

Qual-Tech Tips

A Technical Newsletter for the Power Systems Engineer

Issue No. 2

Qual-Tech Engineers, Inc.
Pittsburgh, Pa.

April 1991

Capacitor Switching

-unexplained events-

"Once or twice a week at approximately 6:45 AM the drives in one area of our plant trip off line. It seems to occur more in the summer than in the winter."

This scenario or some version of it is not uncommon. One of the possible causes of this type of problem is capacitor bank switching - either at the same voltage level or at a higher voltage level, maybe even on the utility power system. One way this can happen is by energizing a capacitor bank on the high voltage system, and magnification of the voltage surge occurs on the low voltage system. Per the figure given below, this is more likely to occur when $L1 \times C1$ is approximately equal to $L2 \times C2$, and also when the kvar size of $C1$ is much larger than the kvar size of $C2$. The transient at the switched capacitor will tend to be less than 2.0 per unit, but on the low voltage system it may exceed 3.0 to 4.0 per unit. This may cause equipment misoperation or failure.

This overvoltage can be reduced by a number of different methods including: closing resistors or reactors in the switch, controlled closing of the switch, moving one of the capacitor banks, and adding a reactor permanently in series with one of the capacitor banks.

-W. Edward Reid

[This article is extracted from a paper developed by the author, entitled "Capacitor Application Considerations - Utility/User Interface". This paper was prepared for the Pulp and Paper Industry Technical Conference - June 1991. A copy can be obtained by checking the box on the enclosed post card and returning it to Qual-Tech Engineers.]

