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It Pays to Find the Right Solution

A company's response to high harmonic currents eliminates its troubles—and increases the capabilities of the system.

Edited by Andrew Humphrey, Assistant Editor

As the facilities manager for Reuters America, New York, John Lasher constantly evaluates the safety, reliability, and efficiency of the facility's electrical systems. Most of the load is nonlinear and consists of components such as computers and work stations.

Lasher discovered high amounts of harmonic current on two subsystems fed by 300kVA transformers. The current was especially high in the neutrals. He was not surprised to find the majority of this current—250A in one case—was at the third harmonic. Infrared testing of the transformers confirmed both were operating in excess of their temperature class ratings.

Lasher and others at Reuters considered several ways to reduce harmonic risk to the facility, including doubling neutral wires and replacing transformers with k-rated units. Ultimately, they decided to install SysteMax on the secondary side of both transformers.

SysteMax is a harmonic suppression system from Harmonics Limited, Monroe, Conn. Connected at the transformer, the system prevents the flow of third-harmonic current—thereby eliminating the need to beef up the distribution system to accommodate harmonic currents. If you remove harmonic currents, phase currents will also fall.

The installation was a success. After installing the harmonic suppression system on transformer No. 1, rms neutral current dropped by 71%, with the third-harmonic current decreasing by 98% to only 5A. Current THD was down by 87% in the phases and rms phase currents were reduced by 44%.

This reduction in rms phase currents enabled Lasher to connect additional computer loads. Post installation infrared testing showed, even with more loads connected, transformer and distribution panel temperatures were significantly lower, which decreased the likelihood of transformer failure caused by overheating.

This harmonic suppression system was the answer to one facility's problem.

A preliminary cost analysis showed an estimated reduction of 8% in power dissipation as heat due to I^2R losses in the transformer and wiring. The installation also saved the company the expense of the air conditioning that would have been necessary to remove this heat. The cost analysis projected a payback in less than two years. More importantly, the installation required only a few hours of downtime; whereas rewiring or replacing a transformer would have taken longer—and consumed more revenue. EC&M