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# WinDaq and the DI-400 Monitor Power Quality for an Electric Utility

DATAQ Instruments

Power utilities need to continuously monitor the quality of the electric power they generate. For one utility, this activity was performed by an array of strip chart recorders. Technology had moved on, however, and the technicians found themselves tending more to the recorders than to the electricity the utility produces. Strip chart recorders are mechanical devices that, when run on a 24/7 basis, would often breakdown. Even when working properly it was necessary to interrupt recording to replace pens or chart paper. Of course, there was the ever-present problem of what to do with all those paper recordings. Archives required huge amounts of space, and it was difficult to locate and share information. For these reasons, the utility decided to replace the strip chart recorders with computer-based systems from DATAQ Instruments. They chose us for our reputation for reliable display and recording software, the smoothness of our display, our signal conditioning capability, and data acquisition hardware know-how.

The utility planned to implement the computer-based system with six computers and one standard and five super-large monitors. Five computers contained DI-400 data acquisition cards and were connected to the large monitors. The sixth was located in a control shop and was used to monitor all acquired data on a standard monitor. The six computers were linked with a local area network.

Each of the five data acquisition computers would display as many as three, and as few as two signals on each of the large monitors. The signals to be monitored for each of three regions were:

Signal	Range	Output
Frequency	50 to 70 Hz	0 to 100mV
Bus Voltage	100 to 180 kV	0 to 100mV

In addition to these six parameters, two system-wide variables were to be monitored:

Signal	Range	Output
Narrow band frequency deviation	59.5 to 60.5 Hz	4 to 20mA
Wide band frequency deviation	55 to 65 Hz	4 to 20mA

These signals were fed to a bank of two DI-75B signal conditioning instruments. The six 100mV signals were connected to model DI-5B40-03 isolated voltage amplifiers. The remaining two process current signals were delivered to model DI-5B32-01 isolated current amplifiers. Amplifier outputs were connected to the DI-400 data acquisition cards with 40-foot cables.

The glue holding these parts together to form the final monitoring system was WinDaq software. The utility chose WinDaq/Lite since sample rates were very slow. WinDaq software allowed the technicians to display data on the screens in real time, scaled in calibrated units. Continuous logging of the data was accomplished using WinDaq's built-in stream-to-disk function with time and date stamping. Further, each data acquisition station could be monitored from the control

shop computer using WinDaq Waveform Browser playback and analysis software over the local area network without interrupting the data acquisition processes.

This system replaced reams of paper records with small, easily archived computer files. Each file contains 24 hours of fully calibrated power system data, with each recorded value correlated to date and time of acquisition. The records are maintained on a PC-based file server and are available for review by WinDaq Waveform Browser playback and analysis software on a moment's notice.