



Optimising 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/Analyser maintenance
5. Chemical usage



Specific Operational Challenges

**Influent
Variability**

pH Control

**Temperature
Fluctuations**

**Accuracy of
Online
Measurements**



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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



Typical DAF System Process Operation

Overloaded system

Lack of true understanding of DAF
process conditions

Ongoing reliance on individual
operator knowledge/experience



Process
Operation
is Not
Process
Optimisation

Determining DAF Efficiency – The Manual Approach



Decreasing
effluent
turbidity



Sludge cake
accumulating in
back 1/3 of DAF



HEALTHY



Thick Sludge Cake

Low turbidity

Determining DAF Efficiency – The Manual Approach



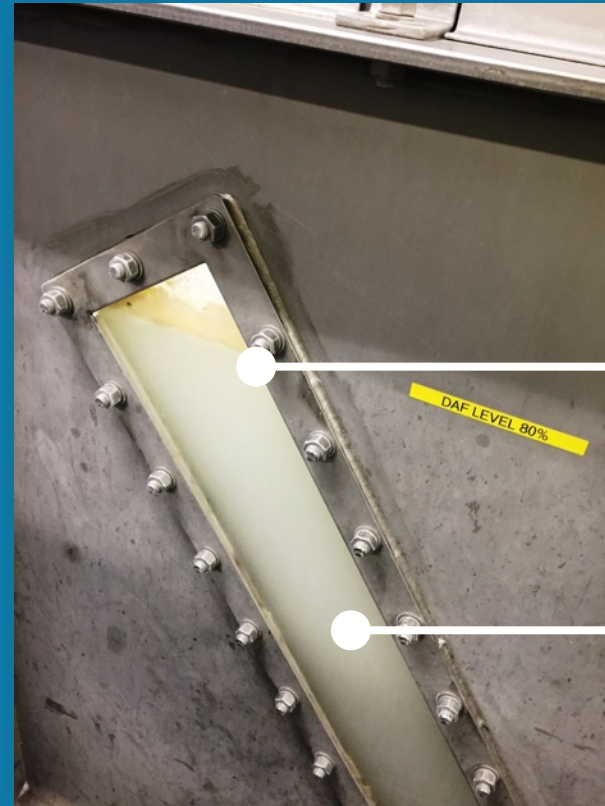
Minimal change in effluent turbidity



No sludge cake



High turbidity



UNHEALTHY

Thin Sludge Cake

High turbidity



We Can Help



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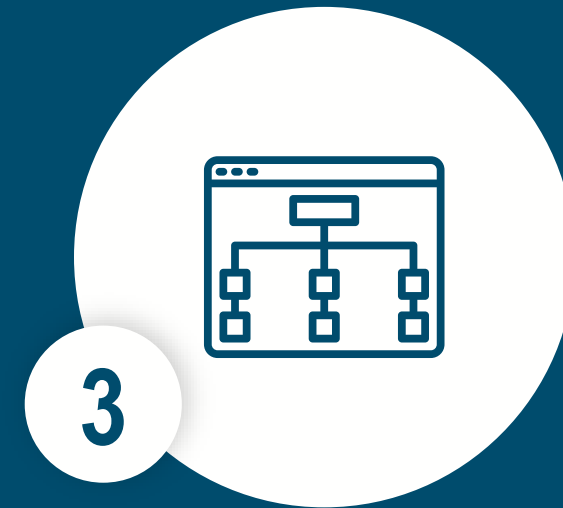
How Can We Help?



**Rugged online instrumentation
for industrial processes**



**Real-time
monitoring**



**Automated
process control**



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



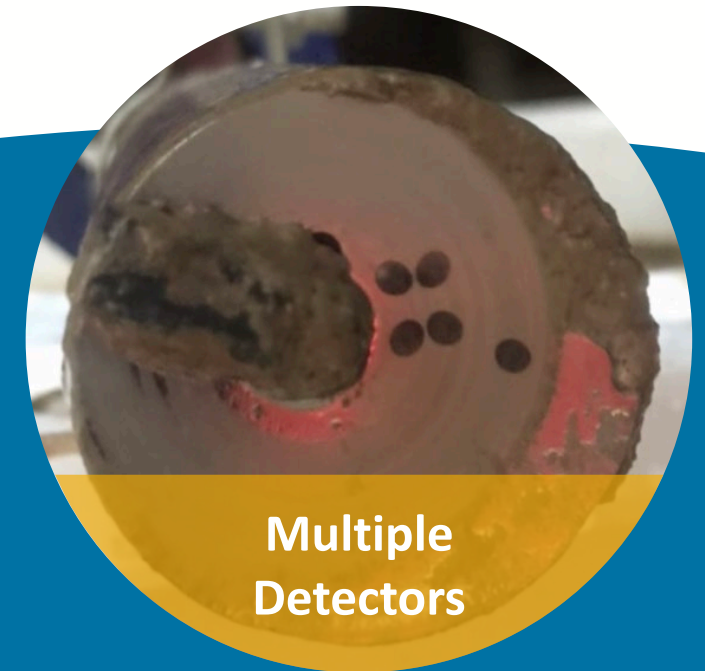
Organics (TOC) Monitoring

BioTector B7000i Online TOC Analyser



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Getting the Job Done in the Dirtiest Environments





2

Real-Time Monitoring



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Real-Time Monitoring

24/7 Process Visibility

Instrument Health Monitoring

Resource Savings

- Chemicals
- Labour

Reduce downstream
treatment costs

Identify product loss



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Universal Controller

sc1000



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

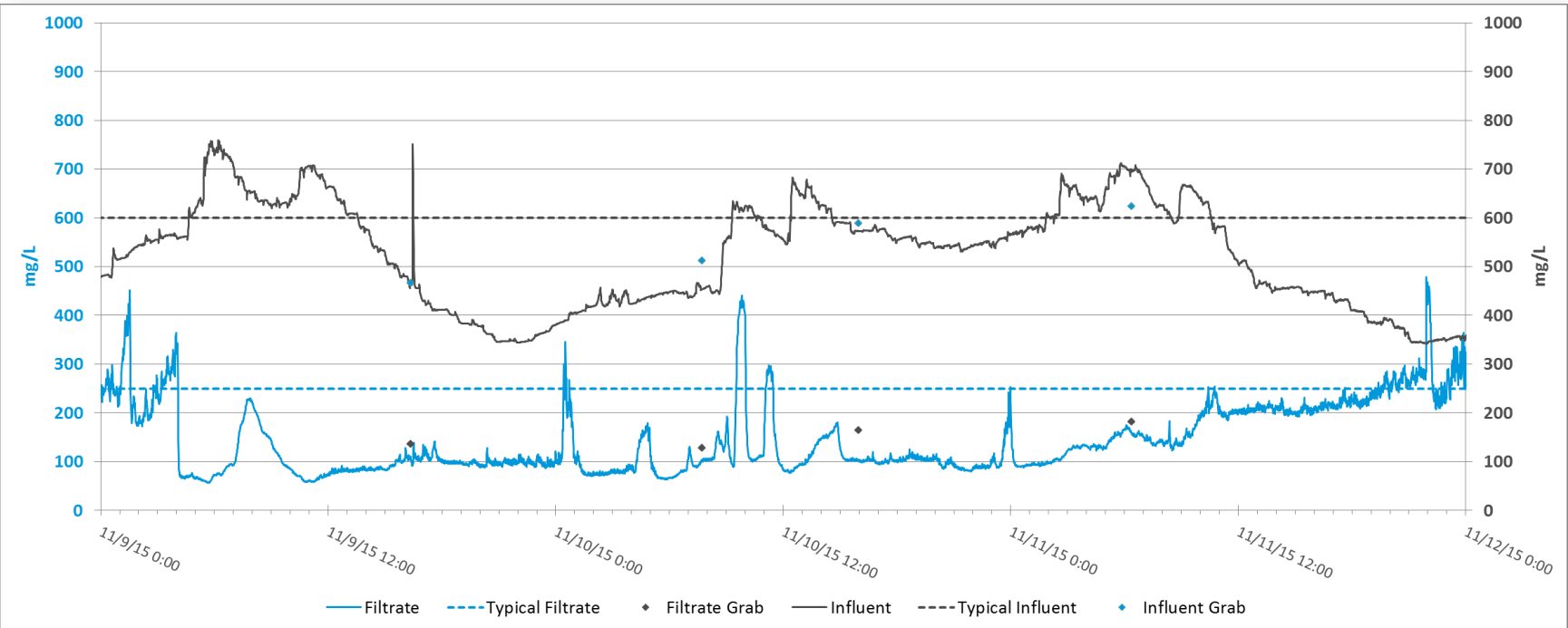
Communication Options

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





Knowing the Process is a Good Start, But...





3

Automated Process Management

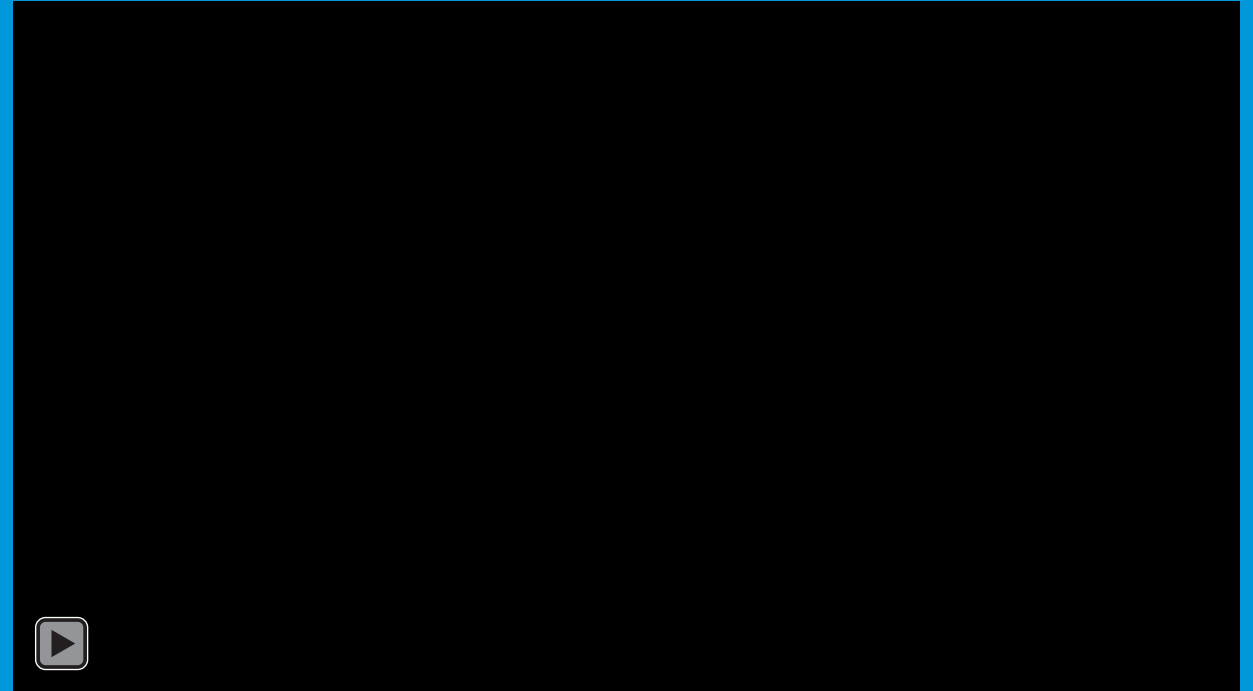


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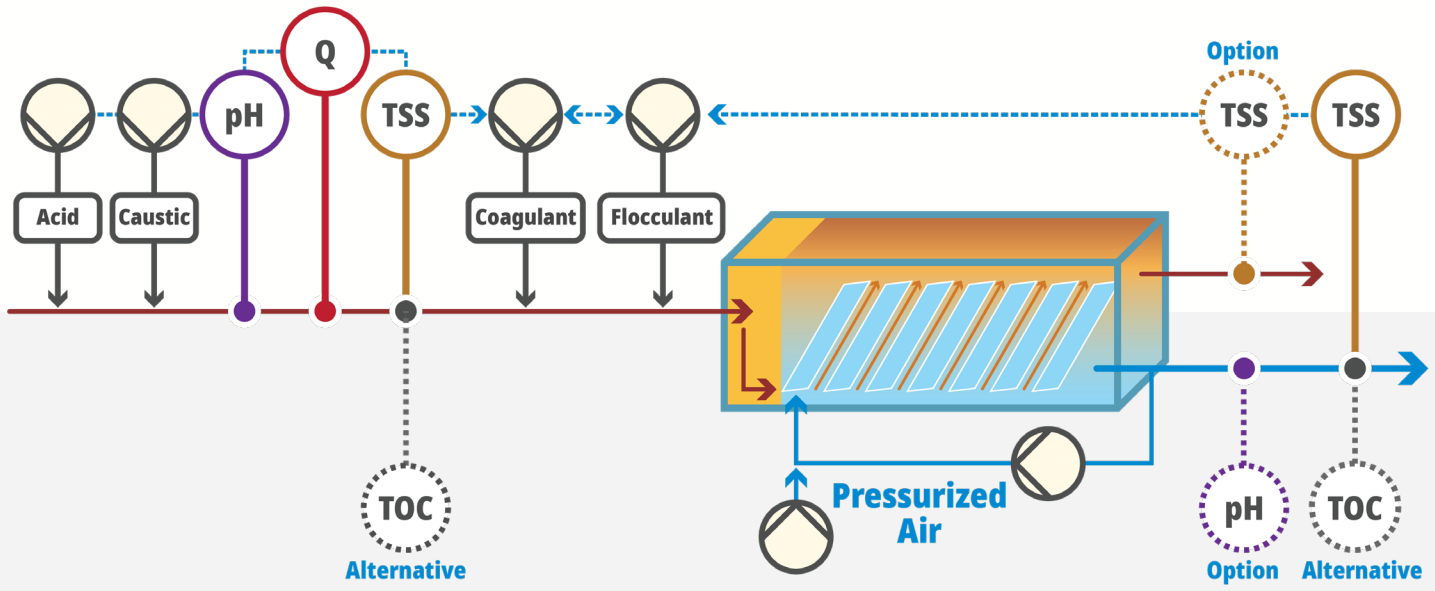
Process Management

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





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	

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



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



Process pH
& Temperature



Influent
Turbidity
Sensor



85% Solids
Reduction

pHIN TEMP 7.6^{pH} 14:49:44 2018-11-15	pHIN TEMP 88.0^F 14:49:44 2018-11-15	INF1797500 SOLID 3406^{ppm} TS 14:49:45 2018-11-15
pHD sc EFF1797776 SOLID 1460^{ppm} TS 14:49:41 2018-11-15	pHD sc 000000083487 INF000000083487 TS 7985.637^{PPM} Chan1 14:49:42 2018-11-15	TSS sc 000000083487 EFF000000083487 TS 528.793^{PPM} Chan2 14:49:42 2018-11-15



Effluent
Turbidity
Sensor



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The Benefits of Automated DAF Process Management



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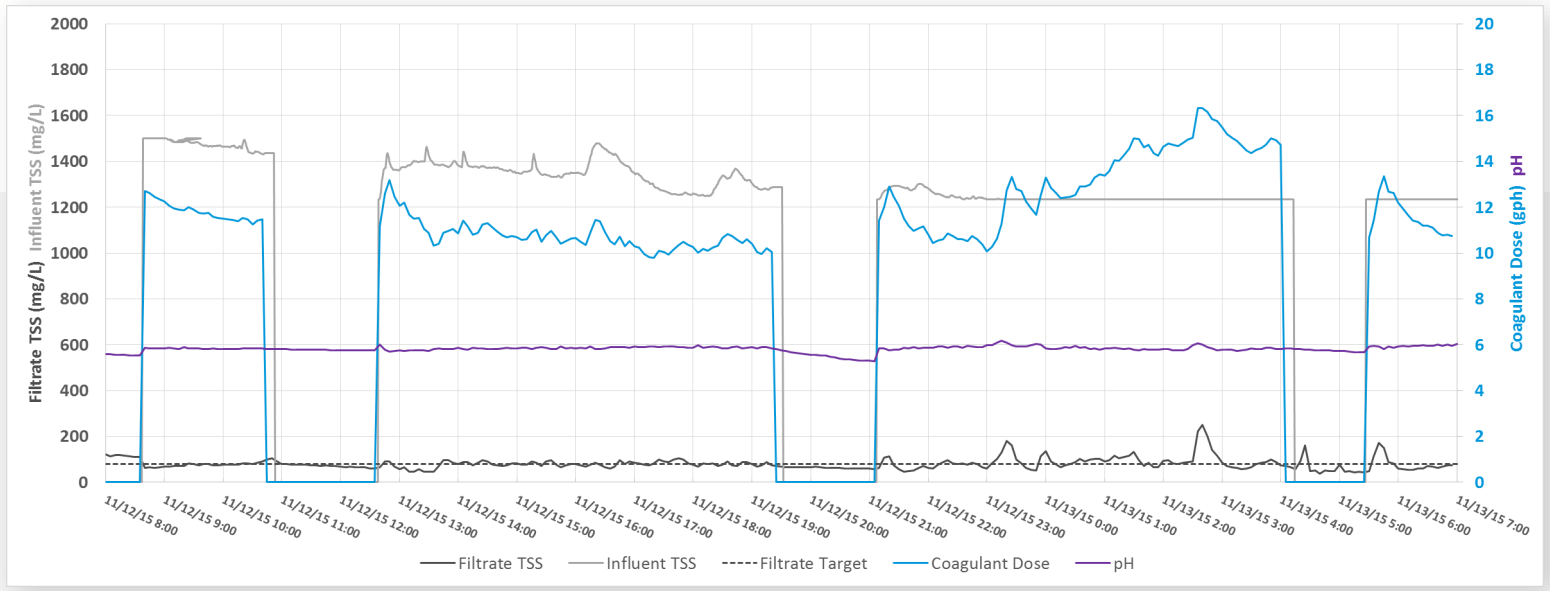
Benefits

- Automated chemical dosing
 - Eliminate manual adjustments
- Reduce operator interaction
- Optimise 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



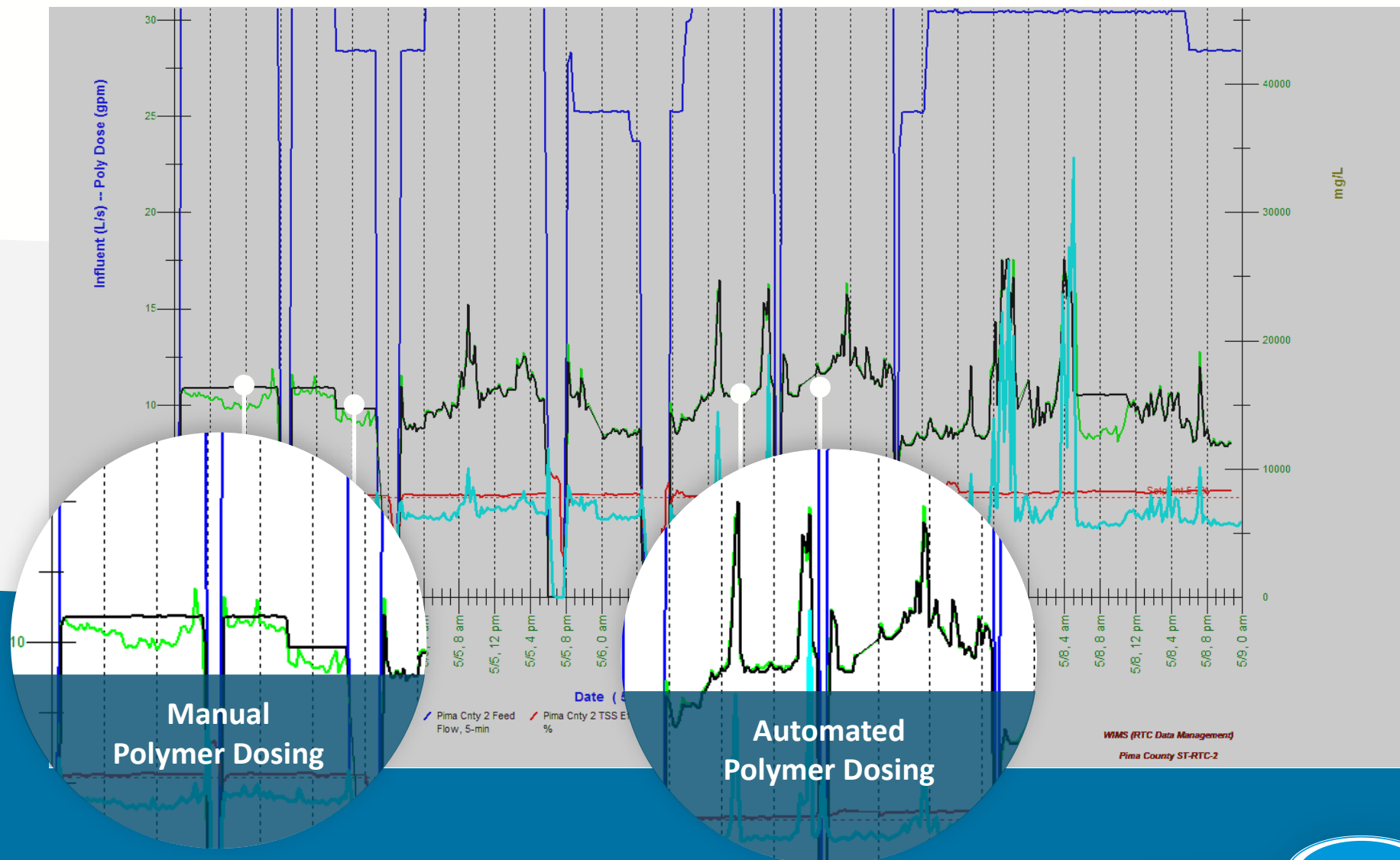


RTC-DAF in Action: Example of Real Benefits



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



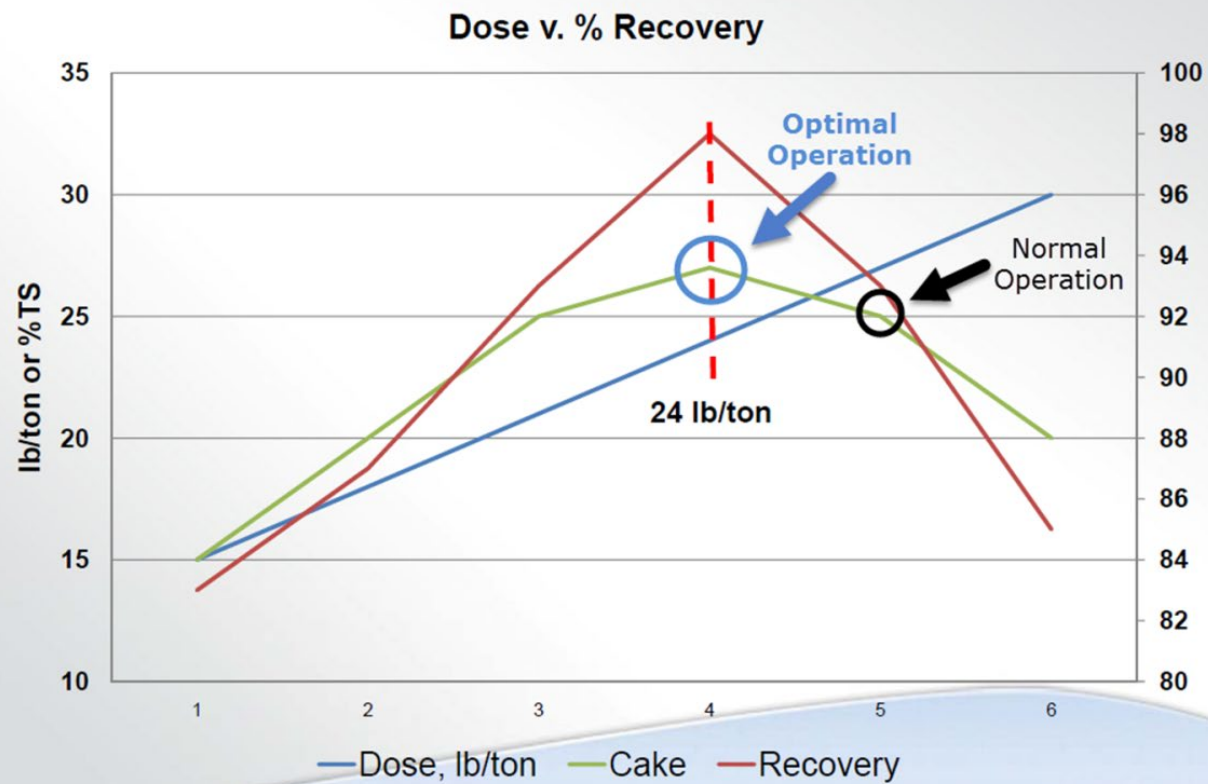


Manual
Polymer Dosing

Automated
Polymer Dosing



Performance Curve



Courtesy of Steve Walker, Carollo Engineering
"Polymer Optimization through for Centrifuge Dewatering," 2011

Polymer Performance

There is an **OPTIMAL** dose ratio.

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

MORE POLYMER \neq BETTER RECOVERY

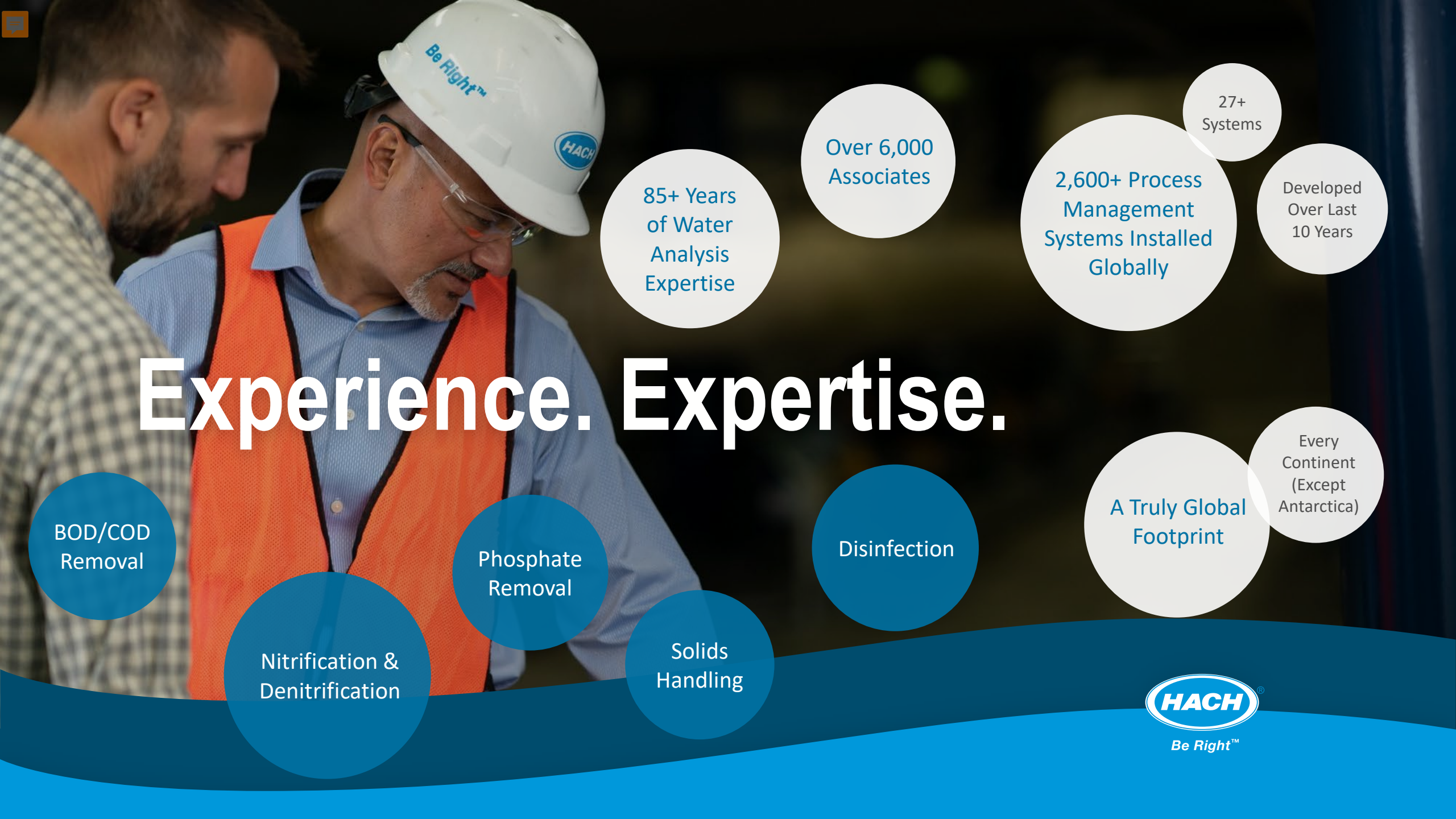


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A Proven Approach from the Industry Leader





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

BOD/COD
Removal

Nitrification &
Denitrification

Phosphate
Removal

Solids
Handling

Disinfection

A Truly Global
Footprint

Every
Continent
(Except
Antarctica)



Be Right™



- 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



Instrumentation + Software
**= Less Uncertainty
& More Efficiency**



The background image shows two workers in hard hats shaking hands on an industrial platform at sunset. The sky is a vibrant orange and yellow, with the sun low on the horizon. In the foreground, there are large, dark, cylindrical objects, possibly pipes or tanks, and a blue diagonal graphic element on the left side.

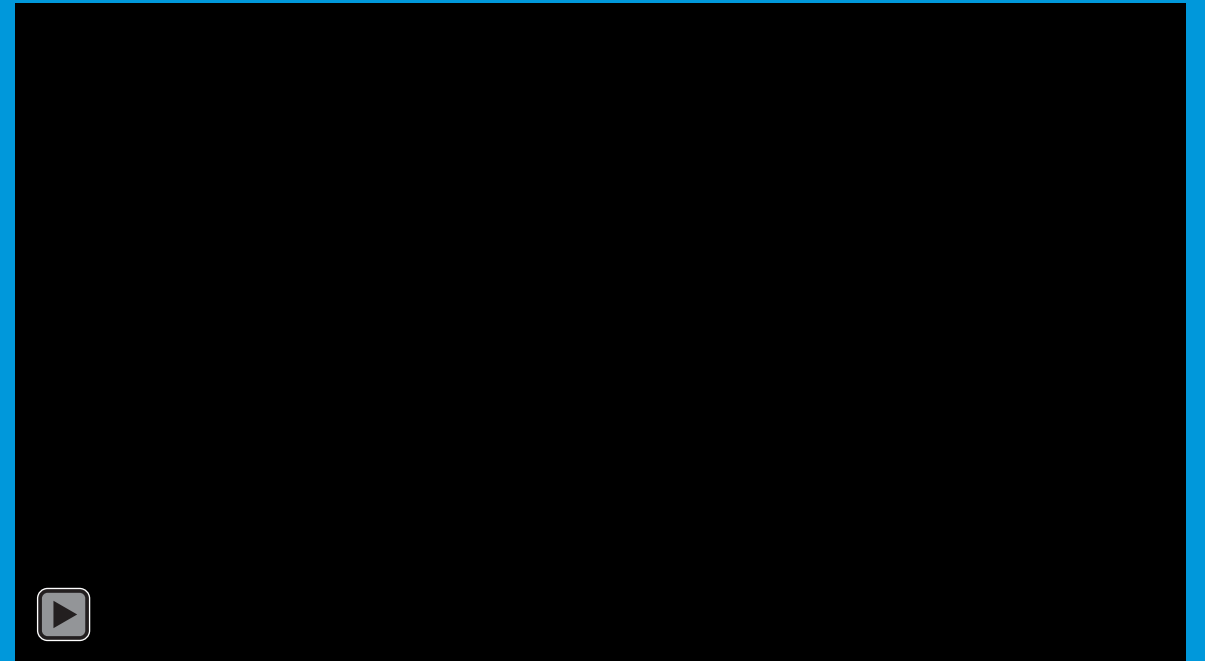
One More Benefit? Hach Support





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
& Optimisation**



Let's Go.



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