



## MAIN-TIE-MAIN TRANSFER CONTROL SYSTEM

Palo Verde Nuclear Generating Station is the nation's largest nuclear power plant averaging 3.3 Gigawatts. Further distinguishing this plant is that it is not located adjacent to a large body of water. Requiring 40-50 thousand gallons of water per minute while being located in the dry Sonoran desert required a creative solution that is both cost effective and environmentally friendly. Palo Verde's Water Reclamation Facility (WRF) resolves this issue by purchasing and processing 20 Billion gallons of wastewater a year from Phoenix and other nearby cities.

In August of 2008 an outage occurred on one of WRF's two main feeders. Because the legacy equipment required manual operation, an operator in full arc flash suit was required to restore all panels by depressing the manual close button on the front of the breaker. A high risk and time consuming procedure. In the course of restoring power to the lost systems and loads an operator manually closed a tie breaker which resulted in phase to ground arc flash incident.

To mitigate future risk to operations personnel, WRF sought a solution to safely operate the gear both locally and remotely. Further to facilitate ease of maintenance evolutions while maintaining power to process loads, WRF requested the system be capable of closed transition transfers.

The solution engineered and implemented by CPC involved replacement of the electro-mechanical protection relays with modern multifunction processor based protection systems. By integrating control schemes within the devices and networking them back to operations command center, CPC was able to deliver all requested functions. In addition CPC implemented through control schemes fail safe sequences that would prevent unsafe interconnection of the two sources in the event of a breaker failure.

Due to the success of this project, CPC has been engaged by WRF to engineer and install this system enhancement throughout their distribution system at all levels.

### Key Benefits and Success Factors

- Rapid system restoration and reconfiguration through remote operability
- Improved maintenance flexibility
- Advanced data acquisition integrated into operator interface panels
- Consolidation of multiple single function relays
- Synchronized event recording for fault/disturbance monitoring
- Addition of test switches to improve testing execution and safety
- Elimination of obsolete devices
- Arc flash risk mitigated by delayed breaker closure following local operator initiation

### Client

*Palo Verde Nuclear Generating Station  
Water Reclamation Facility*

### Location

*Maricopa, AZ*

### Processing Capacity

*90 Million Gallons Per Day*

### Level of Involvement

- ✓ *Engineering Design*
- ✓ *Procurement*
- ✓ *Controls Programming*
- ✓ *Installation and Execution*
- ✓ *Systems Integration*
- ✓ *Testing and Start-up*
- ✓ *Operator Training*



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