



**ENTERPRISE
AUTOMATION**
A TETRA TECH COMPANY

PROJECT PROFILE

CWRF control panel upgrade

ENCINA WASTEWATER AUTHORITY

Customer Background

The Carlsbad Water Reclamation Facility (CWRF) is a water reclamation facility that can produce up to 7 million gallons of recycled water daily. CWRF takes the cleaned, sanitized effluent water from the neighboring Encina Wastewater Authority (EWA) treatment plant and runs it through additional treatment processes to meet the standards for recycled water for use in places like golf courses, Legoland, and more. The non-potable water is low cost and saves valuable natural water resources.

Enterprise Automation has worked with Encina Wastewater Authority, the facility operator, since 2019.

Project Background

The City of Carlsbad contracts EWA to operate and maintain CWRF, given its close connection and proximity to the city's pollution control facility. Following their decision to replace their legacy control system, EWA asked Enterprise Automation (EA) to review and audit CWRF and determine what improvements were needed to make the plant more reliable. Engineers completed a control system audit in 2019 and while reviewing all issues with staff, EA concluded that the most comprehensive and cost-effective solution was to replace and upgrade the entire system instead of fixing many problems individually.

When engineers shared these findings with the City of Carlsbad, the City agreed and requested a plan for the full control system replacement. Consequently, EA completed a more detailed investigation and developed a plan to replace all control system hardware, PLCs, and IO panels.

Project Manager



Matt Avila
P.M.P.

Project Technical Lead



**Nicholas
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Key Insights:

- EA ensured success by modifying specifications despite the tight timeline.
- Experts confirmed PLC and SCADA upgrades wouldn't impact the ultrafiltration system.
- All seven control panels managing 340 IO points were upgraded.

Key Technologies:

- Schneider Electric Modicon M580 PLC
- Schneider Electric X80 Ethernet Remote IO
- Schneider Electric Ecostruxure Process Expert

EA Solutions

During the upgrade, the City of Carlsbad wanted the CWRF offline for no longer than one month. This was an aggressive schedule to take the facility offline, replace all the electrical control infrastructure, upgrade networking, commission, test, and validate the new software. Engineers met this tight timeline through extensive planning and coordination with the construction manager and electrical contractor.

Seven control panels in the CWRF were in various states of upkeep and required three different upgrade approaches. Engineers completely rebuilt two panels, replaced the hardware for one, and partially upgraded the four remaining panels that had outdated equipment. EA selected the new Schneider Electric PLC equipment that was also used in the EWA controls system upgrade to streamline the hardware and reduce the number of spare parts needed on hand. To simplify the controls, engineers replaced three separate non-redundant PLCs with a single redundant SE pair. The entire CWRF was redesigned as a single stratified network and connected to the new network EA configured in a prior network construction project. As a result, the PLCs would be placed in environmentally controlled and physically secure locations. The CWRF control panels could also then function as remote IO.

Operators also benefitted from the new SCADA upgrade. Because EA standardized the screens to match those at EWA, operators required minimal training to understand the screens from site to site.

Within CWRF, the ultrafiltration system was the most complex unit process and EA recognized the benefits of bringing in a specialist to reduce any potential risks. This would prevent problems in the future and potential rework. EA worked with the manufacturer to ensure the system would function as expected after all the upgrades. The manufacturer helped review the EA functional specification and attended software testing before commissioning to smooth out any issues. During commissioning, EA acquired the services of a field technician to assist with equipment tuning and validating the system's operation.

In the end, the construction manager, electrical contractor, and EA overcame a few unexpected obstacles and finished the project on schedule. We met the tight timeline through productive communication and careful planning.



Enterprise Automation, A Tetra Tech Company (NYSE:TTEK), a nationwide process automation consultant - plans, designs, documents, builds, tests, deploys, and supports critical automation and OT infrastructure for process industries.

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