



## DIGITAL UPGRADES FOR NUCLEAR PLANTS

Hurst Technologies is on the front wave of activity in retrofitting nuclear plant control systems with digital technology.

The latest example is the replacement of the legacy annunciator system, plant process computer (PPC), and simulator at an upper Midwest nuclear plant. HTC functions as the owner's engineer. When the project is completed, scheduled for mid-2014, plant operators will use 23 new touch screen alarm display units (VDUs) that will take the place of the old analog-based annunciator board in the control room.

Although digital technology is used, the design minimizes any functional changes to how plant operators interface with the system. Graphics from the VDUs mimic the appearance and functionality of the system. Operators acknowledge alarms and adjust for them as they did previously.

At the same time, though, the digital system adds advanced functionality and makes diagnostics and maintenance easier. Alarms can be logged, alarm history can be traced, and when appropriate, the plant can implement so called "smart" alarming. Configurable actions include alarm blocking, time-delay adjustments, alarm legend changes, alarm priority changes, addition or deletion of alarms, and electronic alarm tagging for "out of service" or "disabled for testing."

Mean time to repair the system will be greatly reduced as well. Hot-swapping (with the exception of the VDUs) can be done while the unit is operating. As importantly, field wiring is decoupled from the actual displays. This means that any input can be rerouted at any time to any alarm display. The new system is expected to be more reliable because it provides greater redundancy. Near 100% availability is expected.

**Obsolescence is forcing the PPC replacement.** The 1980s vintage DEC VAX computers are being replaced with modern PC computers running standard Windows-based software. Like the annunciator, the functionality of the PPC won't change. Supporting this project is a new fiber-optic plant data network (PDN). In addition to supporting the ANN and PPC, the PDN will support the future digital based control and monitoring systems. Having the annunciator and PPC replacements done at the same time allows consistent human-factors methodologies to be applied for interfacing between the two systems.

Some of the equipment included in the project are: network infrastructure, computing hardware, input/output (I/O) hardware, human machine interface (HMI) display and engineering work stations. Computer, servers, I/O, workstations, recorders, and other associated equipment will be replaced in the main control room, the PPC computer room, and the auxiliary and turbine building. Most of the hardware is designed as commercial off the shelf.

This project complements HTC's recent project replacing obsolete annunciator systems at Nebraska Public Power District Cooper Station, as well as dozens of other digital technology projects dating back to 1994.

**If you are considering, evaluating, or launching a digital technology upgrade or installation, put our industry-leading experience to work on your project team.**



**ANNUNCIATOR  
AND PLANT  
PROCESS  
COMPUTER  
REPLACEMENT  
SOLUTIONS**

timh@hursttech.com  
www.hursttech.com  
(979) 849-5068  
P.O. Box 1718  
Angleton, TX 77516