

Lean Water Operations: Controlling the Cost and Pricing of Water While Improving Efficiency. . .A Real World View From United Water

Introduction

In today's economy, finding ways to "do more with less" extends to virtually every business, government and education institution. Plain and simple, the days of "business as usual" are a thing of the past as economic and social pressures mandate more efficiency, accountability and performance. The water and wastewater industry has adopted lean principles – leveraging new technology and processes to modernize the industry. This case study illustrates lean principles that water and wastewater facilities can incorporate into their daily operations to "do more with less" in the face of ever-changing regulations and tight budget constraints.

Putting Lean Operations In Effect: A Real World Look From The Eyes Of United Water

In effort to maintain its focus as a world-class operation, United Water has adopted an enterprise data management system for implementing Lean Operations throughout its locations. This case study offers a real world example of how incorporating lean principles is beginning to have a major impact on the water utility's operating efficiencies. Headquartered in Harrington Park, New Jersey, United Water has been treating water for more than 140 years. Founded in 1869, the company provides water and wastewater treatment services to more than 300 municipalities and 7 million people across the United States. While the size of the facilities it owns or operates varies from quite small to among the largest in the world, one driving concept is consistent from project-to-project: United Water is focused on managing world-class environmental compliance and a quality management system, so it can fulfill its mission of providing comprehensive, sustainable water and wastewater management solutions that promote public, economic and environmental health.

Business Situation

United Water achieves best-in-class water and wastewater treatment by embracing technologies that empower its staff to be as productive as possible by optimizing processes and making business decisions that not only impact its bottom line but also provide a competitive edge. In addition, it relies on technologies that help with regulatory compliance mandates and in developing good working relationships with regulators.

One of the key technologies United Water relies upon for maintaining its world-class operations is the Hach Water Information Management Solution™ (Hach WIMS™) which is now being implemented across United Water facilities nationwide. Among the first to implement Hach WIMS was Bondi Island Wastewater Treatment Facility, in Springfield, Mass. Findings from the plant and subsequent learnings served as a basis for the system's rollout across other facilities.

The Springfield facility is designed to treat 67 MGD of wastewater, with typical limits and monitoring for TSS/BOD, disinfections, chlorine residuals, fecal coliform and ammonia compounds. United Water started with OPS 32, a predecessor to Hach WIMS, in 2005. United Water augmented that product to gather data on natural gas, electricity and chemical consumption. According to Don Goodroe, director of regional technical support, Northeast Division for United Water, “Springfield was the first initiative to bring projects under a common database. It was our first step toward getting better control, transparency, information and standardized calculations for larger plants – those that process more than 10 MGD each day.” In 2006, the system was updated to a networked solution and over time the larger projects were brought into the Hach WIMS system.

The large Springfield facility has four different operational areas that need to work together. In the past, operators in each area captured and entered data directly into spreadsheets and then turned the hardcopies over to an operations group that submitted regulatory reports. The operations group would then spend hours inputting that data for business and compliance reporting. Now, the information is entered directly into the system by the people who are responsible for the data, increasing data accuracy and adding a layer of quality control.

Environmental compliance is a high priority for United Water. Therefore, consistency, scheduling and transparency of operational data are critical to preventing compliance failures, such as late reporting and sampling. It’s a daunting task, as United Water collects more than one million samples each year nationwide.

Like all businesses, United Water has a responsibility to operate efficiently. The use of innovative technology helps the company maintain stable rates for its regulated customers and helps municipal clients operate in a more financially sustainable manner. United Water competes for municipal projects and, while obviously successful, ongoing economic pressure is a driving force to increase overall effectiveness and efficiency. In order to maintain or increase profitability, and reinforce branding efforts that support sales — business success depends on positive compliance records and on ongoing efficiency improvements.

Solution

“We evaluated several different systems, but chose Hach WIMS for a number of reasons,” explains Goodroe. “Overall, Hach WIMS most closely matched what our needs are across the company.” He further says that finding a single-solution (Hach WIMS is an integrated system) allows the company to have a single platform to identify key trends, and manage large amounts of data efficiently to make key decisions for budgeting and short-and-long term operations. United Water’s Contract Services Division has deployed Hach WIMS into almost 400 individual facilities. Hach WIMS’ standard calculations, audit trails and automated compliance reporting helped to establish a formal compliance program which can be used to support expansion of the ISO compliance process within United Water.

The Hach WIMS solution includes personalized data entry forms and dashboards for operators. The dashboards are set up to mimic how operators capture data and are tailored to individual

areas of operations. This helps users to get up-to-speed quickly and become effective immediately, increasing overall productivity. The custom input screens minimize the chance of transcription errors that could occur when moving the data from the source into the database. Hach WIMS also allows each plant to create alarms based on a programmed data range that's related to the operation being monitored and controlled. If operators input data outside the range, they are immediately alerted.

United Water has taken a very proactive approach to rolling Hach WIMS out to the organization. Identification and cultivation of "Systems Champions" who help the rest of the teams incorporate proven methods and processes has resulted in positive change for their own groups, as well as provided overall guidance and support. "We've developed support groups that are led by System Champions," says Brent Fewell, vice president, environmental compliance for United Water. "There are Champions in different areas that may excel in the system, and they can, in turn, help those who are just getting started. Our Champions help with process control, system management and trending or tracking. They help set up custom spreadsheets or graphing tools that support utilizing the system at its highest capacity."

Fewell also says that once the system is set up, United Water can take two different approaches when users want to tweak or modify something. Advanced users can help make changes or, if there are large, wholesale changes that need to be made, they may consult with Hach service teams.

As the EPA and an increasing number of states are implementing more electronic reporting platforms Hach WIMS enables electronic submission of eDMRs, NetDMR or e-reports, as well as creating the traditional paper reports where required. This feature has cut labor associated with regulatory reporting and has made it easier to work with regulators when they are on-site. United Water's tech support group has designed forms that are used when state regulators visit the plant so they can quickly find the information the regulators need. The data can then be emailed as a PDF document to the state after the visit. The group also has linked Hach WIMS to its internal sustainability reporting – as sustainability is a core element in the company's mission and branding efforts.

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Don Goodroe, Technical Manager
of United Water's Northeast
Division

Web accessibility also is a key benefit the system delivers to United Water. "I can get information on any of the multiple projects that I'm tracking right from home. I don't have to call the project manager, and that's huge." Goodroe explains. "Hach WIMS establishes a central database and gives us the capability to track all of our environmental, safety, internal and contract compliance needs from a single source. You also can look at other facilities to see who's doing the best and who's doing the most for continuous improvement."

As for next steps, United Water is updating Hach WIMS across its Regulated Business operations to get it up to the same level as those implemented in more than 200 contract service engagements.

Benefits

Operating more efficiently and with greater consistency, making business decisions based on actionable data and automating alerts to operators so they never miss scheduled tasks are just a few of the advantages Hach WIMS has created for United Water.

Improving Compliance

According to Goodroe, establishing transparency is key to compliance. “The company’s first initiative was to combine the projects into a common database to establish transparency. We could see discharge levels inching toward permit limits. We set up internal permit limits and dashboards to keep operators, as well as managers, up-to-speed on a daily basis. The system has enabled us to anticipate and head off compliance issues before they occur.”

Hach WIMS has impacted the non-compliance penalties that the company occasionally must cope with and has helped create an opportunity to develop a better working relationship with regulatory agencies. Fewell says, “We have been meeting with state and federal regulators and one of the things we are touting is our Hach WIMS initiative. We are very proud of this initiative and the regulators are taking note.”

“As with any company, we do have occasional non-compliance and enforcement matters. Our goal is to always strive for improvement. In two recent enforcement matters we met with regulators, took full responsibility and told them that part of our corrective action was to put the Hach WIMS program in place. They were very supportive of this and it helped build trust and credibility in our efforts not only to achieve, but go beyond compliance, and helped to mitigate the penalties we might have otherwise incurred.”

United Water also uses Hach LAB Cal™ to help manage sampling. The system quickly shows what samples are due, what samples have been completed and what samples, if any, have been missed. This helps with compliance and easy tracking of sampling activity and results over time.

Added Tori Morgan, pretreatment and compliance manager for the Midwest Area, “Audit trails are very important to help accurately track information and were a big factor in deciding on the Hach solution. Reports query audit trail information for better QA/QC which also is important to our overall quality efforts and initiative.”

Using Data Effectively

Each plant in the system has some unique data requirements. Whether it is to track all chemical usage and costs at the West Basin, California, water recycling plant or monitor multiple chemicals in a single field at the BexarMet water treatment plant in San Antonio, Texas. The configurability of Hach WIMS easily adapts to individual needs.

Often outside engineering firms need large quantities of data quickly for all types of projects. With Hach WIMS this data can be generated and provided in minutes, with complete assurance that the data is accurate. When the EPA was investigating drought conditions and needed

specific information about specific locations, United Water was able to provide comprehensive information very quickly to the agency. Information also can be provided instantaneously when the state environmental regulators have questions or require additional data.

Reports that can be easily generated and sent automatically on a regular basis always have been a major part of the United Water sustainability program. Seeing long term trends based on historical data makes it much easier to do meaningful comparisons of processes and parameters, which helps to identify upsets and process drifts. Having the data in a central location allows everyone to be aware of the status and enables all users to know where additional support might be needed.

Saving Time & Money

“Hach WIMS has made my life much easier and allows me to further improve the system,” says Joe Thaxton, technical support manager, South and West regions. “I’m still developing features that everybody has been asking for, as well as tracking non-numerical contract compliance and state compliance, along with the laboratory and the other reporting we have to do. It makes it easier, since it’s all in one place. It’s so easy to link disparate systems and put a report together.”

Hach WIMS also allows Thaxton to spend more time concentrating on safety and environmental work. “It actually has freed my time up to be able to pay more attention to environmental and safety compliance, and HazMat issues which are all critical,” he adds.

The benefits of Thaxton’s work are realized by management and operators alike. Here’s one example: A few years ago, the company was required to generate sewage reports, which involved compiling large amounts of information and setting up spreadsheets and tools which took a great deal of time. Now that data can be produced with a mouse click, taking minutes instead of tens of hours due to the easily accessed and organized data in the Hach WIMS database.

Exactly how much money United Water has saved by using the Hach WIMS is both proprietary and a little hard to ascertain, because the savings comes mostly from operational efficiencies and preventing non-compliance from happening in the first place, but savings are estimated to be in excess of six figures.

Improving the Business

“We feel in the long run there’s no doubt that the company will benefit from greater optimization,” predicts Jim Mastrokalos, operations manager for United Water New Jersey. In fact, many project results are confirming his assertion. “One of our operations managers told me that he definitely can validate considerable time and cost savings, better planning and improved compliance.”

The ability to track and analyze processes plant-wide also has given Mastrokalos better insight into operations. “It has brought our monthly financial review of key performance indicators relative to energy consumption, chemical usage and variables into clear focus. We can very

easily and quickly look at the components, identify how they relate to each other and understand the way the business is going,” he said.

United Water’s goal of being best-in-class in the industry helps to cultivate a favorable public image. Compliance is two-dimensional relevant to those goals: on the one hand, compliance excellence saves the company money and fosters a more favorable relationship with state and federal regulators; on the other hand, compliance excellence enables the company to honestly present itself as an organization committed to sustainability and to providing excellent customer service.

Results

- Implemented Hach WIMS at almost 400 sites
- Enabled better business decisions and budget planning due to more accurate data
- Developed standard processes due to readily available data which can be easily visualized
- Reduced compliance penalties
- Enabled United Water to become more proactive
- Provided easy accessibility to data by entitled users
- Allowed monitoring of energy and chemical usage and costs
- Enabled easier analysis when viewing long-term trends
- Supported change management through best practices/champions
- Enhanced operational transparency

Conclusion

The progress made at both the managerial and operational level within our industry is significant and continues to advance. The concepts within Lean Operations build upon that progress as illustrated by the work being done at United Water and elsewhere, and provide an outline for revisiting and adjusting the improvement processes continuously, and to use automation technology to drive holistic improvements throughout the organization. Lean Operations for water and wastewater is intended to help utilities drive even more efficiencies from day-to-day operations, while creating the “lean sustainability” to deliver the highest level of service over the long haul. Its central concern is minimizing inefficient efforts and resources, and to leverage new technology and processes to modernize the industry. United Water is just beginning to realize the impact such an approach can have on fulfilling its mission of providing comprehensive, sustainable water and wastewater management solutions that promotes public, economic and environmental health.