



# SWAT™ Automated Water Treatment System

ADVANCED TECHNOLOGY FOR SAFE, EFFICIENT RECYCLED WATER TREATMENT

## Overview

The SWAT automated water treatment system uses cutting-edge technology coupled with tried and true water chemistry, clarification and filtration methods to provide low-cost water management for recycled water in oil and gas operations.

The SWAT system chemically treats produced water through a clarification process in four steps:

1. Chemical oxidation raises the oxidation reduction potential level of the water to eliminate bacteria and oxidize heavy metals present in the water.
2. Coagulation whereby the dispersed colloidal particles agglomerate. Suspended particles are usually very small and may have electrical charges either on or between them. Typically, these are negative charges, which cause them to repel one another. Coagulants neutralize the repulsive electrical charges between the small particles by surrounding them and allowing them to come together to form larger clumps.
3. Flocculants (polymers) are added to facilitate the settling of suspended particles in a solution. Flocculants facilitate the agglomerations to create larger flocules, which settle into the solution due to gravitational force. Flocculants try to bridge the molecules forming clumps for ultimate removal from the water.
4. Filtration is the final step in removing any remaining total suspended solids in the recycled water. TETRA uses an automated back-washable disc filtration in combination with string-wound cartridge filters to provide filtration as low as 5 micron.

This system enables recycling of up to 50,000 bbl/day of produced water.

## Features

- Capable of treating the largest flow rates
- Automated oxidizer dosing based on oxidation reduction potential proportional integration derivative loop control
- Efficient water clarifier dosing based on flow meter parts per million control

*Features continued...*

- Capable of dosing multiple oxidizer chemistries
- Make-down technology to minimize chemical inventory on location
- State-of-the-art clarifier and solids separation technology on the market today
- Programmable logic controller driven platform for efficient and safe operation
- Real-time sensor data for measurement and monitoring
- SCADA enabled online trending capabilities
- Auto-reject valve system for out of spec water quality

## Benefits

- Lower water treatment costs by reusing produced water for completion operations
- Reduce truck traffic, water sourcing and disposal costs
- Improved completions through better water quality
- Increased efficiency and quality control through automation
- Reduce HSE exposure with automated safety alarms on critical operations
- Simple, fast, economic and we always meet spec

