

CQS Innovation, Inc.

# Central Control Monitoring System

CCMS Water Distribution Control:

- maximizes resource usage.
- contains capital investment.
- allocates instantly and automatically.



## for Water Distribution

automatically maximizes resource usage

◀ *Water for injection is monitored to ensure purity.*

### PROBLEM:

*- How to control and direct two pure water ingredients to completely support a number of manufacturing operations and ensure constant control of purity.*

### BACKGROUND

**Managing purified water takes balancing priority factors.**

In pharmaceutical manufacturing, the most costly ingredient can be the purified water used in the manufacturing processes, even if it is not an ingredient of the final product. Each manufacturing process requires a precise level of water purification. Water For Injection (WFI) is very pure and monitored very closely. Purified Water (PW) is used for oral liquid doses and the intermediate processing steps of dry products. Both WFI and PW are perishable commodities that must be monitored and supervised. Both types of water are needed on demand for manufacturing processes scattered throughout any large facility.

The customer planned an addition of three new storage tanks to support new production processes, but demand patterns suggested expensive new generating capacity might also be needed. The customer's ability to manage existing supply capacity and allocate those resources among a range of consumer departments would determine the full extent of the extra generating investment, if any.

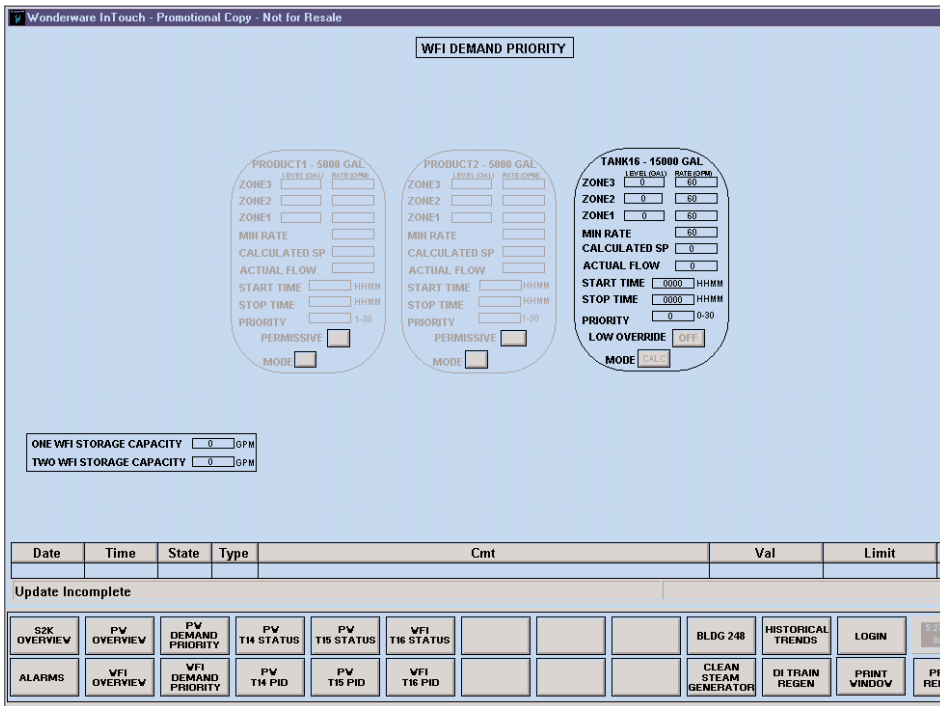
### CHALLENGE

**A new prioritization system to eliminate the need for more generating equipment.**

The new control system had to direct production resources to maintain an equitable, adequate pure water supply for each of the manufacturing consumers. Control systems on the existing tanks maintained water purity by controlling temperature and pressure of each tank's plumbing system.

Sufficient supply of new water to each manufacturing system was adequate for each day's operations only if the consumption could be distributed over three shifts' time. This meant a distribution scheme had to be devised to provide users all the water they needed during the production hours and replenish water in the holding tanks during non-production hours. With a varying range of demands and priorities, water distribution to the consumers' storage tanks became a complex logic task that changed on a minute-by-minute basis.

For the new distribution system to be reliable, the distribution logic would have to be fault tolerant enough to continue to regulate the water distribution process even if the HMI (Human Machine Interface) should fail. The system had to support manual override operations to compensate for any "unprogrammed" demand situations. And finally, the system gathering precise consumption data needed to allow accurate distribution of product costs to each department.



## SOLUTION:

Operator screen display shows parameters of three tanks to control WFI delivery.

# Ample water, on demand, no interruptions

## SOLUTION

**Balance production and demand through a complex needs algorithm.**

At the start of the project, all consumers agreed to their relative priority among other consumers, in exchange for 'water department' assurance that their specific water needs would be met.

CQSI created the exact CCMS (Central Control Monitoring System) algorithms to distribute each level of pure water to consumers. Based on consumer and supplier departments' input, the CCMS executed the priority logic evaluating needs of the consumers competing for the available supply. It then determined if this demand fell within the specified time limits to resupply that specific tank and measured that tank's current supply level.

The CCMS determined the percentage of production flow and length of time to divert water to a tank, if within that tank's time limits. Constantly monitoring the relative preparedness of each tank, the system continuously meters out the waters (in separate loops for PW and WFI) to consumer departments' holding tanks day and night, so all consumers stay supplied from a source needing only an "average" rather than a "peak load" capacity. The system was interfaced to existing controllers with a minimum of downtime by using the PLC-network interface technique.

## RESULTS

**Efficient control eliminates need for more investment.**

The installed control and distribution management system now meets each consumer's needs for PW and WFI, and there has been no need to expend major capital for additional generating capacity. The consumption of each water resource is monitored and controlled by the central system and reported to the consumers monthly. Waste has been greatly reduced as consumers determine where losses occur and repair their problems. The control system automatically and continuously monitors for TOC (Total Organic Carbon) and conductivity, and generates an alarm for the operators should any problem be uncovered.

New elements can be added and reconfigured easily into the CCMS. Since all the "water department" reports are centralized, adjustments among consumers' priorities are made easily and quickly, and a solid database of consumption information is available for realistic cost allocation.

## Making your manufacturing

From plant-wide systems to customized solutions for specific needs, CQS Innovation, Inc. has the experience in automation systems to meet your project's goals.

For more information on how our integration of computer systems, controllers, networks and software systems can improve your manufacturing site's product quality, production flexibility and quality-control tracking, call (800)860-1968, ext. 385.



2390 Pipestone Road  
Benton Harbor, MI 49022  
Tel: (269)926-2148 FAX: (269)926-6854  
Website: [www.cqsinnovation.com](http://www.cqsinnovation.com)