

Wide Area Water Distribution Case Study



Introduction

The Taiwan Water Corporation is responsible for the distribution and management of the water resources in Taiwan. The Kaohsiung Area Water Distribution Automation (KAWDA) project encompasses six different area network systems in the Kaohsiung area of southern Taiwan. The Kaohsiung Water Distribution Center (KDC) is connected to each of the six Area Control Centers (ACCs) and is responsible for the monitoring, distribution, control and management of the whole system.



Problem

Even though Taiwan is a subtropical island that receives three times the world's average rainfall, its population of 21 million makes it the 18th "driest" country in the world. The annual rainfall per person is only one-fifth the world's average. Taiwan draws about 60 percent of its water from surface sources including lakes, rivers and reservoirs. The rest is pumped from underground sources.

The Taiwan Water Corporation is responsible for gathering the water, pumping it to the treatment plants and then distributing the purified water to its customers. To monitor and control such a critical system, the Taiwan Water Corporation required a new state-of-the-art Supervisory Control and Data Acquisition (SCADA) equipment and software for six separate area control centers and one main master control system organized in a pyramid structure. Multiple levels of redundancy were required so that if any one computer fails at an ACC site or the main KDC site, the system continues to operate without

interruption. The system is to interface to the existing Programmable Logic Controllers (PLC) and to the new Remote Terminal Units (RTU). Large historical database storage, easy to use control interfaces and sophisticated reporting, trending and alarming applications are required. Advanced modeling and simulation software is to be used for operation strategy forecasting and for training purposes.

Solution

In a competitive bid, Willowglen Systems Inc. was selected to provide the new KDC and ACC master station SCADA system hardware and software, Front End Processors (FEP), and 83 new Remote Terminal Units (RTU). Water modeling and simulation software from 7T of Denmark was integrated with the SCADA system.

Willowglen's SCADACOM® system provides high performance distributed processing power. The computing load at KDC is shared by two main servers, two operator workstations, one modeling workstation, one training workstation, and a separate workstation is used to drive a video projector in the demonstration center.

At each of the six Area Control Centers, a single server and two operator workstations communicate over an Ethernet Local Area Network (LAN) to a Willowglen FEP which has serial communication lines to the various RTUs. Colour inkjet, laser and dot matrix printers are supplied for alarms, reports and screen displays. In addition, the processing power of the SCADA system is easily upgraded, both in terms of speed and capacity, by adding more workstations to the LAN and more CPU modules (up to a total of four) to the servers.

Willowglen's compact, dual processor based Model 1400 RTU was selected for installation at the treatment plants, pumping stations and monitoring stations. These powerful RTUs scan the data, time tag results, and use Report By Exception techniques to communicate critical events to the master station.