Optimizing Your DAF Process

Process Management for Dissolved Air Flotation Systems

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Maintaining your DAF system is priority #1, right?
Wrong.
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DAF Elements that Require Attention & Potential Problems:

1. Solids loading rate
2. Hydraulic loading rate
3. Regular testing
4. Probe/Analyzer maintenance
5. Chemical usage

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Specific Operational Challenges

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Specific Operational Questions

- What to measure – and why?
- Where to measure it?
- Is a shift or daily grab sample good enough?

  Hint: It is not
- Is my system running as designed?
- Is my instrument giving me correct readings?
- What do I do with the data?
- Do chemical and/or power savings matter?

  Hint: Absolutely

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Typical DAF System Process Operation

Overloaded system

Lack of true understanding of DAF process conditions

Ongoing reliance on individual operator knowledge/experience

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Determining DAF Efficiency – The Manual Approach

Decreasing effluent turbidity

Sludge cake accumulating in back 1/3 of DAF

HEALTHY

Thick Sludge Cake

Low turbidity

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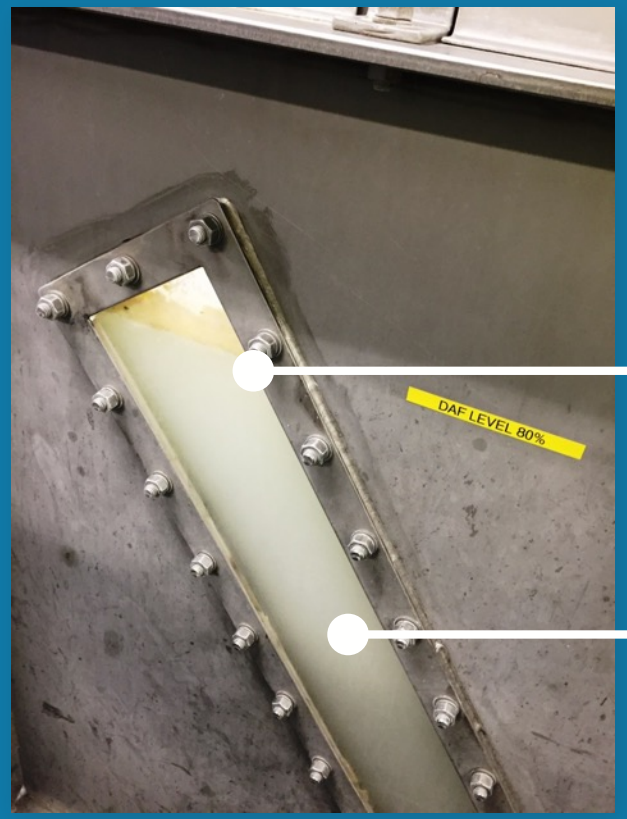
Determining DAF Efficiency – The Manual Approach

Minimal change in effluent turbidity

No sludge cake

High turbidity



UNHEALTHY

Thin Sludge Cake

High turbidity

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We Can Help
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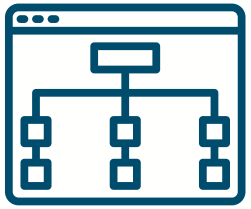
How Can We Help?

1

Rugged online instrumentation for industrial processes

2

Real-time monitoring



3

Automated process control

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1

Rugged Instrumentation

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Rugged Instrumentation

Total Suspended Solids (TSS) / Turbidity Monitoring

Solitax sc Sensors

TSS sc Sensors

pH Monitoring

Digital Differential pH & ORP Sensors

Organics (TOC) Monitoring

BioTector B7000i Online TOC Analyzer

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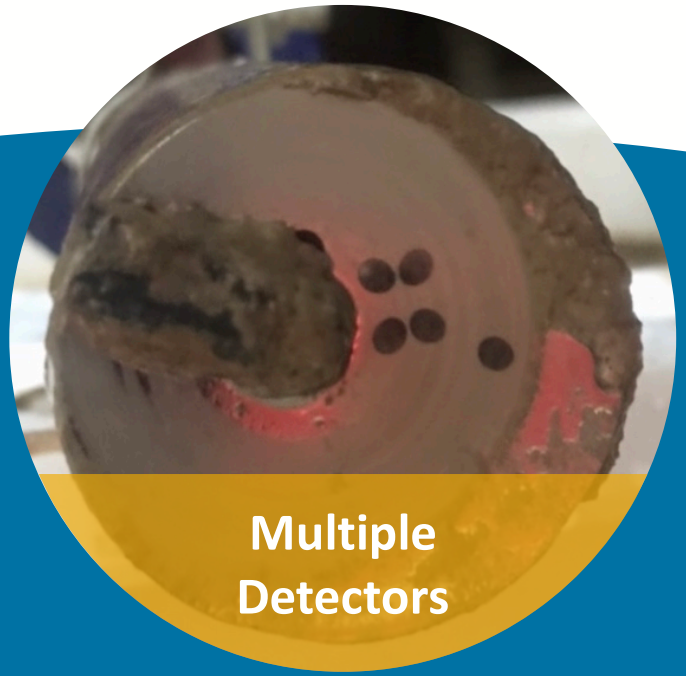
Getting the Job Done in the Dirtiest Environments



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2

Real-Time Monitoring

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Real-Time Monitoring

24/7 Process Visibility

Instrument Health Monitoring

Resource Savings

- Chemicals
- Labor

Reduce downstream treatment costs

Identify product loss

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Universal Controller

Standard Features

- Highly configurable
- Up To 8 Sensors
- Plug And Play Functionality
- C1D2 Certification
- NEMA 4x/Ip66
- 4 Relays
- Up To 12 mA Outputs
- Up To 12 mA Inputs
- SD Card For Data log And Configuration
- Networking
- Allows Up To 32 Devices Per Network

Communication Options

- Modbus Rs232/Rs485
- Modbus TCP/IP
- Profibus Dp
- Hart 7.2

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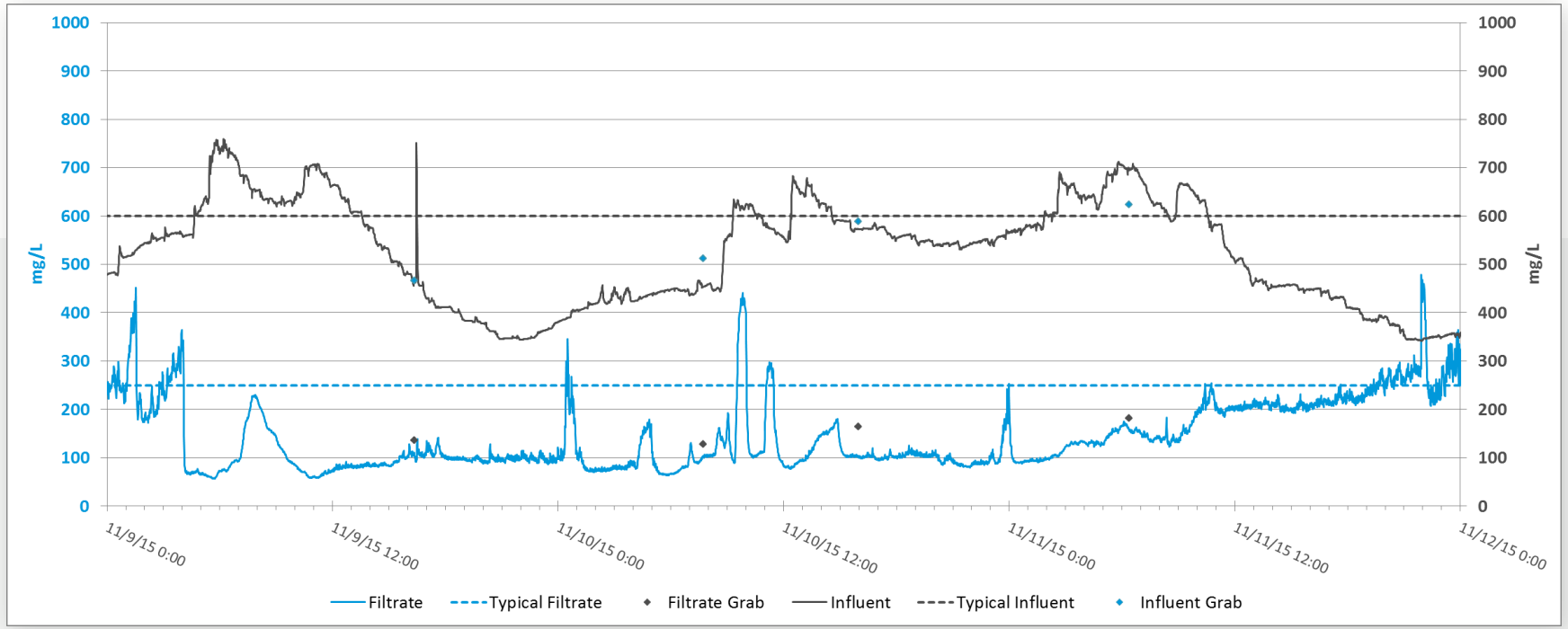
Knowing the Process is a Good Start, But…



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3

Automated Process Management

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Process Management

1. Collect real-time data
2. Calculate dynamic set points
3. Treatment adjusted – chemical feeds or aeration
4. Manual and automated modes available

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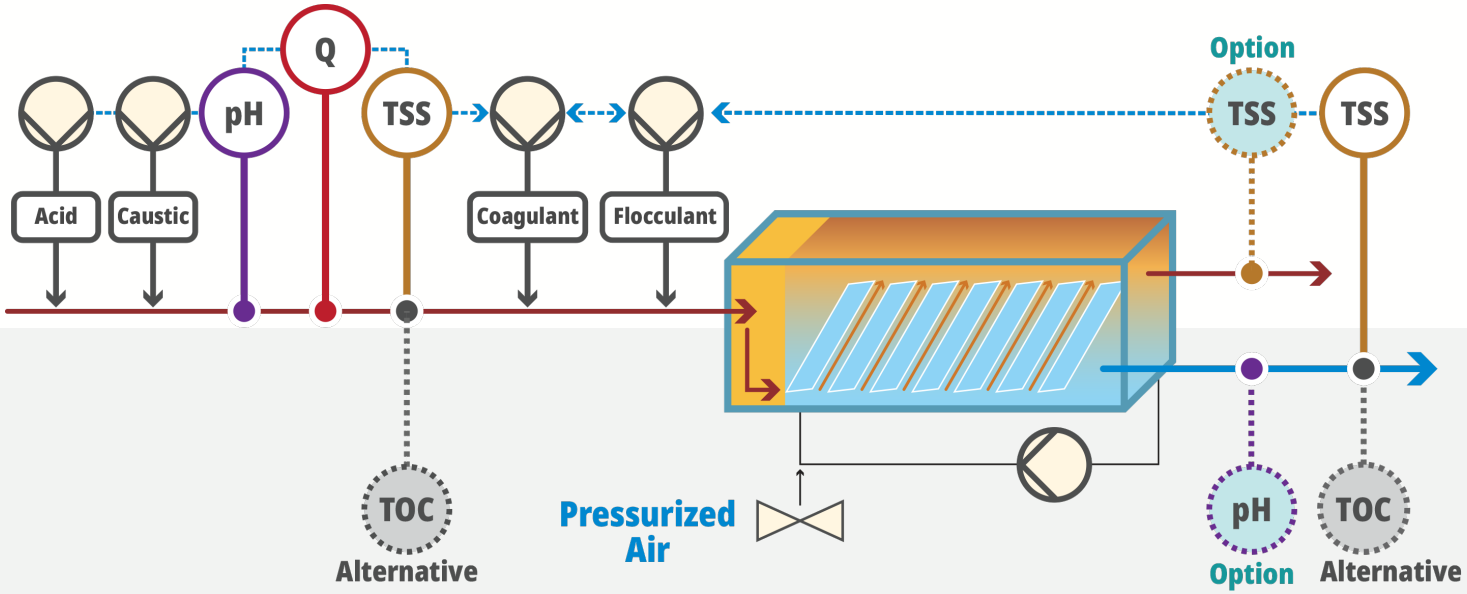
RTC-DAF System Overview



RTC DAF Parameters=	Monitor	Manage
pH, Influent	Y	Y
pH, Effluent (optional)	Y	Y
NTU (TSS), Influent	Y	Y
NTU (TSS), Effluent	Y	Y
NTU (TSS), Float	Y	Y
Flow	Y	

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RTC-DAF Input and Output Options

Inputs	
Influent Flow	Standard
Effluent Turbidity	Standard
Effluent pH	Standard
Influent pH	Optional
Influent Turbidity	Optional
Coagulant Flow Rate	Optional
Anionic Flocculant Flow Rate	Optional
Cationic Flocculant Flow Rate	Optional
Pre-DAF Acid Flow Rate	Optional
Pre-DAF Base Flow Rate	Optional
Post-DAF Acid Flow Rate	Optional
Post-DAF Base Flow Rate	Optional
5 Open Parameters	Optional

Outputs	
Coagulant Flow Rate Setpoint	Standard
Anionic Flocculant Flow Rate Setpoint	Standard
Cationic Flocculant Flow Rate Setpoint	Optional
Pre-DAF Acid Flow Rate Setpoint	Optional
Pre-DAF Base Flow Rate Setpoint	Optional
Post-DAF Acid Flow Rate Setpoint	Optional
Post-DAF Base Flow Rate Setpoint	Optional

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RTC-DAF User Defined / Adjustable Settings

- Effluent Turbidity or TSS Setpoint (NTU or mg/L)
- Coagulant PPM dose
- Anionic Flocculant PPM dose
- Cationic Flocculant PPM dose
- Effluent Turbidity or TSS PID values
- Coagulant Specific Gravity
- Anionic Flocculant Specific Gravity
- Cationic Flocculant Specific Gravity

- Pre-DAF pH target value and range
- Pre-DAF pH PID values
- Post-DAF pH target value and range
- Post-DAF pH target value and range
- Minimum and Maximum Limits (flow setpoints, pump ranges, PPM or lb/ton, etc)
- Warning and Alarm limits for all measurements

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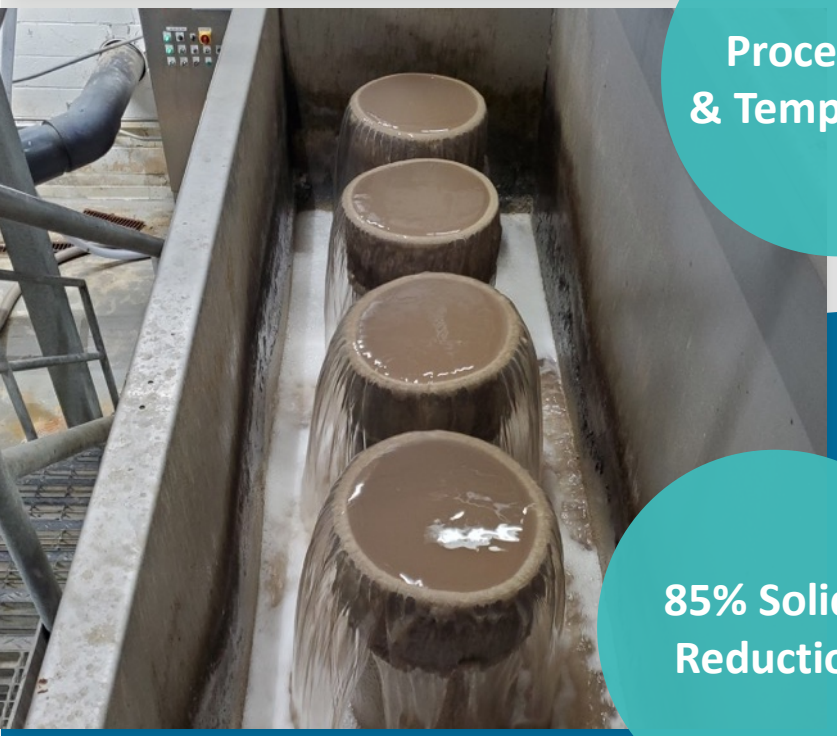

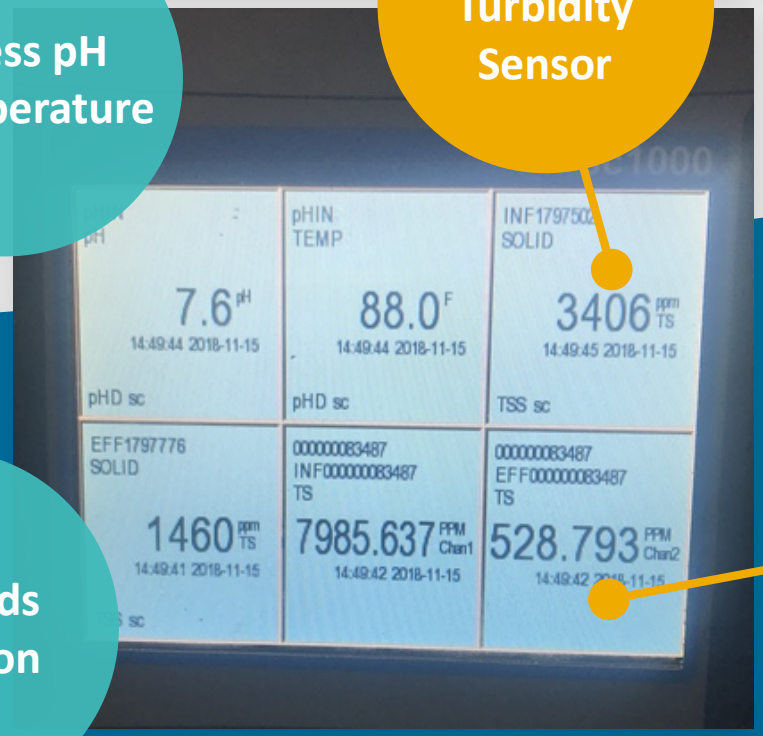

Process pH & Temperature

Influent Turbidity Sensor

85% Solids Reduction

Effluent Turbidity Sensor

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The Benefits of Automated DAF Process Management

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Benefits

- Automated chemical dosing
  - Eliminate manual adjustments
- Reduce operator interaction
- Optimize both solids and filtrate quality
- Consistent & cleaner effluent concentration
  - Reduced discharge costs
- Critical visibility into the process
- Chemical savings
- Save time
- Consistent compliance and reduced fees

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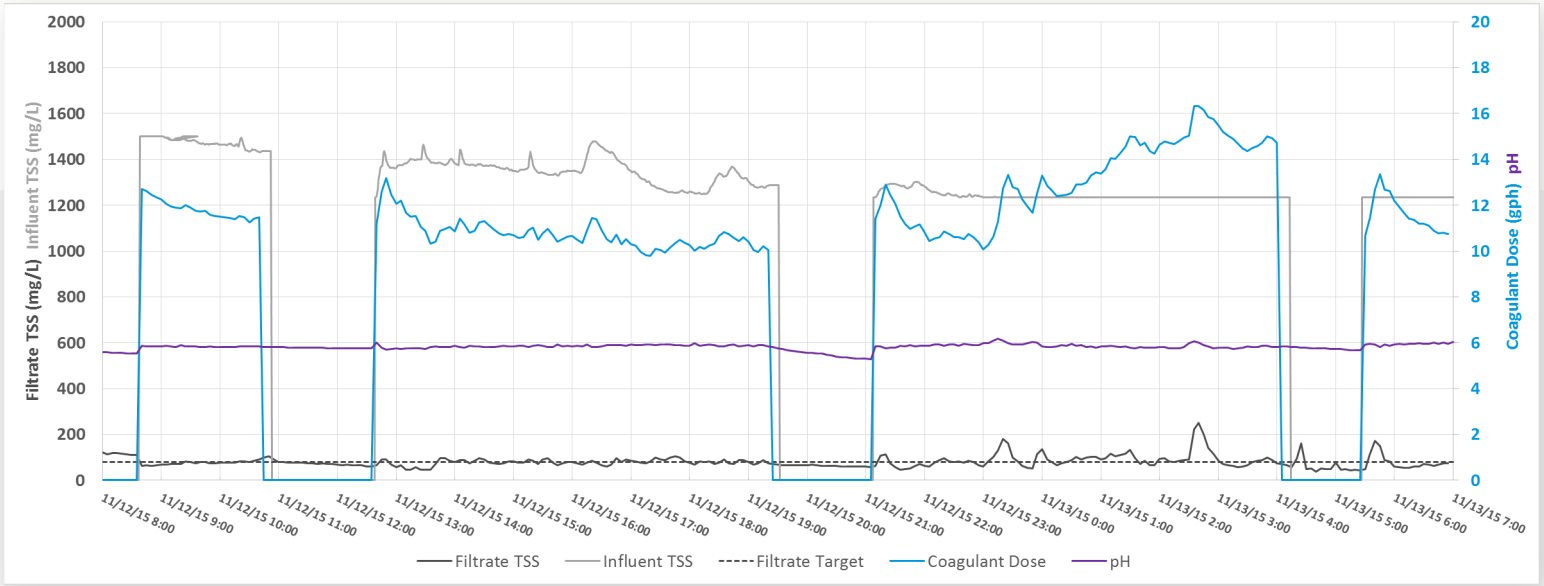
RTC-DAF in Action:

Example of Real Benefits



Your process might still be highly variable, but the desired outcome is consistently met regardless of variation.

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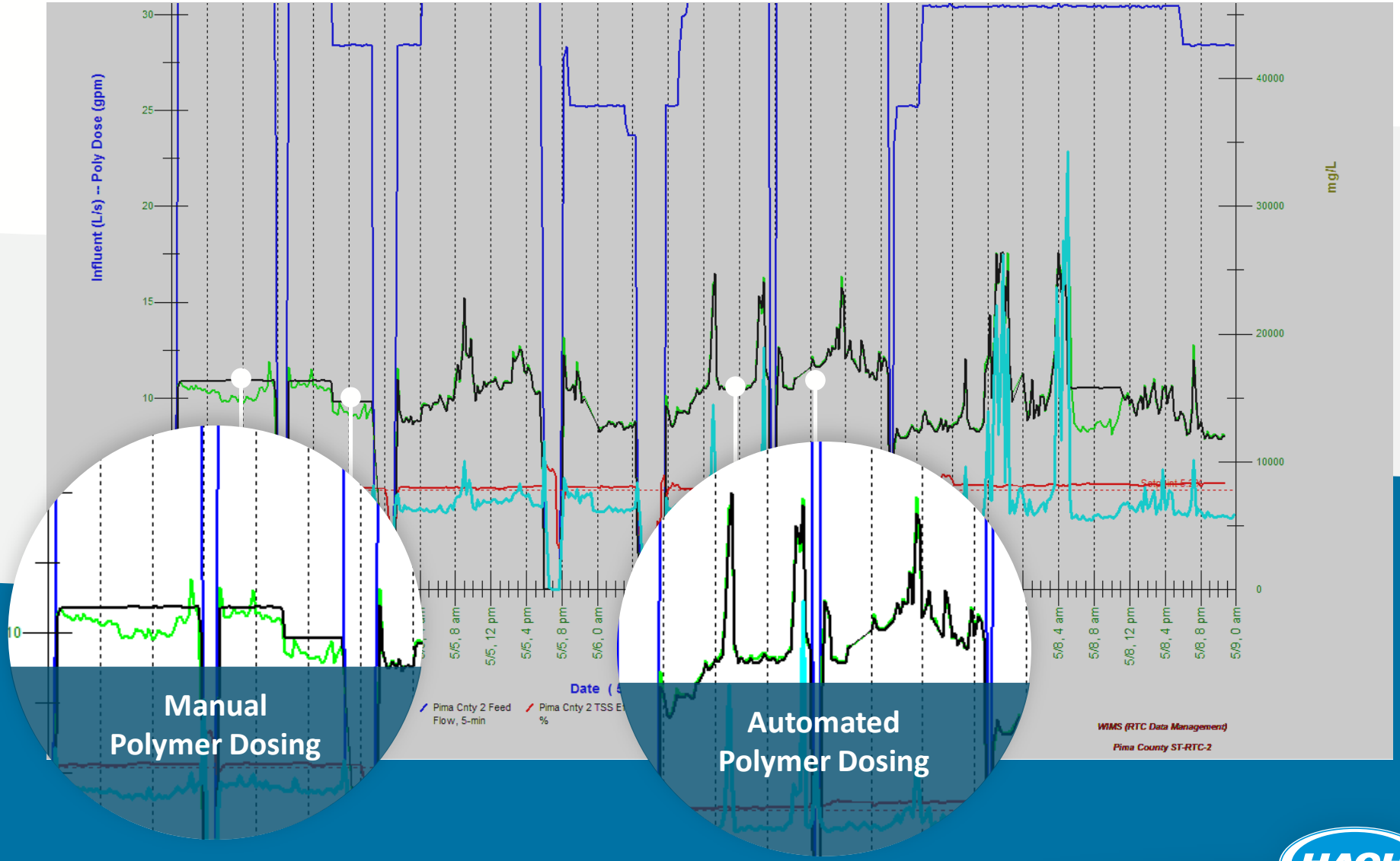

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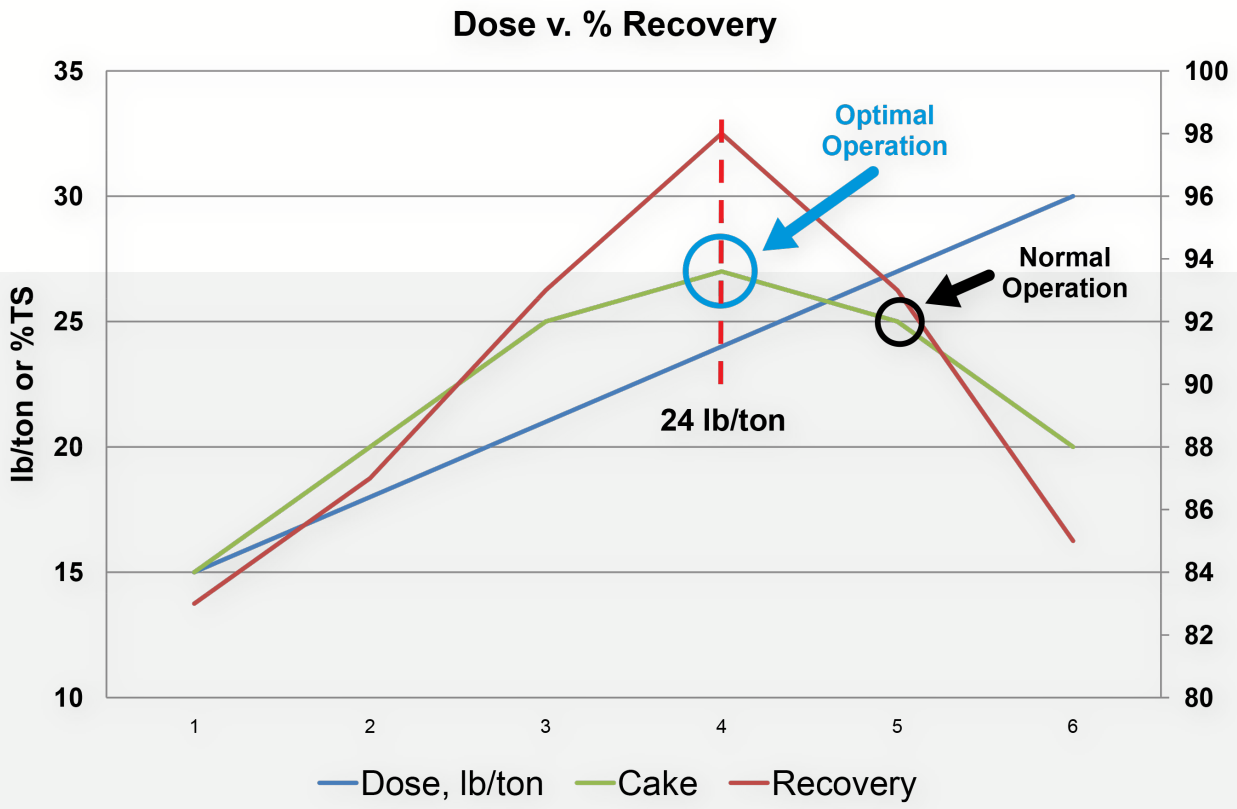
Performance Curve



Polymer Performance

There is an **OPTIMAL** dose ratio.

Adding chemical beyond the optimal point is wasting both chemical and budget.

MORE POLYMER ≠ BETTER RECOVERY

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A Proven Approach from the Industry Leader

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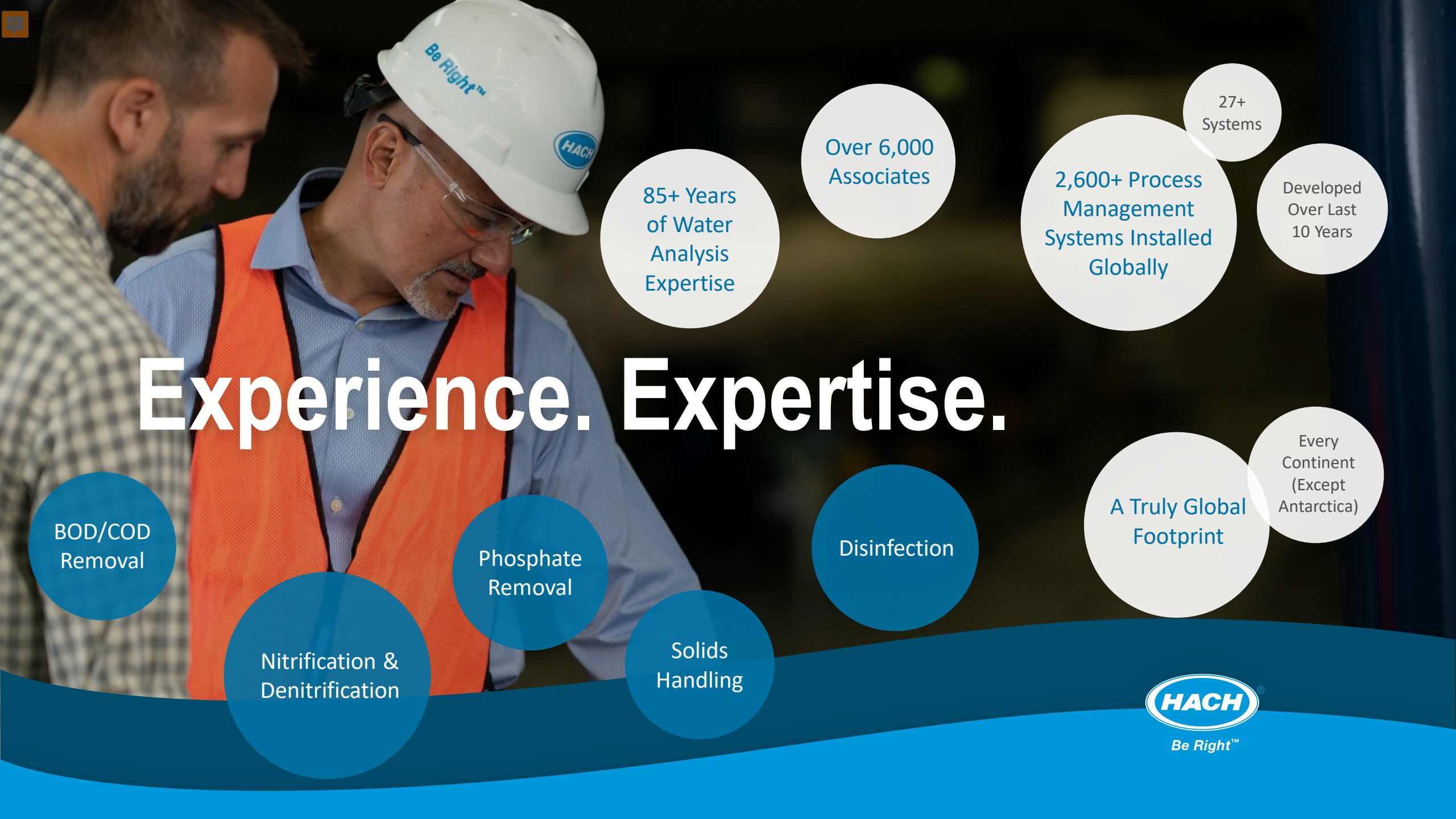

Experience. Expertise.

85+ Years of Water Analysis Expertise

Over 6,000 Associates

2,600+ Process Management Systems Installed Globally

27+ Systems

Developed Over Last 10 Years

A Truly Global Footprint

Every Continent (Except Antarctica)

BOD/COD Removal

Nitrification & Denitrification

Phosphate Removal

Disinfection

Solids Handling

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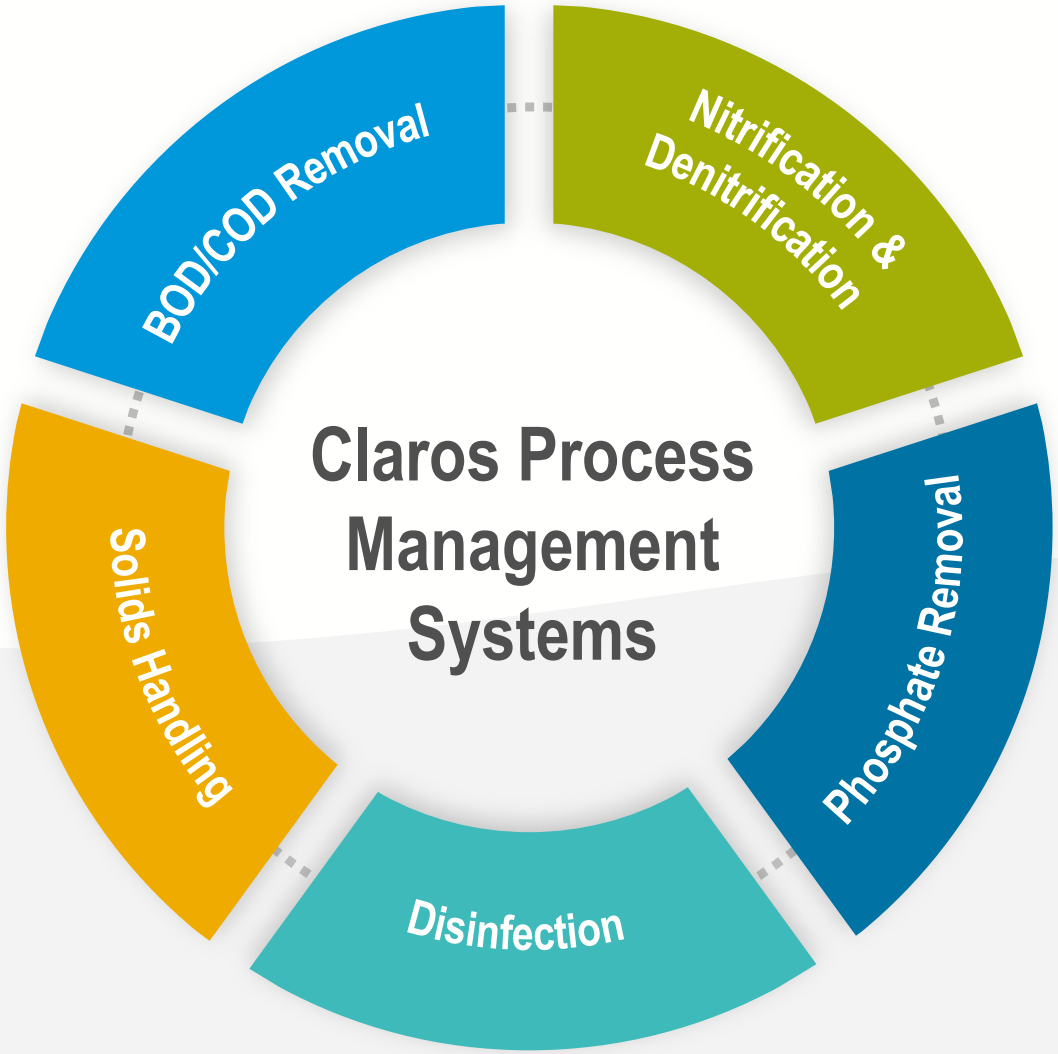

- Dissolved Oxygen Control
- Ammonia Removal
- Total Nitrogen Removal
- Chemical Phosphorus Removal
- Sludge Retention Time
- RAS Control
- Sludge Thickening
- Sludge Dewatering
- DAF Coagulant/Polymer Control
- Chlorination / Dechlorination

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Claros™

The Water Intelligence System from Hach®

Instrumentation + Software

= Less Uncertainty & More Efficiency

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One More Benefit?
Hach Support

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Service Protected

Yearly Service Partnership

1. A dedicated Hach® support team available to consult
2. Hach technicians providing guidance specific to your plant and application
3. Monthly reports to review your plant's performance
4. Reduced risk of unexpected downtime with service/maintenance recommendations

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How to Get Started *Typical Process Stages*

Discuss needs with Hach Representative & Process Management Specialist

In-Depth Project Planning

Best practice to include 3rd party partners (Engineers, Energy Consultants, etc)

Proposal

Technical Recommendations

Pricing

Proposal Approval

Installation

Commissioning

Ongoing Support & Optimization

Let’s Go.
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