



## TRES RIOS WATER RECLAMATION FACILITY

### CUSTOMER CASE STUDY

# Pima County Implements Situational Awareness Strategy to Improve Operational Efficiency of Wastewater Facilities

Pima County  
Industry - Water & Wastewater

## Goals

- To ensure capture of institutional knowledge of current workforce for effective training of future operators
- To employ an effective Situational Awareness strategy enabling personnel to effectively understand and address operations of the facility

## Challenges

- Management of more than 60 million gallons of sewage each day to support the region's population of more than 1 million people
- To take immediate action when alarms sound alerting operators to issues within the plant
- With assets spread out over more than 700 miles, operational management is difficult

## AVEVA Solution

- AVEVA® System Platform
- AVEVA InTouch®
- AVEVA Historian
- AVEVA Historian Client
- AVEVA IntelaTrac Mobile Operator Rounds

## Results

- Capacity of the plant has doubled resulting in a 50% increase in operational efficiency
- Overall energy consumption has been reduced by 10%
- Current staff levels were maintained, while still achieving significant operational improvements
- "Institutional Knowledge" is captured to train future workforce, successfully addressing concerns of the facility's aging workforce
- Sophisticated data mining capabilities resulted in the County receiving a \$352,000 rebate check from the local utility

# Background

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**Pima County, Arizona** – Blessed with a land full of natural beauty, where the desert valley is punctuated by mountain ranges that kiss the sky, Pima County is at the heart of Arizona’s major commercial and academic hub.

Pima County has taken significant steps to look after the well-being of its citizens by preserving one its most precious resources – water.

Using a AVEVA HMI SCADA solution based on Situational Awareness, as well as a mobile workforce and decision support system, the Pima County Regional Wastewater Reclamation Department provides management and maintenance of the county’s sanitary sewer system.

Serving a population of around one million people, the department manages an average daily flow of about 60 million gallons of water.

“We manage 3,500 miles of sewer lines stretching across a 420 square mile area,” said John Sherlock, Deputy Director for Treatment at Pima County. “Add in two metropolitan treatment plants, seven sub-regional facilities, 27 lift stations and 77,000 manholes, that’s quite a bit of ground to cover.”

The county’s Tres Rios Water Reclamation Facility has been recently upgraded from a “high purity oxygen conventional pollutant removal” technology to a five-stage “bardenpho process” that performs complete biological nutrient removal (BNR) of phosphorus and nitrogen.

As a result, Pima County facilities have the highest nutrient removal levels required by both federal and state regulations to protect water quality.

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**“The new AVEVA SCADA system has enabled our Tres Rios facility to double capacity, while operating using the same number of staff, which is about a 50 percent increase in operational efficiency with a 10 percent reduction in energy consumption.”**

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Rod Graupmann, SCADA Manager,  
Pima County, Tres Rios Facility



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**“Our typical ammonia value coming into the plant is between 30 - 40 parts per million. With our current treatment technology, we remove about 99% of that, resulting in the plant’s typical discharge of about one part per million ammonia.”**

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John Sherlock,  
Deputy Director for Treatment, Pima County

## Automation Plays Critical Role in Water Quality

Automation plays a critical role in the successful operation of the state-of-the-art Tres Rios Water Reclamation Facility. The automation system used to operate the facility is a collection of software from AVEVA.

Using AVEVA System Platform, AVEVA InTouch, AVEVA Historian, AVEVA Historian Client and AVEVA IntelTrac Mobile Operator Rounds, both facility management and operators can view, evaluate, and modify operations, as well as quickly address any issues that arise.

AVEVA plays an integral part of the SCADA solution that enables Pima County to ‘do more with less’ by simplifying the high complexity of wastewater renewal on a county level.

AVEVA System Platform acts as Pima County’s “Industrial Operating System” by providing common services such as configuration, deployment, communication, security, data connectivity, people collaboration, and many others. These services enable Pima County to build a single, unified “Plant Model” that logically represents its processes, physical equipment and industrial systems.

The Plant Model also gives essential context to data, greatly assisting with diagnostics and troubleshooting, as well as providing valuable system documentation throughout the system lifecycle. The Plant Model is unique to the AVEVA System Platform.

AVEVA InTouch integrates with System Platform and provides sophisticated HMI capabilities using common graphics with an object-based engineering approach, and Integrated Development Environment. These make it easier and faster than ever to create standardized HMI applications and deploy them across all industrial sites, saving up to 70% in development time.

Also, AVEVA was able to take Pima County's first generation InTouch application and run it on the latest version. AVEVA is the only automation vendor that provides this unsurpassed investment protection.

"The solution that is currently embedded in the Pima County wastewater reclamation system has evolved and improved since its inception," Sherlock said. "It has gone beyond traditional HMI SCADA."



### AVEVA helps Pima County manage:

- 60 million gallons of water per day
- 3,500 miles of pipes across a 420 square mile area
- 2 metropolitan treatment plants
- 7 sub-regional facilities
- 27 lift stations
- 77 thousand manholes

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**“Being able to access detailed data from the Historian allowed RWRD to analyze our electrical usage and determine that we could save more than \$200,000 a year on a time-of-use electrical rate.”**

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Eric Nelson,  
Technical Services Manager, Pima County

### Access to Historical Data Saves in Utility Costs

The data-mining capabilities of the SCADA system's AVEVA Historian application produced detailed documentation, which enabled the County to receive a \$352,000 rebate check from the local utility.

AVEVA Historian is a high-performance process historian capable of storing huge volumes of data generated from Pima County's industrial wastewater facilities. Historian easily retrieves and securely delivers information to operators' desktop or mobile devices, enabling them to analyze processes anywhere at any time.

AVEVA Historian combines a high-speed data acquisition and storage system with a traditional relational database management system, which facilitates access to plant data using open database standards. This enables faster troubleshooting and easier discovery of high value process improvement opportunities.

“Being able to access detailed data from the Historian allowed the Regional Wastewater Reclamation Department (RWRD) to analyze our electrical usage and determine that we could save more than \$200,000 a year on a time-of-use electrical rate,” said Eric Nelson, technical services manager at Pima County. “The preliminary analysis would have been impossible to do without the Historian and we would have missed a huge opportunity to reduce our service costs to our ratepayers.”

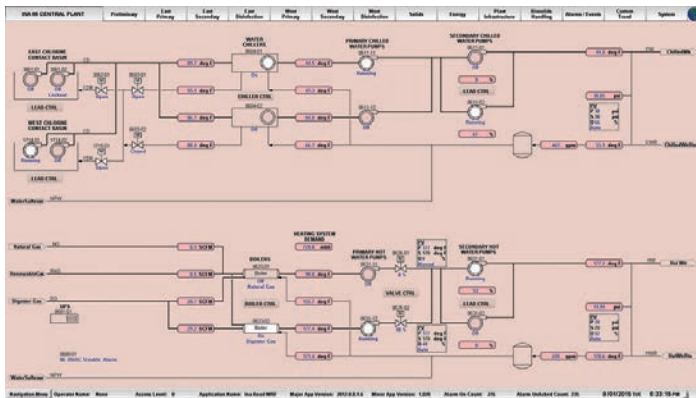
“A couple of things that were done with our Situational Awareness was to keep it focused, keep it simple, keep it easy on the eyes, keep things that require your attention to get your attention.”

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Larry Sawicki,  
Control Systems Engineer, Pima County

## Situational Awareness Key to Success

Pima County has employed advanced Situational Awareness techniques in its HMI SCADA implementation. This methodology enables personnel to be aware of the processes and systems in their operating environment, understand the information being presented, and acting on that information when needed.

By achieving the proper Situational Awareness, a facility’s operations team make effective decisions that will deliver overall business success. At Pima County, this means using techniques that enable its staff to perceive, comprehend and project what is happening in the water reclamation facility.



## Goal-Oriented Design

The Situational Awareness strategy implemented in Pima County’s AVEVA based HMI SCADA uses goal-oriented design, effective window structure, color usage, and actionable alarm management.

The results have been quite dramatic. Operators who previously ignored too many nuisance alarms now take immediate action. Problems are identified and addressed right away before they escalate.

“We’ve been able to notice a distinct improvement by operators when things are going wrong and to take suitable response and action,” Sawicki said.

“IntelTrac Mobile Operator Rounds allows us to take selected information from the plant that was not previously available in SCADA and push that to SCADA, making the data trendable alongside the information that is already available in the SCADA system.”

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Christopher Grant,  
Program Coordinator, Pima County

## Beyond HMI SCADA

Always on the leading edge of technology, Pima County also uses AVEVA IntelTrac Mobile Operator Rounds, a sophisticated mobile workforce and decision support system. IntelTrac Mobile Operator Rounds collects information from standalone assets.

IntelTrac Mobile Operator Rounds exception-based, Web reports keep everyone on the team up-to-speed on the current state of plant operations.

As a mobile workforce and decision support system, IntelTrac Mobile Operator Rounds allows Pima County water technicians to quickly and easily manage operations, both at the plant site and remotely. IntelTrac Mobile Operator Rounds includes configurable software and ruggedized mobile hardware solutions that enable workflow, data collection and general task management for plant operations, maintenance management, production tracking and compliance applications.

Its integration with AVEVA System Platform and Historian provides a comprehensive analysis and reporting solution that accelerates and sustains operational process improvements, a key component of an effective Operations Management System. IntelTrac Mobile Operator Rounds also ensures that best operating and regulatory procedures are followed at all times, and data is collected on non-instrumented plant assets. In addition, critical environmental, health and safety inspections are performed on schedule, and mobile operators have vital information at their fingertips to operate plant assets in the most effective manner possible.

“IntelTrac Mobile Operator Rounds has allowed us to capture institutional knowledge of individuals who have been here for many years,” Grant said. “These individuals have been extensively interviewed and we’ve incorporated their knowledge into the electronic rounds to help new operations and management technicians, as well as assist with training.”

Pima County has achieved a 50% increase in operational efficiency and a 10% reduction in energy consumption.

## Pima County Increases Operational Improvements with AVEVA

At the Tres Rios facility, Pima County has achieved 50% increase in operational efficiency and a 10% reduction in energy consumption.

“The new SCADA system at Tres Rios has allowed us to double the capacity of the plant while operating with the same number of people we had on staff before the expansion,” said Rod Graupmann, SCADA Manager for Pima County. “That roughly equates to 50% increase in operational efficiency.”



### Customer First Support

The success at the facilities of Pima County Regional Wastewater Reclamation Department wouldn't have been possible without local support from AVEVA West and EMA, a AVEVA systems integrator.

The department subscribes to the Customer FIRST for AVEVA program which offers a portfolio of essential software maintenance, technical support and services to help Pima County protect and extend its AVEVA software investment, and keep its operations running smoothly.

Customer FIRST for AVEVA program includes:

- Continuous software maintenance and innovation through software version upgrades to evolve its AVEVA solution to best address changing business needs
- Access to technical support experts that are adept at resolving issues quickly, capitalizing on years of experience
- Optional services and system management applications to help manage, optimize and extract the most value from the software solution

AVEVA Customer First support includes on-site support, which assists Pima County address problems as they come up. It also provides access to AVEVA software engineers as Pima upgrades and expands its AVEVA-based wastewater reclamation solution.

AVEVA West and EMA, the system integrator for Pima County, worked closely to architect the system and implement best practices,” said Brian Farner, senior systems consultant at AVEVA West. “Pima County embraced the technology and ran with it. Every once and a while they came across a technical hurdle, and they called on us for answers. Together we've really designed a great system for Pima County.”

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**“By subscribing to the premium support program, Pima County has access to 24/7 support by phone, as well as the latest releases of AVEVA software.”**

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Mitch Araman,  
Regional Southwest District Manager, AVEVA West

### AVEVA Helps Pima County Improve Operations and Cut Costs

Using Situational Awareness and a sophisticated mobile workforce and decision support system, Pima County has created an HMI SCADA solution that has driven down the cost of doing business, increased efficiency and promotes safety in its wastewater reclamation facilities.