



City of Vacaville Wastewater Treatment Plant

Project Name: City of Vacaville Easterly Wastewater Treatment Plant Expansion

Project Location: Elmira, California

Consultant: West Yost Associates, Brown & Caldwell

General Contractor: Walsh Pacific Construction, Con J. Franke Electric

The City of Vacaville selected FluidIQs to design a complete control system to monitor and control all processes pertaining to the renovation and expansion to 15 Million Gallons per Day (MGD) of their existing wastewater treatment plant.

Technology Implemented:

The control architecture included 12 Allen Bradley ControlLogix programmable logic controllers, 11 Intellution iFIX SCADA and HMI nodes, and nearly 500 field instruments.

Communications between ControlLogix controllers was accomplished with a dual redundant ControlNet network utilizing fiber optic and coaxial cabling, while communications between ControlLogix controllers and SCADA nodes was accomplished with Ethernet networks utilizing 100Base-FX fiber optic and 100Base-TX cabling, and industrial switches.

FluidIQs fabricated all of the programmable logic controller panels, implemented the entire PLC programming and SCADA development, provided instrumentation and local alarm panels, and conducted functional and operational onsite testing, while Walsh Pacific Construction and Con J. Franke Electric performed all of the installation work.

Major Challenges

A challenging aspect of this control system project was the necessity to maintain synchronization of all alarm timestamps and acknowledge states across eight independent servers.

This was accomplished by referencing a synchronized system clock on the SCADA network and utilizing the PLCs to broadcast operator alarm acknowledge commands to all other SCADA servers which in turn perform an automated self acknowledge of that alarm throughout the system.

Due to the large number of instruments and pieces of equipment that required operator accessibility through the SCADA system for control, set point entry, etc. the power and flexibility of Visual Basic for Applications was utilized to create a collection of preconfigured forms through which an operator could interface with the SCADA system.

These forms were written to be generic and would therefore receive database references dynamically during runtime to create specific forms.

Configuring, troubleshooting, and maintaining separate SCADA applications for each server in the system would have been very time consuming. Instead, a single SCADA application was written to be self-deterministic of the computer on which it was running, thus allowing it to configure itself to assume the role of any server or client in the system. This significantly simplified updating processes and virtually eliminated coordination and synchronization issues in SCADA.