



**ANSI Committee on Education**

**Standardization Case Studies**

**ACCOMPANYING QUESTION AND ANSWER WORKSHEET**

As appropriate, please suggest recommended study, test or quiz questions / answers to accompany the case study proposed above.

<b>Proposed Question</b>	What initiated the development of AFCIs?
<b>Proposed Answer</b>	In the late 1980s, an outcry arose for a solution to the residential electrical fire problem in the US. In 1992, the US Consumer Products Safety Commission initiated the “Home Electrical System Fires Project.” The US Consumer Products Safety Commission’s (CPSC) research revealed that electricity-generated fires, such as those from arc faults, were associated with more than 40,000 home fires, claiming over 350 lives and causing 1,400 injuries annually. They challenged the Electrotechnical Industry to develop a product to reduce the incidence of these fires.

<b>Proposed Question</b>	How do AFCIs offer protection that other devices do not provide?
<b>Proposed Answer</b>	An AFCI contains complex electronic circuitry that can identify specific characteristics of current or voltage waveform that is unique to arc faults. When the AFCI detects a potentially hazardous arcing condition, its control circuitry trips the internal contacts, de-energizing the circuit and reducing potential for igniting a fire.  UL provided the following summary of arc-fault detection to the CPSC: "...the most promising new technology evaluated is arc-fault detection (AFD) technology...AFD technology is capable of detecting and responding to arcing-fault currents below normal load currents as well as above and, therefore, has the potential to monitor and detect precursory arcing conditions that may not constitute an immediate threat of ignition... but which could eventually lead to ignition."

<b>Proposed Question</b>	What was/is the role of Underwriters Laboratories (UL) and of the National Fire Protection Agency in promoting AFCIs?
<b>Proposed Answer</b>	The CPSC contracted with UL to provide research and evaluation. Their assessment included: <ul style="list-style-type: none"> <li>- Arc-fault detection</li> <li>- Modified-trip circuit breakers</li> <li>- Ground fault interrupting products</li> <li>- Supplemental protection (fuses and thermal cut-outs)</li> </ul> Underwriters Laboratories worked with National Electrical Manufacturers Association (NEMA), manufacturers, and other interested parties to develop the final AFCI safety standard. UL also certifies specific products as meeting the

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	standard. UL developed unique tests to evaluate an AFCI's effectiveness in detecting and protecting against arc faults. NFPA produces the National Electrical Code (NEC), the model code for electrical wiring, which now requires use of AFCIs in residential wiring.
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