Remote Monitoring of Operations in Real Time, 24/7

Access the dashboard any time and pull up the digital twin of any connected asset to check on its performance, and eliminate the need for on-site personnel to record measurements and communicate them to stakeholders.

Remote Control of Discrete Equipment in Real Time, 24/7

Remotely adjust settings, like pump speed, flowrate, and fluid blend, on individual pieces of equipment without having to task on-site personnel to do so.

Centralized, Holistic View of Assets

Displaying equipment on a job site in a central, web-based interface affords users an all-encompassing degree of control over operations, enabling fine-tuning of discrete components to optimize overall performance.

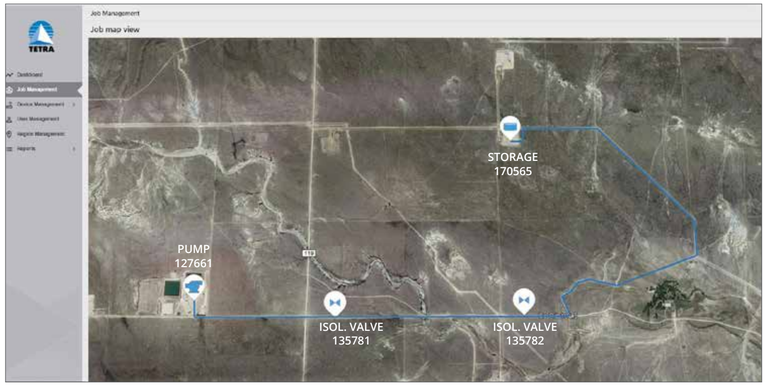
Alerts & Localized Safety Mechanisms

Receive alerts in real time when operating parameters deviate from set ranges or critical issues arise, allowing quick corrective or preventive action and avoiding costly incidents and nonproductive time. All safety mechanisms are localized and function regardless of cellular or satellite connectivity, ensuring assets are not unexpectedly orphaned if communication is interrupted or severed.

Customized Reports & Data Analytics

Receive customized reports on operating trends and other valuable data analytics via email as either Excel or PDF files. Reports can be customized according to region, sub-region, job title, and other criteria. Such reports are an indispensable means of gauging operational efficiency, identifying risk and areas for improvement, assessing discrete costs, and planning similar operational configurations.

FIGURE 2 – Job management map view of the cloud-based dashboard displays the location of operating assets.



TETRA

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BlueLinx™ Automated Control System

Water Management Solution Offerings

- Automation and Monitoring
- Sourcing
- Fresh and Produced Water Transfer
- Pipeline Construction
- Storage and Pit Lining
- Treatment and Recycling
- Oil Recovery
- Blending and Distribution
- Flowback and Testing

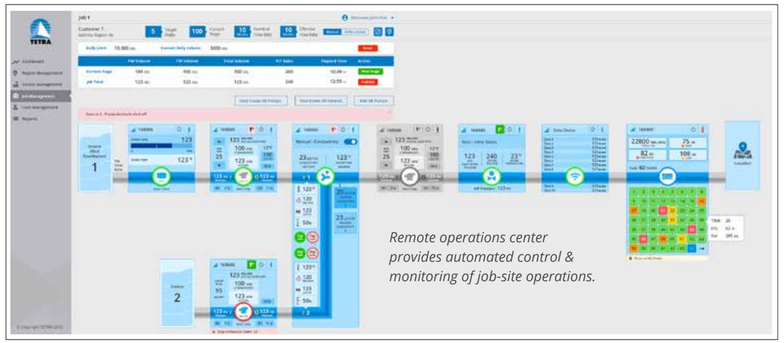
TETRA

The TETRA BlueLinx™ automated control system closes the loop on water management by providing remote control and monitoring for water transfer, storage, water recycling, treatment, blending, distribution, and sand management. Our BlueLinx system provides accurate, real-time metrics for efficient operations that can help deliver the lowest cost per barrel of water.

Cloud-Based Dashboard

The nerve center of our BlueLinx automated control system is the cloud-based dashboard connected via either cellular or satellite link to field equipment sensors—so you are always connected to your operations no matter when or where they take place. The dashboard displays the operating metrics of each asset in real time, providing immediate access to readings including inlet and outlet pressures, fluid composition, water conductivity, storage level, and equipment status and performance.

FIGURE 1 – Schematic of the cloud-based dashboard.



Cellular or satellite connectivity

Water Transfer

Water Blending & Distribution

Water Storage

Water Treatment & Recycling

Sand Management

On-site equipment outfitted with sensors and localized safety features

Applications

The BlueLinx automated control system provides remote, real-time control and monitoring of [1] water transfer; [2] water blending and distribution; [3] water storage; [4] water treatment and recycling; and [5] sand management.

1 Automated Water Transfer

Automated Pumping System

The TETRA automated pumping system optimizes water transfer while markedly lowering both cost and risk. Our cloud-based dashboard provides immediate control of pressure and flowrate, as well as real-time monitoring of pump speed, flowrate, inlet/outlet water pressures, water temperature, engine performance, and engine fuel level. The design also includes localized safety features that function regardless of cellular or satellite connectivity.

2 Automated Water Blending & Distribution

Automated Distribution Manifold

The TETRA automated distribution manifold brings a new level of efficiency and safety to managing buffer volumes of frac water. Its real-time tank-level monitoring and control ensures a steady supply while preventing tank overflow, all in a safe and timely manner.

Automated Blending System

The TETRA automated blending system accurately blends flowback, produced, brackish, and fresh waters into a single homogeneous fluid. The system consists of the water blending controller, which measures input and output water conductivity in real time to automatically adjust input ratios, and the patented on-the-fly blending manifold, which blends fresh and produced water streams into an optimal fluid for fracturing.

3 Automated Water Storage

Whether water is stored in conventional above-ground storage tanks, minion tanks, open pits, or batteries of multiple frac tanks, TETRA automated water storage monitoring reduces or eliminates the need for on-site personnel to manually check levels. The system also automatically notifies operators in the event of high storage levels, thereby helping them avoid incidents like overflow and the associated nonproductive time.

4 Automated Water Treatment & Recycling

Oil Recovery After Production Technology (ORAPT™) Oil Separation System

The TETRA ORAPT oil separation system captures and removes residual oil from produced water, routing the recovered oil to the sales pipeline and ensuring water composition complies with storage regulations. In some cases, the recovered oil can even offset the cost of the system.

SwiftWater Automated Treatment (SWAT™) System

The TETRA SWAT system chemically treats flowback and produced waters so they can be used in fracturing operations. The system uses a chemical and mechanical process to recycle up to 100,000 barrels of water per day, improving completions with better quality water and greatly reducing truck traffic, water sourcing, and disposal costs.

Automated On-the-Fly Treatment System

The TETRA automated on-the-fly water treatment system treats produced and fresh water with accurate dosages of approved biocides to eliminate bacteria and sulfides prior to fracturing use. To ensure safe, low-risk operation, the system generates biocides only while water flows through the transfer line; when the flow stops, biocide production ceases.

5 Automated Sand Management

TETRA automated sand management solutions use proprietary cyclonic technology to separate and capture sand and solids far more efficiently and effectively than competing sand management systems. Best of all, their operation is fully automated, thus forgoing the need for on-site personnel to weigh tanks, dump the sand, or perform other routine tasks. The cloud-based dashboard enables remote monitoring and control in real time, providing technicians with accurate, no-risk command of sand separation.

FIGURE 3 – TETRA Integrated Water Management Solution can help deliver the lowest cost per barrel of water through automated technologies and service integration.

Benefits of using BlueLinx automated control system

- 24/7 access to digital twins for real-time monitoring of operations
- Remote, off-site control of discrete assets
- Centralized, holistic view of multiple components
- Precise, real-time control over water transfer, water recycling, and sand management
- Consistent water properties for improved compatibility with frac additives
- Cellular (or optional satellite) connectivity
- Up to 50% in personnel savings
- Up to 30% reduction in fuel consumption
- Reduced environmental and human risk
- Customized daily reports sent electronically
- Localized safety features that function regardless of connectivity