

ENERGY USER NEWS

Utilities Admit "Transients" Hike Electrical Use

By PAUL L. EDWARDS

NEW YORK--The possibility that transient voltage activity may cause "very small" increases in electricity use has been acknowledged for the first time by several utilities in a survey conducted by the Edison Electric Institute, a trade association for privately-owned utilities.

But, said the association in summarizing the findings of its members, the conditions that lead to such increases are rarely, if ever encountered. Transients are momentary bursts of excessively high voltage.

However, the engineer whose findings were examined by the utilities counters that those situations are not rare and may be encountered routinely in commercial and industrial buildings.

Dr. Walton N. Hershfield developed a test last year that he said demonstrated that transient voltage activity can cause an increase in electrical energy losses. (See Oct. 31 EUN page 1)

Several months ago, Edison Electric asked its members for comments on the Hershfield findings. Those responses did not dispute that transients could cause an increase in losses in iron-core devices such as transformers or electric motors, said Tom Kinney, staff engineer.

The utilities did object to the assumption of two conditions in Hershfield's work, however. First, they said, Hershfield claimed that there are thousands of transients present in some systems. That's not so, according to the utilities.

Second they said, Hershfield's work concerned inductive loads rather than resistive loads. Most loads, according to the utilities are resistive.

Not from Utility

Further, Kinney said, Hershfield claims most transients originate within a building or plant; they are not delivered by the utility. Kinney raises

the question, therefore, whether the elimination of transients would have any effect on the response of the utility meter and the customer's utility bill.

Additional testing of the effect transients have on electricity is necessary, Kinney said. He is currently writing a proposal to the Electrical Power Research Institute in Palo Alto, Calif., that the research group perform that testing.

Nonetheless, Kinney said, "It seems that transients would reduce efficiencies in a system, so it seems logical that transient activity would increase kilowatt-hour consumption."

Hershfield, too, called for increased utility testing of the effect of transient activity on efficiency loss and electricity consumption.

"If the utilities can be of service to the public," he said, "they would immediately devote their time and effort in research to provide assistance to the customer in helping him clean up the electrical environment in his business, industry or plant."

"Greater Magnitude"

Further, Hershfield responded to the criticism leveled at his work by the utilities. "My research indicates that transient activity is a phenomenon of greater magnitude than is generally accepted."

Transient measurement, he said, requires sophisticated instrumentation that can measure the duration, amplitude and frequency of the transients.

"The worst case of transient activity that I have measured was 648,000 per hour. This occurred on a dimmer panel that controlled 24 fluorescent fixtures in a college lecture hall," Hershfield said.

He added that similar observations have been made on the output of Westinghouse elevator controllers and ganged electroplating rectifiers at a GM plant in Fremont, Calif. Observed

transient activity there, he said, measured millions per hour.

As for inductive versus resistive loads, Hershfield said, "This is not entirely true. The hysteresis loss is a measure of the efficiency of an electrical system."

Clean Power

Responding to the final point questioned by the utilities, Hershfield said, "Transients cause loss in electrical systems. Most transients are generated on-premises. Very few come in on the power line. My experience indicates that public utilities usually deliver clean power. On-premises, transients cause electrical devices to use more power, which usually appears in the form of internal heating in iron-core devices. The disc-type wattmeter does measure and charge the customer for this increased energy use."

Hershfield concluded saying that utilities and others can substantiate his findings with actual field tests.

One distributor of transient voltage suppression equipment agreed with Hershfield that more field testing was necessary to demonstrate to everyone's satisfaction that high levels of transients are present in some cases and that they can cause electrical use to increase.

Campbell cautioned, however, "To measure transient activity, you must have fast, accurate measuring equipment. Too many times, utilities have gone out with insufficient equipment and then reported there were no transients present. Then we'd go out with our oscilloscope and measure thousands of them in the same place."

Both Hershfield and Campbell also called for the establishment of standards for transient voltage suppression equipment. Hershfield said he has tested many devices that he does not consider effective suppression devices.