

# Broadcast Engineering®

THE JOURNAL OF DIGITAL TELEVISION

## Special Report: **EMERGENCY** systems

- Backup power systems
- Mission-critical HVAC

GENERATOR 5  
600KW, 4160V

**CAUTION**  
THIS UNIT MAY  
START  
AUTOMATICALLY  
AT ANY TIME

**DANGER**  
HIGH VOLTAGE

DAY TANK #5  
CAMMP #3021

## MPEG-4 AVC

Inside this emerging standard

## High-speed data networks

Understanding how they work

## MGE's UPS protects KTVT against dead air

BY BILL WISE **Ghostwritten by Susan Connell**

As a CBS-owned television station, KTVT (CBS11) in Ft. Worth, TX, is held to the highest operational standards. When the transmitter stops broadcasting for more than three seconds, a call to CBS headquarters in New York to explain why the station is off the air is required. Unfortunately, the Dallas-Ft. Worth area is well-known for its wild weather, and the transmitting towers (and the power lines that keep them going) seem to be magnets for weather-related problems. While nothing can be done about the weather, part of my job is finding ways to take care of the effects. Installing a heavy-duty uninterruptible power supply (UPS) in October 2002 has helped immensely. In spite of several bouts of severe weather, the systems have stayed on the air. Before installing the UPS, the system went down as often as three or four times a month.

Installing a UPS was an obvious solution, but finding the appropriate UPS for the station's analog and digital equipment was not as clear-cut.



**This UPS employs fault-tolerant circuitry to handle high current inrush without risk of damage to the inverter.**

Although the station has redundant input from two utility substations feeding Russell Electric switchgear and a 750kW Caterpillar generator for emergency power, the sensitivity of broadcast equipment made selecting the right UPS critical. With guidance

from MGE UPS Systems and Critical Site Solutions, we installed an 800KVA EPS 6000 Series UPS from MGE. The unit provides backup power for the entire analog and digital plant as well as the blowers for the HVAC system.

Having a UPS available to protect against momentary outages and bridge the gap until the generator starts up is important, but the real benefit for transmitting equipment is protection from the crowbar effect. Any time we lose power for more than

a couple of seconds, the transmitter's crowbar protection circuit essentially puts a dead short across the IOT's power supply, taking 35,000 volts of DC to ground instantly and demanding an enormous inrush current. It's designed to protect the IOT from things such as internal tube arcs, but it results in premature wear. By using a UPS to avoid these glitches altogether, we eliminate a lot of maintenance and replacement costs. Since the tubes cost \$35,000 each, it takes only a few failures to justify the added protection. We found that MGE's UPS systems were the only units that could handle the current without immediately going to bypass.

IOT transmitters place special demands on a UPS. To handle the short on the output, the UPS must provide current for the duration without sagging the voltage on the critical bus. Alternatively, if the static switch is beefy enough, it can effectively transfer the output to the utility line, allowing the extra force of the utility to clear the fault current. If the UPS inverter output sags

during the crowbar, it may drop other electronic loads sharing the UPS output. Also, if the UPS inverter is not able to tightly regulate the voltage during these "step loads," the voltage may stray out of tolerance when the crowbar clears, which can be devastating for sensitive devices like transmitter tubes.

The 800KVA MGE system we installed provides power to keep KTVT's transmitters and other equipment going for about 10 minutes – plenty of time to keep critical systems running while the

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generator goes through at least three start-up cycles. In midsummer the total load on the UPS adds up to about 585KW. When power is restored, the generator shuts down automatically and the system synchronizes back to the utility. When we installed the UPS we noticed that our normal utility input is higher than the standard 480V. All of the transformers in the building were adjusted to this higher voltage. To maintain synchronization, we had to adjust the UPS to produce the slightly higher voltage. MGE's factory service techs were accommodating for this and other parts of the installation.

KTVT's investment established its worth many times over. The UPS has all but eliminated dead air resulting from weather and power-related disturbances. We had a big series of lightening hits at the beginning of the year. Every station with transmitters in our area went down during the thunderstorms, except us.

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*Bill Wise is the transmitter supervisor for KTVT in Ft. Worth, TX.*