

Workgroup Session

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Potable Water Process

What is the status in your country?

1. “Looked into it”
2. Started sales campaign and some installations
3. Active and known sales force

Water treatment processes

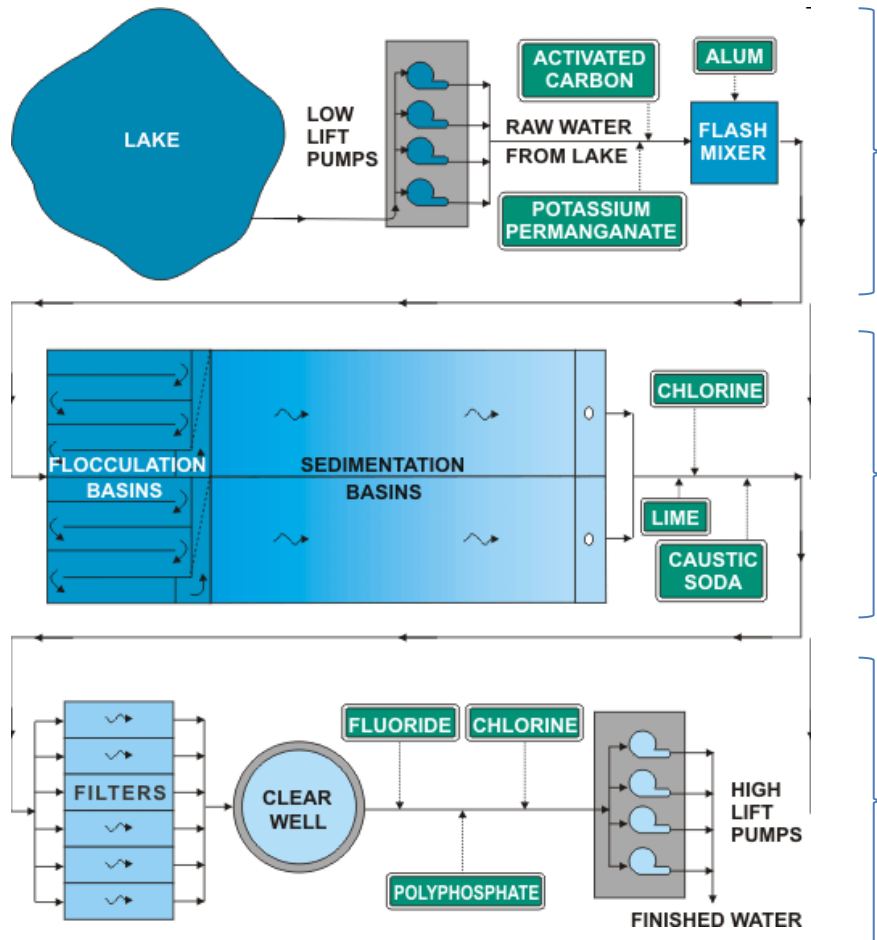
- Measuring challenges and solutions

Where are the customers

What are your plans?

Surface water, Free Chlorine

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Step 1: Raw water treatment

- Oxidation
- Byproduct removal
- Coagulation

Step 2: Water clarification

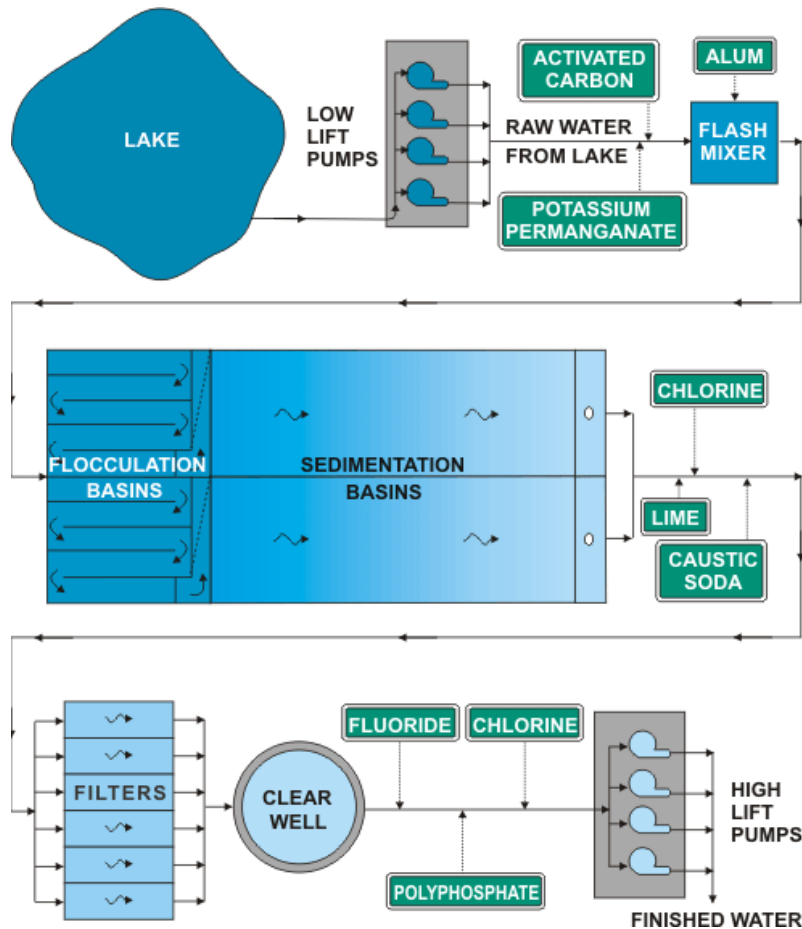
- Flocculation
- Sedimentation
- pH stabilization

Step 3: Final treatment

- Sand / AC filters
- Free Chlorine addition
- Distribution

Surface water, Free Chlorine

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Step 1: Intake surveillance

- Turbidity
- pH, Conductivity
- Dissolved Oxygen

Step 2: Water clarification

- Turbidity
- Free Chlorine
- pH

Step 3: Final treatment

- Turbidity
- Free Chlorine
- Combined Chlorine

Measuring challenges Turbidity

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Challenges	Solution
Water can contain changing amount of particles which can clog flowcells.	Wide diameter tubing Big particle deposit chamber Automatic flushing
Algae and biofilm can cover optical lenses	Non contact optics
Temperature deviation due to season changes	Heated optics avoids condensation
Result validity (remote installation)	Flow alarms LED emitters provide stable and accurate readings
Measurement verification	VeriKit provides fast and reliable verification



Measuring challenges: Chlorine DPD

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Challenges	Solution
Water can contain changing amount of particles which can clog flowcells.	Wide diameter tubing Overflow cell Cleaning module
Algae and biofilm can cover optical lenses	Automatic zero calibration Flow through photometer Cleaning Module
Temperature deviation due to season changes	No influence
Result validity (remote installation)	Flow alarms Reagent level control Photometer surveillance
Measurement verification	VeriKit provides fast and reliable verification

Measuring challenges: Chlorine Trides

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Challenges	Solution
Water can contain changing amount of particles which can clog flowcells.	Wide diameter tubing Overflow cell
Algae and biofilm can cover sensors	Reference electrode provides stable voltage Sample driven rotor provides constant sensor cleaning
Temperature deviation due to season changes	Temperature compensation
Result validity (remote installation)	Flow alarm
Measurement verification	Manually with Chematest

Measuring challenges pH, Cond, O2

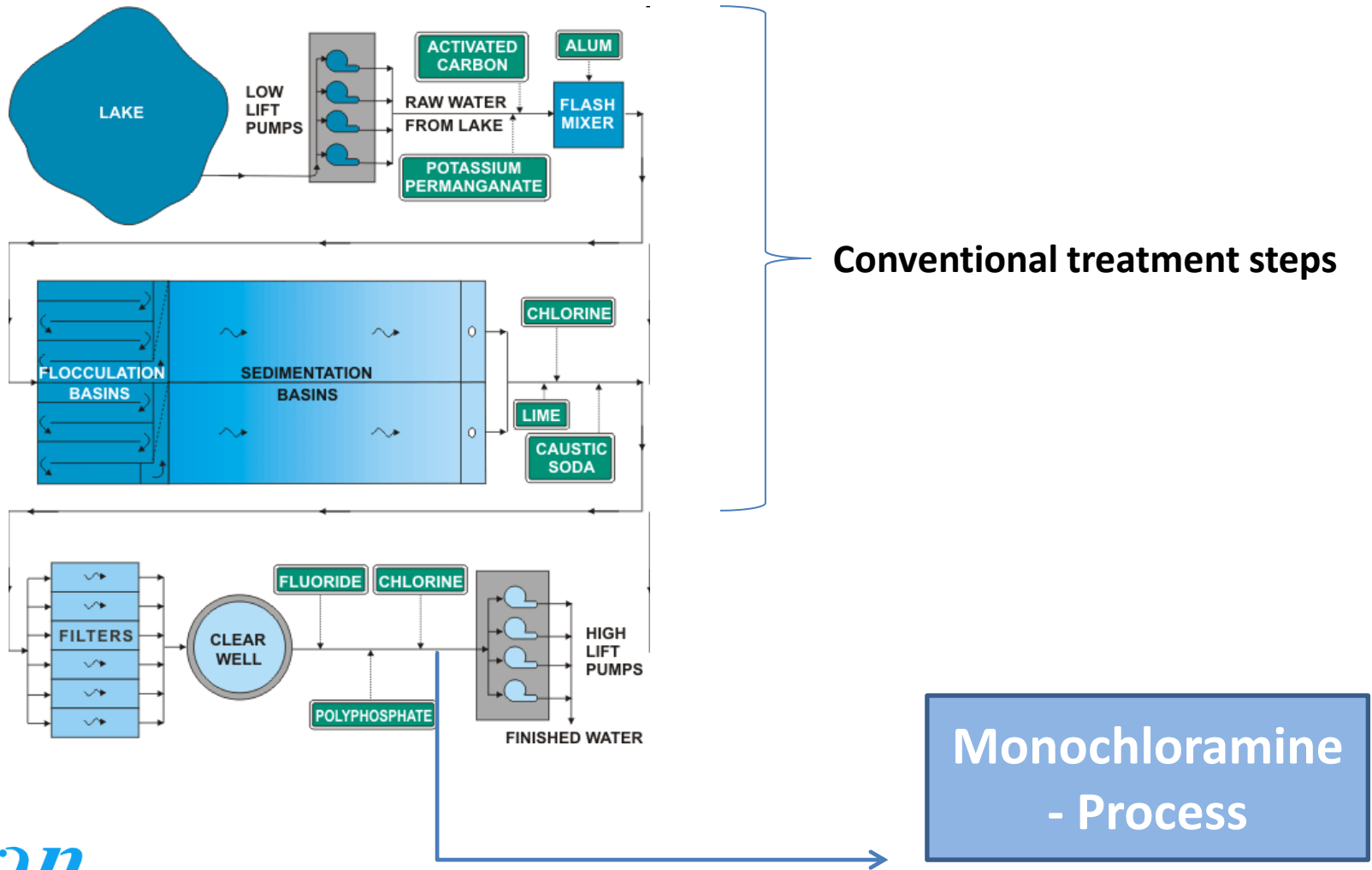
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Challenges	Solution
Water can contain changing amount of particles which can clog flowcells.	Wide diameter tubing and flowcells
Algae and biofilm can cover optical lenses	Flowcells with rinsing option
Temperature deviation due to season changes	Temperature compensation
Result validity (remote installation)	Flow alarms
Measurement verification	M-Flow cells have removable beakers for fast calibration or verification.



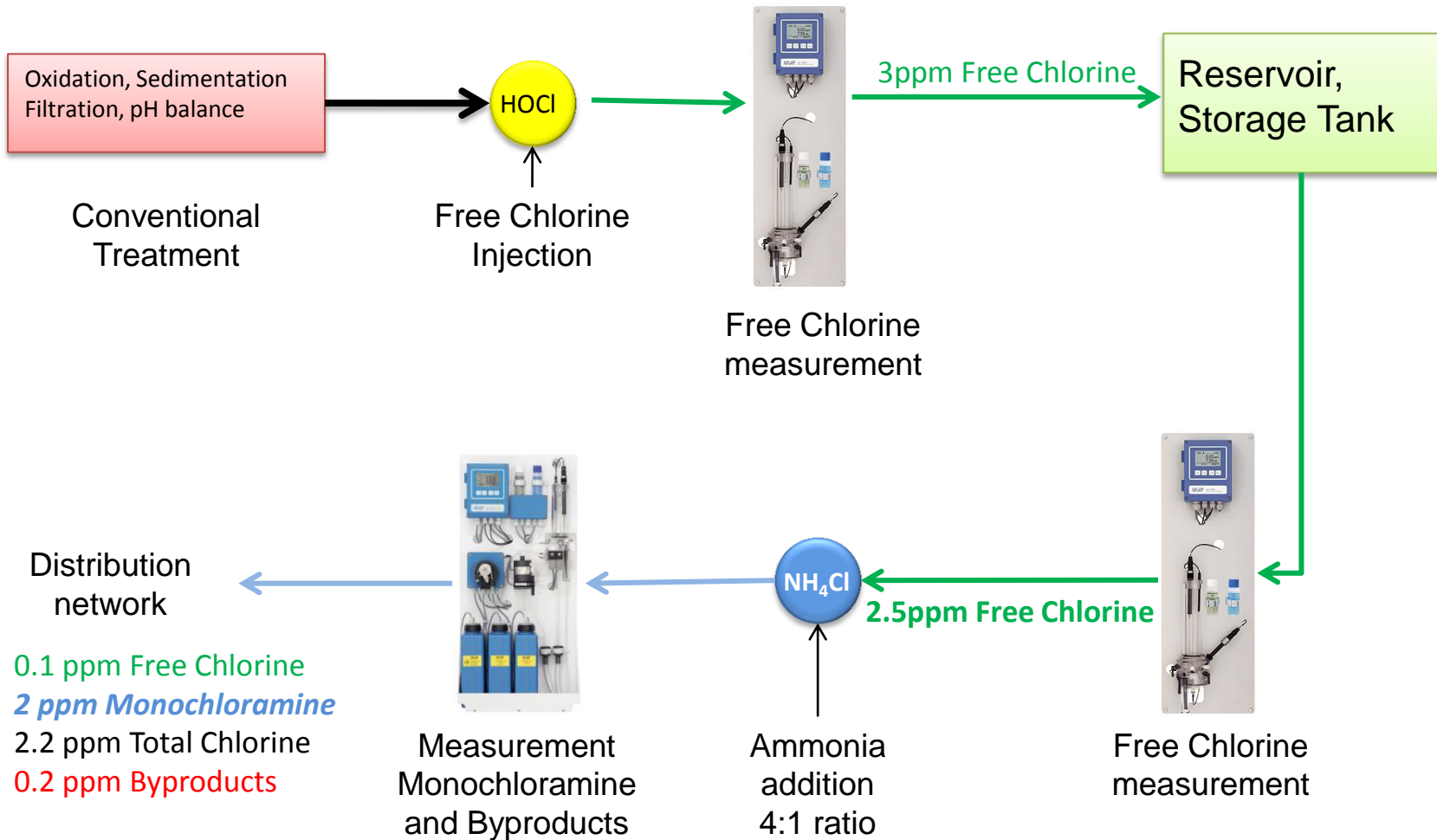
Surface water, “Monochloramine process”

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Monochloramine Process

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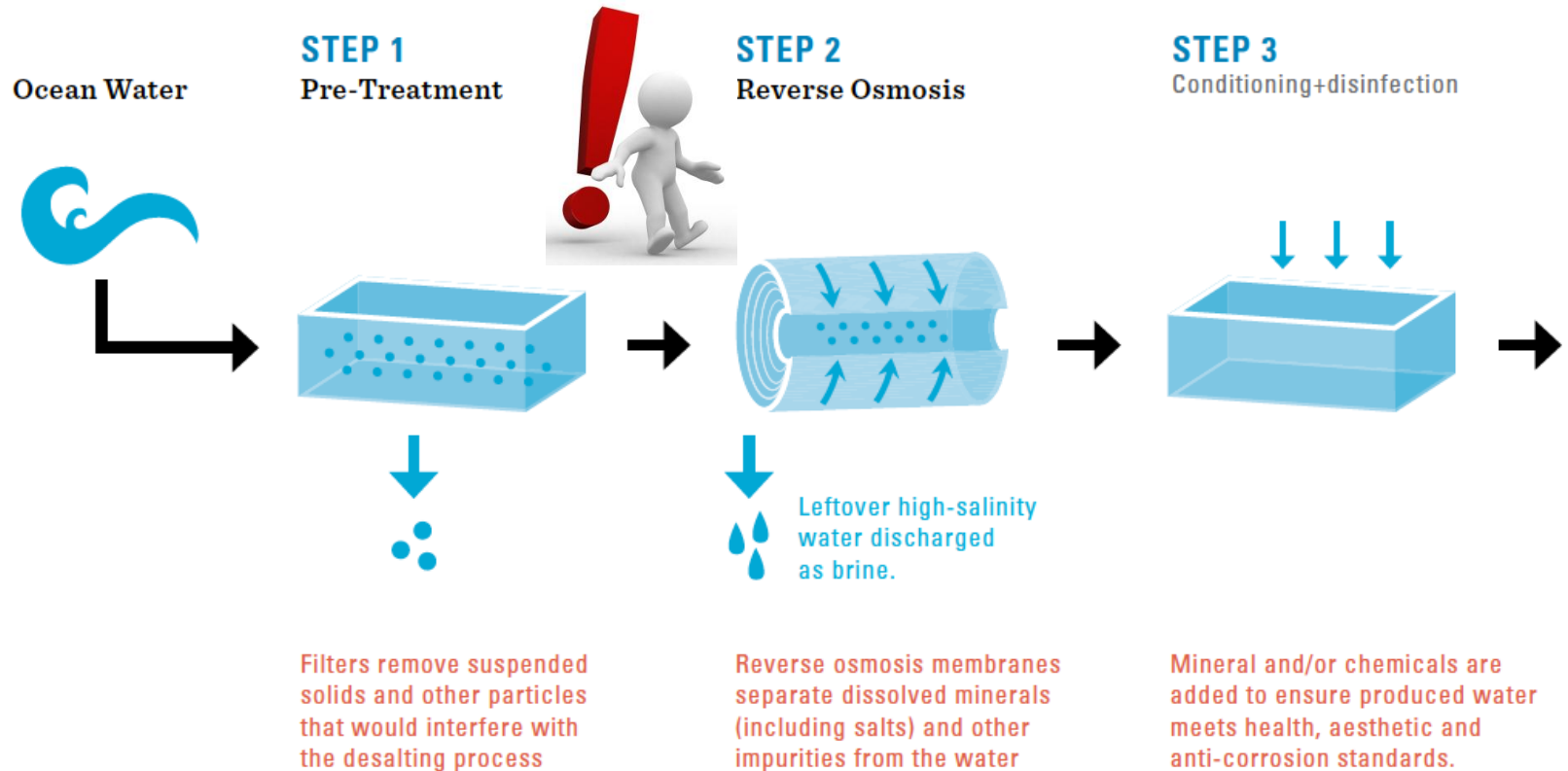
Measuring challenges: Monochloramine

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Challenges	Solution
Measurement of Monochloramine only	AMI Codes II CC
Measurement of unwanted Byproducts (Difference between Free Chlorine+Monochloramine to Total Chlorine)	AMI Codes II CC
Result validity (remote installation)	Flow alarms Reagent level control Photometer surveillance
Measurement verification	VeriKit provides fast and reliable verification

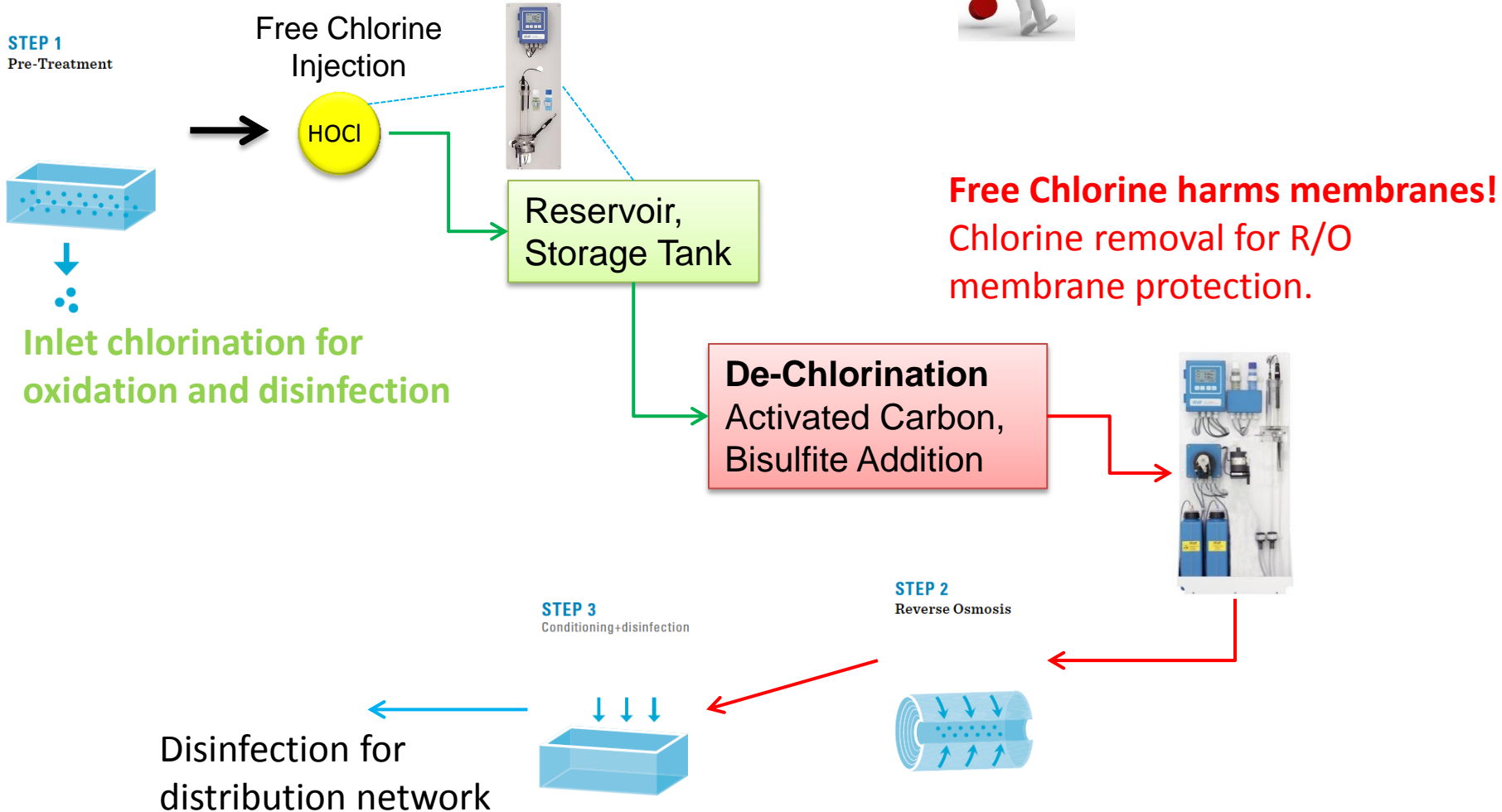
Sea Water: Desalination

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Sea Water: Desalination

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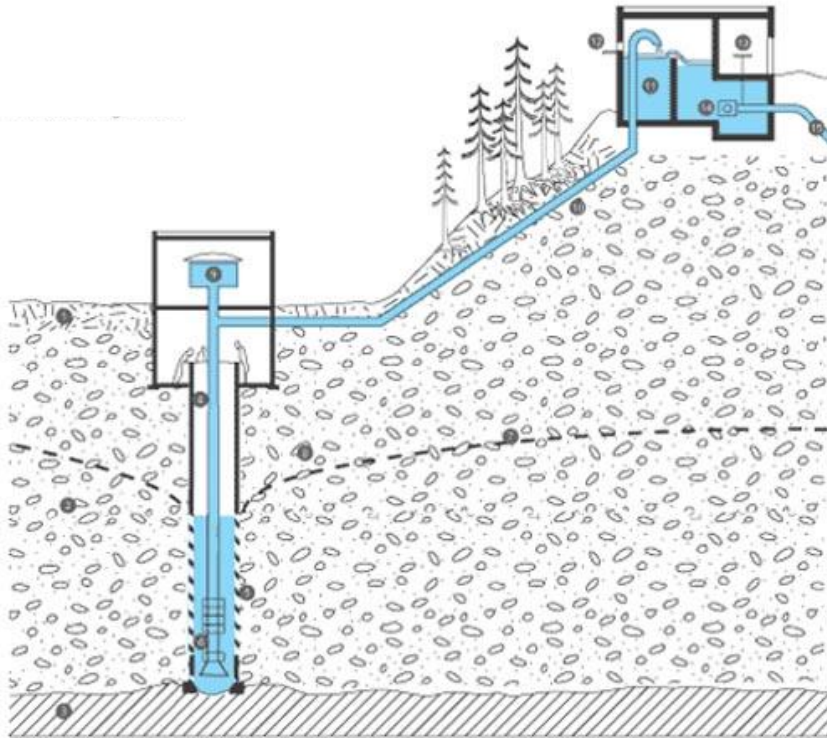
Measuring challenges: Chlorine DPD

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Challenges	Solution
Biofilm growth covers membranes and sensors	Cleaning module reduces manual cleaning and prevents algae growth
Low chlorine value must be measured accurately and stable!	DPD measurement is absolute and very precise especially at low levels.
Result validity (remote installation)	Flow alarms Reagent level control Photometer surveillance
Measurement verification	VeriKit provides fast and reliable verification

Ground Water without treatment

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Typical installation:

- Turbidity
- Conductivity
- Dissolved Oxygen

No disinfection necessary?



Water treatment Rapperswil

What other treatments exists

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- Many more.....
- ^
 - What are the control parameters?
 - What are alarming limits?

Municipal water: Who is the customer?

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- Who makes the specification?
 - Government?
 - Engineering companies?
- Who takes decisions?
 - Chemist?
 - Technical director?
 - Local water treatment manager?
 - City council?
- Who is your first contact for product presentations and trials?



Find and convince!

Chlorine DPD: SWAN

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AMI Codes
Free Chlorine FAC

Listprice: 3'500€
Reagents: approx 700€ /a



AMI Codes CC
All chlorine forms

Listprice: 4'250€
Reagents: approx 900€ /a



HACH Cl17 (Chlorine DPD)

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- Retail Price:
 - 3600-6000€
- Common discount up to 50% for enduser!
- Price for consumables / year
 - 600€ - 1500€ reagent kit
 - “Maintenance kit” 100€
- Advantages:
 - Well-Known thanks to good marketing
 - Enclosure
- Disadvantages
 - **Manual zero calibration!**
 - Not for sea & waste water
 - No flow / reagent alarms
 - Maintenance complicated
 - Instable value, no trust



HACH APA 6000 (Monochloramine)

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- Retail Price:
 - USD 14,000 (!)
- Common discount
(rough street price)
 - 20% for direct sales and
 - 30 ~ 50% discount for local distributor

Price for consumables / year

- US\$ 140 per set x 12 months



- Advantages:
 - **4 in 1 instruments** – TCL, Total Ammonia and Free Ammonia (by calculation) and Monochloramine
 - Low reagent consumption
 - It comes with a enclosure.
- Disadvantages
 - Need very frequent maintenance
 - Complicated interior connection, due to space restriction.

Amperometric analysers

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- Retail Price:
 - Very cheap (1000€)

Examples:

- Severn Trent
- ATI Technologies
- Countless others

Price for consumables / year

- Sensor
- Membranes



Model TCA-22
Total Chlorine Analyzer

swan
ANALYTICAL INSTRUMENTS

- Advantages:
 - Cheap
 - Complete systems with dosing pumps, valves etc
- Disadvantages
 - Need very frequent maintenance, membrane or complete sensor exchange
 - Instable readings due to unknown membrane condition
 - Coating issues same as AMI Trides!

Where what when

Disinfectants: General problems

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- Batch readings
 - Clogging of cuvette and tubings
- Use of Micropumps
 - Expensive maintenance
- Surveillance of reagents and flow missing

Turbidity

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AMI Turbiwell
Non contact optics
For all applications

Listprice: 4'750€
No consumables!

Siegrist AquaScat WTM

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- Retail Price:
 - 5'200€
- Common discount up to 30% for enduser!
- Price for consumables / year
 - Light bulb (~100€)
 - Standard solution(~10C
- Advantages:
 - Non contact optics
 - Automatic verification and alarm
- Disadvantages
 - Freefall stream interruptions (diss. Gas) lead to instable readings
 - No flow alarms
 - High sample consumption (~270l/h)



Siegrist AquaScat HT

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- Retail Price:
 - 5'200€
- Common discount up to 50% for enduser!
- Price for consumables / year
 - Light bulb (~100€)
 - Standard solution(~100€)
- Advantages:
 - Non contact optics
 - Automatic verification and alarm
- Disadvantages
 - Freefall stream interruptions lead to instable readings
 - No flow alarms
 - High sample consumption (~270l/h)



HACH 1720 E

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- Retail Price:
 - 4'800€
- Common rebates
up to 50% for enduser!
- Price for consumables /
year
 - Light bulb (~100€)
 - Standard solution(~100€)
- Advantages:
 - Cheap
 - Quick calibration
- Disadvantages
 - **Manual calibration required!**
 - High maintenance
 - Tungsten lamp, need regular replacement & recalibration



HACH Ultraturb sc

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- Retail Price:
 - 3'900 €
 - 4'700 US\$
- Common discount up to 30% for enduser!
- Price for consumables / year
 - Light bulb (~100€)
 - Standard solution(~100€)
- Advantages:
 - Indicates 4 digits (0.0001)
 - Wiper for selfcleaning
 - High measuring range up to 1000FNU
 - Up to 6 bar
- Disadvantages
 - Problems with flow stability
 - Fouling on optics, wiper breaks easily
 - Wiper can scratch the optics
 - Leakages on the flowcell



E+H Turbimax CUE21

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- Retail Price:

- ~3'900 €

- Common rebates

- up to 30% for enduser!

- Price for consumables / year

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- Advantages:

- High measuring range up to 1000FNU
 - Self-cleaning optics with ultrasonic

- Disadvantages

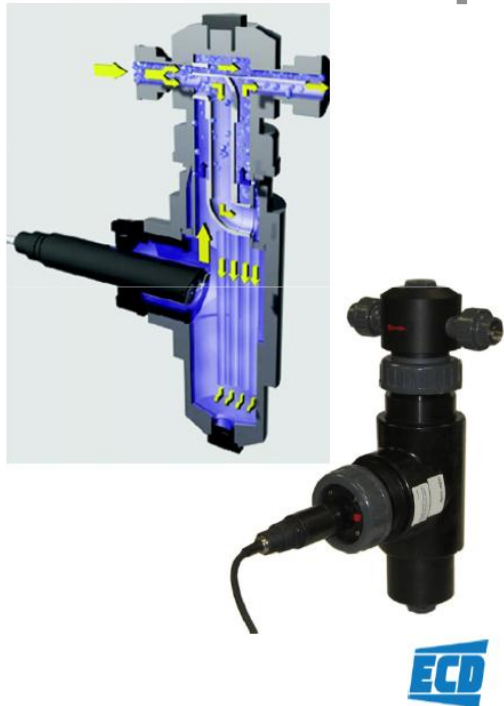
- Cheap setup
 - Fouling on optics, despite ultrasonic



Inline Turbidity sensors

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- Retail Price:
 - Usually cheap



- Advantages:
 - Ideal for high values / polluted streams
 - Self-cleaning optics with wipers or other means
 - Easy handling
- Disadvantages
 - Fouling on optics, despite cleaning
 - Not ideal for potable water with low values
 - Mechanical cleaning breaks easily

Turbidity: General problems

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- Fouling on the optics
 - Different automatic cleaning methods do not provide valid readings.
- Manual calibration required
 - Drifts from electronics and optics
- High sample flow required
 - Most freefall and backscatter system
- Problem with foam or dissolved gas lead to peaks
- Light source (Tungsten lamp) must be replaced regularly
 - New calibration required after exchange / maintenance

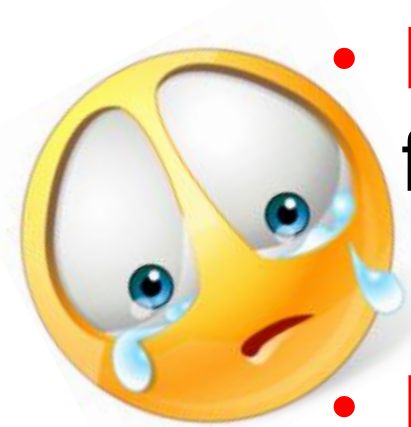
Workgroup Session Conclusions

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Potable Water Market

Workgroup Session Conclusions

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- **Fact 1:** HACH is predominant and de-facto standard
- **Fact 2:** Customer uses HACH as they don't know about better alternatives
- **Fact 3:** HACH and other competitors are most often cheaper

Workgroup Session Conclusions

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Road to success



- **Know your Endcustomer**

- Raise brand awareness
- Know your state regulations and laws!

Workgroup Session Conclusions

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- Know your Endcustomer!
 - Know and visit water treatment plants (desalination plants), pilot plants etc
 - **Run trials, testinstallations, Swan Seminars etc**
 - Let the customer **experience** the difference to the cheapos

Workgroup Session Conclusions

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- Raise brand awareness
 - Know the unique features (USP) on Swan Instruments
 - Calculate **Cost of Ownership**
 - **The cheapest analyzer is significantly more expensive after a few years**
 - Know your competitors, their maintenance issues and consumable prices



Model TCA-22
Total Chlorine Analyzer

Workgroup Session Conclusions

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- Raise brand awareness
 - Show customers that Swan is a global player and technology leader
 - Raise trust in the Swan brand with follow-ups and technical services
 - Be present where decision makers and operators meet (trade shows, seminars...)

Workgroup Session Conclusions

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- Know your state regulations and laws!
 - Be part of national standard committees
 - **Know** the difference between lies and actual standards (e.g. “we need to calibrate a Turbidity meter”)
 - Know where online instrumentation is mandatory

Workgroup Session Conclusions

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- **We do have superior instruments**
- **Let the customer know about it**

- **Price reduction is not necessary**

