LOG OF MEETING

DIRECTORATE FOR ENGINEERING SCIENCES

SUBJECT: THERMOPLASTIC MATERIALS USED IN ELECTRICAL EQUIPMENT
Meeting with representatives from Underwriters laboratories Inc.

DATE OF MEETING: October 5, 1995

PLACE: CPSC offices at East West Towers, Bethesda, MD

LOG ENTRY SOURCE: Edward W. Krawiec

DATE OF ENTRY: October 6, 1995

COMMISSION ATTENDEES:
Aaron Banerjee, ESEE
William H. King, Jr., ESEE
Rohit Khanna, ESME
Edward W. Krawiec, ESEE
Andrew G. Stadnik, ES

NON COMMISSION ATTENDEES:
Ken Adams, SPI
Dave Adams, Hewlett-Packard
Jim Beyreis, Underwriters Laboratories Inc.
John A. Blair, SPI/DuPont
Paul B. Brown, SPI/GE Plastics
Bob Davidson, Underwriters Laboratories Inc.
Dave Dini, Underwriters Laboratories Inc.
Ric Erdheim, NEMA
Chris Guzy, AHAM/GE Appliances
Dave Haataja, Underwriters Laboratories Inc.
Neal W. Hursh, EIA/Thomson
Richard V. Long, EIA/Sharp
Louis Mecseri, EIA/Sony
Joe Moore, AHAM/Health-O-Meter
Wayne Morris, AHAM
Bruce C. Navarro, B. C. Navarro Legislative and Regulatory Affairs
David Shipley, Power Tool Institute
Inder Wadehra, APC/IBM
Will Ziegler, Leviton Manufacturing Inc.

SUMMARY OF MEETING: Mr. Krawiec introduced himself and Mr. Stadnik. Both then gave brief overviews of CPSC concerns about the use of thermoplastic materials in electrical equipment. Mr. Krawiec emphasized that the subject of this particular meeting was the issue of the distortion of thermoplastic materials providing support to and insulation for overheating electrical components. The loss of dimensional integrity can lead to rapid

escalation of a relatively minor problem to a potentially hazardous failure of the equipment. Mr. Stadnik emphasized the need for the producers and users of thermoplastic materials to assist in the development of a comprehensive approach to reducing the concerns about the use of thermoplastic materials. Mr. Stadnik then introduced Mr. Beyreis.

Mr. Beyreis provided an overview of UL's efforts to evaluate the use of polymeric and other materials in ways that are appropriate to the type of material, the type of product in which the material is used, and the expected operating conditions and usage of the product. He emphasized the point that there are no "bad" materials, only bad applications of materials. This point became the underlying theme of UL and industry comments throughout the meeting. Mr. Beyreis then introduced Mr. Davidson.

Mr. Davidson began his remarks with a brief historical perspective of insulating/supporting materials used in electrical equipment over the past 100 years. He emphasized that each of those materials had been viewed as having some characteristics that limited their utility in some applications while having other characteristics that made them better for use in other applications. He explained that both the characteristics of the materials and the characteristics of the product using those materials had to be considered. He pointed out that the UL Standards covering the use of polymeric materials in electrical equipment (the UL 746 series of standards) relied upon that approach. He also pointed out that UL was constantly reviewing and revising its standards as required to take into account changing material and product characteristics as well as reports of problems which may develop during the use of such products. Mr. Davidson indicated UL is currently exploring techniques such as the use of Hazard Based Safety Engineering, Failure Modes and Effects Analysis, Fault Tree Analysis, and others to try to ensure that its standards and the application of those standards capture potential problems which may not be easy to otherwise recognize. He emphasized the need for a comprehensive and systematic analysis of reported problems in order to evaluate the need for and the types of changes which might improve a standard.

Mr. Davidson then provided an overview of UL's opinions concerning the significance of the reports of product failures involving thermoplastic materials which had been provided by the CPSC. He offered the following categories of involvement of thermoplastics in those incidents: the materials were responsible for the initiation of the failure, the materials were responsible for contributing to the failure, the materials were involved in the failure but were actually victims, or the materials were not involved in the failure. Of the eight reports provided to UL, Mr. Davidson believes that in only three of the cases did thermoplastic materials possibly contribute to the failures while such materials were not implicated as the cause of

the failure in any of the cases. He characterized the materials as either not having been involved in or merely the victim of the failure in most of the cases.

Mr. Krawiec pointed out that the eight reports sent to UL were not necessarily the most comprehensive or most illustrative reports known to the CPSC. Those reports were simply those which were available for release by the CPSC following the 1/11/95 meeting between CPSC and UL at which UL requested such reports. Mr. Krawiec then described the information available to the public concerning the failure modes identified by the CPSC which resulted in a voluntary corrective action program covering virtually the entire multi-year production of a particular electric heater. Using Mr. Davidson's approach, the thermoplastic materials used in this heater could be categorized as "victims" of component failures. Mr. Krawiec pointed out that the properties of the "victimized thermoplastics" in this instance resulted in the rapid escalation of a minor failure into a significant risk of fire and that when fire was ignited, the thermoplastic materials transported the fire outside the essentially all metal heater enclosure.

Mr. Beyreis again pointed out that the inappropriate use of an otherwise capable material could result in a problem but that the way to deal with that kind of situation was to make appropriate changes to the standard covering that particular type of product. He indicated that UL believes that providing such information to the Industry Advisory Conference (IAC) for the type of product involved would ensure a studied and systematic approach to dealing with such problems.

The discussion then turned to the use of various analytical and evaluative techniques employed by the manufacturers' representatives in attendance. A number of points were emphasized during that discussion. It was stated that no single or even combination of techniques should be incorporated in a standard since none could identify all possibilities of difficulties which could develop. And, it was more important to train everyone involved in the design and manufacture of products to avoid blindly following standards and practices -- that there is a need to "step back" occasionally to assess the overall characteristics of a product in order to make the best decisions concerning issues such as the selection of materials. The use of tools such as Hazard Based Safety Engineering, should be part of that "stepping back" process not a requirement of a product standard.

The meeting concluded with the identification of the following action items:

- CPSC will provide additional reports and supporting information to UL for analysis.

- UL will continue its efforts to develop the use of Hazard Based Safety Engineering approaches as tools to help evaluate materials.

- UL will try to develop a "managed approach" to getting pertinent information to the specific product IACs.

- Hewlett-Packard will provide copies of its Hazard Based Safety Engineering training materials to the CPSC.