As deregulation approaches, utility companies are becoming more involved with customers.

Dedmon, plant manager, ComEd, Belvidere, IL, is an example of the kind of help ComEd can give its customers at the request of Jim Dedmon, plant manager, ComEd engineers installed monitoring equipment at the facility to calculate rectifier efficiencies and DC bus transmission losses on a chromium plating line.

According to Dave Anderson, account manager for ComEd, here is what the engineers found:

- Rectifier efficiency was determined by comparing input power to output current (calculated by measuring voltage drop across the shunt resistor) and voltage. The power conversion efficiency calculated at 81 percent and was within acceptable limits for a 9V tap switch rectifier at 6000A.
- The average voltage measured across the terminals at the end of the bus was 8 volts, indicating an 11 percent loss in power.
- The temperature at some contacts exceeded 400 °F. An increase in bus temperature causes discoloration of the copper, increasing resistance by adding to the oxidized layer.
- To compound the problem further, for every 1.8 °F rise in temperature, the resistance of copper increases by 0.004 percent.

Measuring voltage across the electrodes prior to work entering the bath, and again at the rectifier, provides the percentage of energy consumed in transmission, according to Anderson. This lost energy calculation can be used to indicate problems in transmission and identify the need to issue a maintenance work order. Even if the equipment operates at part-load and current is used to control the process, the electric bill will still suffer the consequences of a poorly maintained DC bus.

In many of the older plating facilities, voltage is used to control the process. Current density at the plating bath will change as resistance of the bus increases, causing production rates to slow and temperature to increase.

Dave Anderson, left, account manager for ComEd, with Jim Dedmon, plant manager of U.S. Chrome.

After disassembling the bus, cleaning the components and reassembling the equipment, U.S. Chrome realized a productivity increase of more than 10 percent on the chromium line. This resulted in a savings on one line of $1,485 per year.

Most rectifiers today have a current control option that ensures current density requirements are maintained at the bath, as long as no other path-to-ground is available. In circumstances where equipment is operating at maximum load, however, a change in bus resistance over time cannot be offset by an increase in voltage, because no more capacity is available.

ComEd also offers assistance in other areas applicable to plating shops, such as systems that use electrocoagulation for wastewater treatment.

According to Anderson, ComEd’s continued involvement in customer operations and energy-related issues will help the power company to develop expertise to benefit commercial and industrial customers. “ComEd will continue to provide industry-specific, technical and energy services to its customers in a deregulated environment,” he said.

Editor’s note: ComEd (Commonwealth Edison Company) serves 3.4 million customers in northern Illinois. It provides power service across one-fifth of the state of Illinois, including the city of Chicago. The area served includes eight million people, or about 70 percent of the state’s population. ComEd is the nation’s third-largest consumer electric utility.