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**LOG OF MEETING**

**DIRECTORATE FOR ENGINEERING SCIENCES**

**SUBJECT:** Meeting with representatives from ZLAN Ltd.

**DATE OF MEETING:** April 29, 1996

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

**LOG ENTRY SOURCE:** Edward W. Krawiec

**DATE OF ENTRY:** May 22, 1996

**COMMISSION ATTENDEES:**  
Erlinda Edwards, ESEE  
William H. King, Jr., ESEE  
Edward W. Krawiec, ESEE  
Anna Luo, ESEE  
Mia Ngo, ESEE  
Robert L. Northedge, ESEE  
Rena Rauchschalbe, CE  
Zulma Soto, CE  
Andrew Stadnik, ES

**NON COMMISSION ATTENDEES:**  
Vince Baclawski, National Electrical  
Manufacturers Association  
Robert Clunn, ZLAN  
Sam Cristy, Washington Business  
Information Inc.  
Kenneth C. Krogh, ZLAN  
Tom Mach, Electronic Industries  
Association  
Al Scolnik, National Electrical  
Manufacturers Association  
George Spencer, ZLAN

**SUMMARY OF MEETING:** A copy of the view-graphs presented by ZLAN representatives at the meeting and a copy of a ZLAN brochure are appended to this Meeting Log. Mr. Krawiec opened the meeting with a brief description of the CPSC project which was intended to identify and evaluate new approaches to minimizing hazards associated with home electrical wiring systems. Mr. Krawiec noted that ZLAN Ltd. was an early participant in that project and that the concepts and technologies explored by ZLAN have been rapidly evolving since that time. Mr. Krawiec indicated that the purpose of the meeting was to permit ZLAN representatives to explain and demonstrate their latest approaches to providing enhanced levels of branch-circuit protection for residential applications. Messrs. Clunn, Krogh, and Spencer of ZLAN then made a multi-media presentation which

led to the identification of Spencer introduced himself and Messrs. Blanton and Davenport to the attendees and then gave a brief overview of ZLAN Ltd. He emphasized ZLAN's goal of bringing new approaches made possible by high-speed microcircuitry to the objective of reducing the number of fires attributed to electrical system malfunctions.

Mr. Spencer noted that, according to Fire Administration data, 1 in 5 fires in this country are attributed to electrical malfunctions. Mr. Spencer believes that a significant number of those fires could have been prevented if overcurrent protective devices -- primarily circuit breakers -- were better able to detect and respond to anomalies in our electrical systems. He pointed out that the basic design of conventional thermal/magnetic circuit breakers is over 50 years old and remains essentially unchanged over those years. He noted the electrical industry's insistence on defining the role of conventional overcurrent protective devices as one of merely protecting the wiring itself from overheating.

Rather than debate the logic of the industry position, Mr. Spencer has tried to focus attention on the possibility of dramatically improving the responsiveness of thermal/magnetic breakers to all electrical system anomalies by adding another sensing element in parallel with the thermal and magnetic trip elements as they currently exist. This approach is analogous to that of the introduction of Ground Fault Circuit Interrupter (GFCI) technology to conventional thermal/magnetic circuit breakers over 20 years ago. The GFCI sensing element operates in parallel with the conventional thermal and magnetic trip elements to detect and respond to an entirely different type and range of electrical anomaly. The GFCI sensing element thereby enhances the capability of a circuit breaker and expands its role beyond the mere protection of the wires from overheating. Mr. Spencer believes that ZLAN's "Circuit Overload Protection" (COP) sensing technology could similarly enhance the capability of a conventional circuit breaker and expand its role to providing true responsiveness to potentially dangerous overcurrent conditions.

Mr. Spencer described the COP concept as providing extremely high-speed monitoring of the actual current flow through the electrical system. In contrast, both the conventional thermal and magnetic trip elements respond to an indirect effect of current flowing through specially designed parts of those trip elements. Since they respond to an effect of current flow, such sensing schemes are inherently slow responding and subject to external influences. By programming the COP circuitry to accept certain well defined "overcurrent" conditions as acceptable, the COP can be set to respond almost instantly to both very low levels and very fast changing overcurrents. The ability to provide some level of "intelligence" to the COP function would

permit it to respond to a vast range of potentially dangerous conditions now outside the capability of a conventional circuit breaker to detect while minimizing "nuisance tripping" of the COP breaker.

Mr. Spencer noted that the single greatest impediment to providing dramatically improved overcurrent protection to our electrical systems is the total absence of electrical equipment design constraints which would limit "in-rush" or starting-current transients. Most electrically powered utilization equipment (motors, lighting, electronic equipment, etc.) draw a current very much higher than their normal or running current for at least a few electrical cycles when they are first turned-on. For example, a 60 watt bulb will draw a nominal 1/2 amp after it is lit but can draw over 10 times that amount of current -- 5 amps or more -- when first turned-on (depending upon the type of bulb and its construction details). Mr. Spencer's point is that high-speed microcircuitry makes it a trivial problem to sense and respond to rapidly changing overcurrent conditions but that the designs of electrical utilization equipment unnecessarily complicate the problem by producing "normal" short-term overcurrent conditions which are not easily distinguished from potentially dangerous conditions. Mr. Spencer sees a need for a massive but sharply focused effort by industry, academia, and government to study the issue of "normal" transient overcurrent conditions. The objectives of such an effort would be to develop standards governing permissible levels of such transient conditions and to develop "soft-start" technology which would minimize if not eliminate transient conditions. It would then be feasible to develop enhanced COP type protective schemes which could further reduce the incidence of electrically caused fires.

Mr. Spencer "guesstimated" that such an effort might require a budget of fifty million dollars a year over a ten year period. He noted that the cost may seem large but that it is only a fraction of the life, injury, and property loss costs associated with electrically caused fires.

Messrs. Spencer, Davenport, and Blanton then provided demonstrations of the ZLAN "Current Rating Verification" apparatus and COP equipped circuit breakers. Copies of two sets of data supporting ZLAN's positions were provided to the attendees. The data sets are entitled, Short Circuit Current vs Circuit Breaker Trip Time Test Data and House Test Data - Test Data Taken with a ZLAN Current Rating Verification Meter. Copies of these data sets are appended to this Meeting Log.