSC staff comments dated 4 June 1998.

**Arc Fault Detection Tests** -
Carbonized path arc ignition test - The CPSC staff agrees with the revision to repeat an inconclusive test.

Carbonize path arc interruption test - The CPSC staff agrees that the definition of eight arcing half cycles needs additional refinement. The standard should include references to characteristic waveforms.

Unwanted Tripping Tests - The CPSC staff agrees that the characteristics of the loads need to be further refined. The standard should include references to characteristic waveforms.

From the comments at the IAG meetings and tests completed by the CPSC staff on arc fault detection tests and nuisance tripping tests, it appears that an arc simulator would simplify tests in the standard. The CPSC staff believes technology exists to simulate arcs at 120 VAC with a recorded waveform. Captured characteristic waveforms would also make testing repeatable.

The CPSC staff agrees with adding the 1000 W dimmer test. We also believe that tests should be designed up to the permissible load limits of the NEC when possible to represent the entire range of conditions to which the AFCIs may be subjected.

The CPSC staff agrees a lamp burnout and a conditioned snap switch should not cause the AFCI to trip.

**Resistance to Environmental Noise Test** - The CPSC staff agrees that a resistance-to-environmental-noise-test is needed to prevent nuisance tripping and should be established before the first edition of UL 1699 is published. The CPSC staff also supports development of a test method to determine whether the AFCI functions as intended and does not nuisance trip.

**Markings** - The CPSC Human Factors Staff has reviewed the recommended markings and believe they are adequate for the installation of receptacle-type AFCIs. However, additional

markings might be required when the test circuit issues are resolved.

The CPSC staff appreciates the opportunity to comment on the Discussion Items Regarding the Proposed First Edition of UL 1699. The views expressed in this letter do not necessarily reflect the official position of the Commission since the matter has not been reviewed or considered by the Commissioners.

Sincerely,

Douglas Lee
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Division of Electrical Engineering

Cc: Colin Church
CPSC Voluntary Standards Coordinator