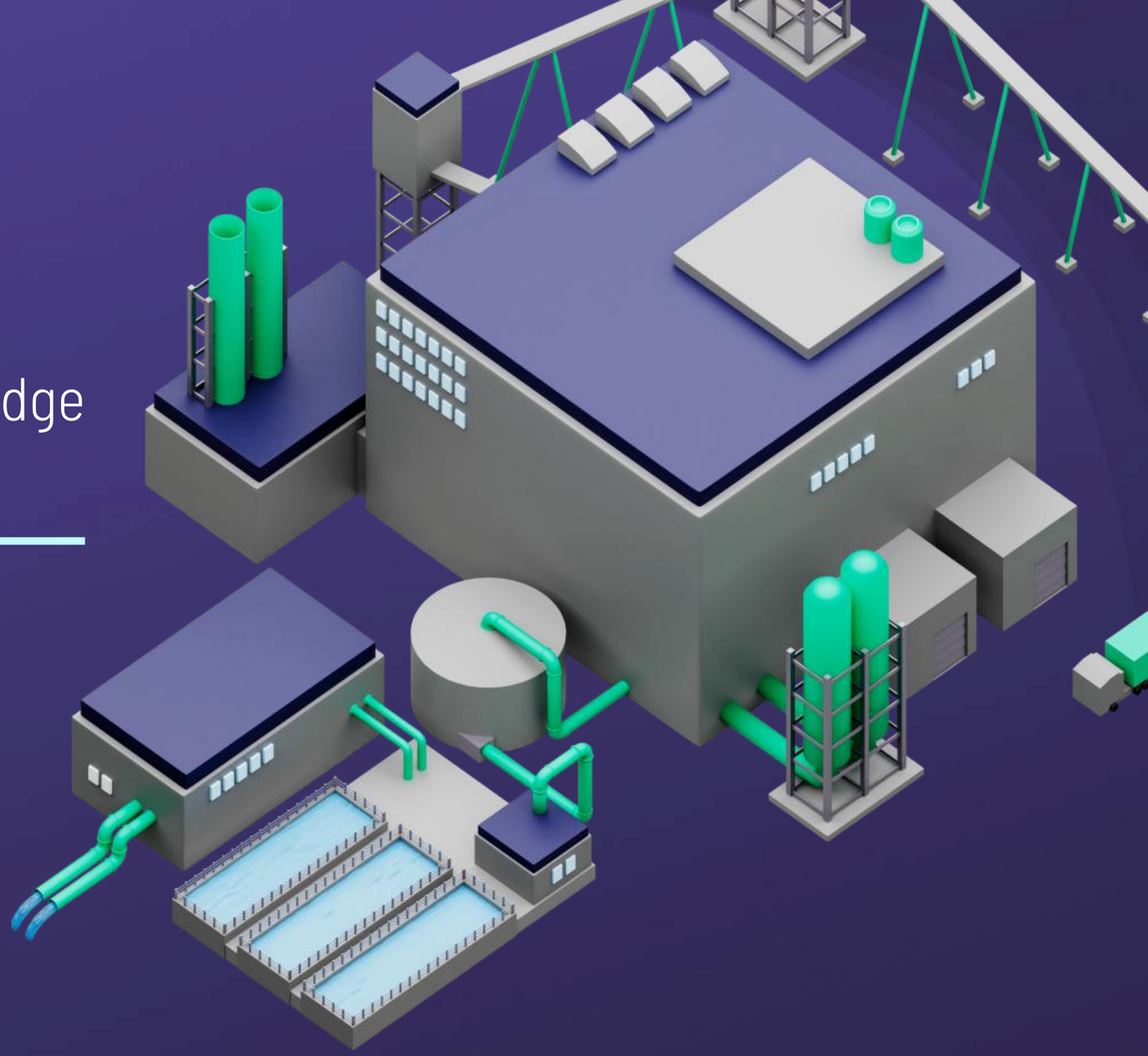
**IMWA Talks Episode 1:**

From Mine Water Monitoring to Operational Knowledge

27th of August

Tuomo Nissinen, CEO 3AWater



# STAY AHEAD

WITH ACCURATE, ON-SITE TESTING

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# Water quality matters more than ever in mining

**Tighter regulations:**

Low limits
Limited discharge

**Water and climate variability:**

Scarcity
Heavy rains
Droughts

**Complex ores & processes:**

Variable ore
Sensitive enrichment

Advanced treatment | Changing water qualities | Water reuse | Process sensitivity

**Water management costs** | **Compliance risk** | **Operational risk**

**Water quality is no longer only an environmental topic — it is an operational issue.**

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# Mine water monitoring today: fast indicators, delayed chemistry

**Online / continuous**

pH · EC · redox · turbidity · flow · level

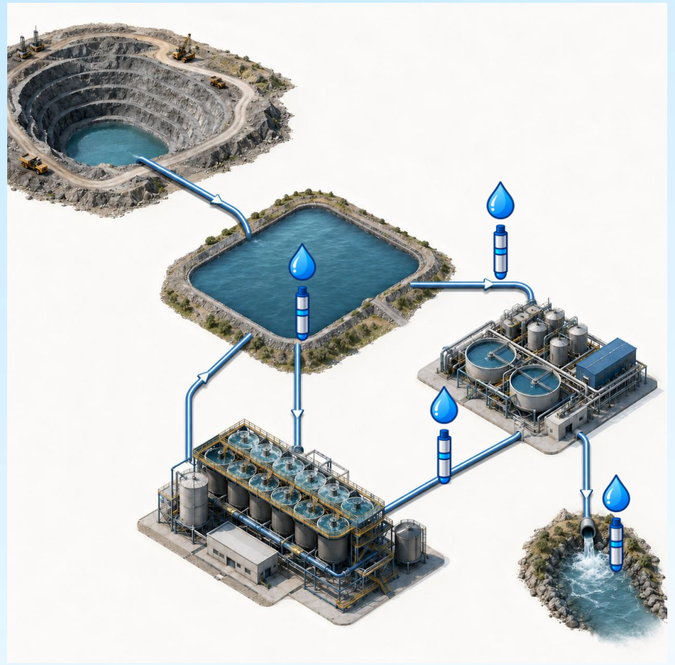
Fast indication of change

**Lab / periodic**

Metals · sulphate · other chemistries

Daily · weekly · monthly samples

Detailed info often delayed



**Good monitoring data may already exist, but not always at the speed or detail needed for operational decisions.**

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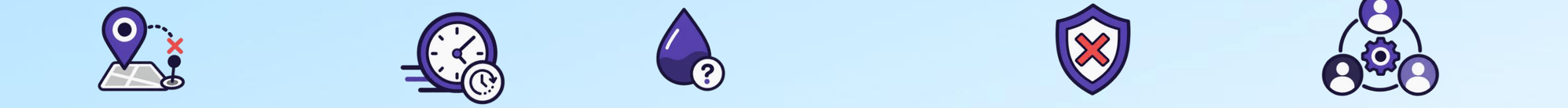
# Where monitoring data often fails to become action

**Water system** → **Monitoring** → **Data** → **Interpretation** → **Decision** → **Action**



**Wrong point**– Sampling not linked to decision

**Too late** - After decision window

**Not specific enough** - Change detected, cause unclear

**Trust gap** – Reliability and interpretation

**No embedded process** - No owner, overview or routine action

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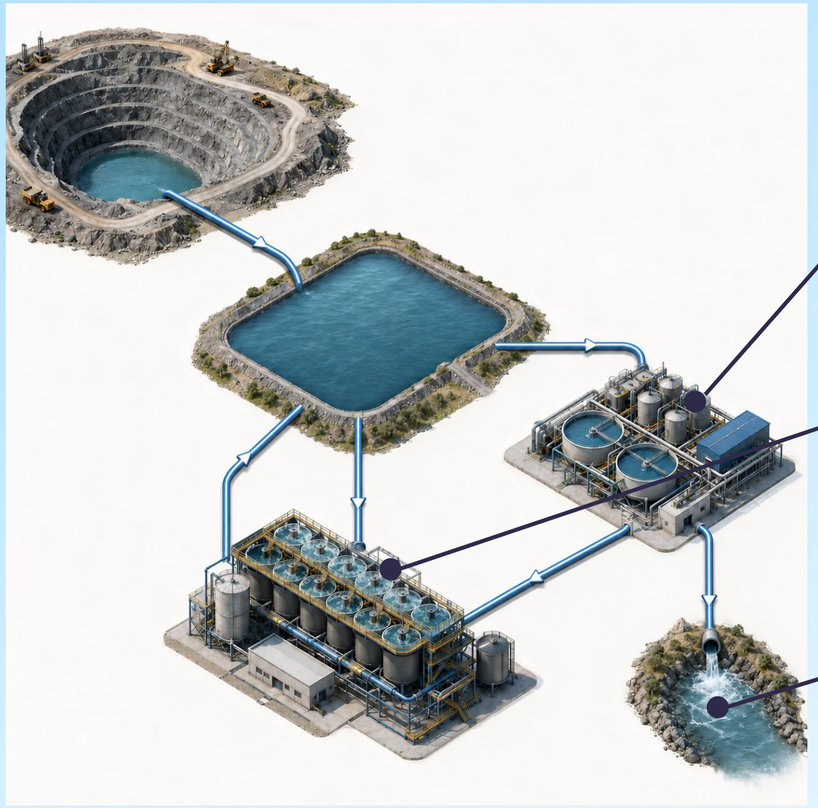
# Why the monitoring – decision gap matters



**Higher treatment cost**

More chemicals, more safety margin

**Operational risk**

Water quality affects flotation stability

**Compliance risk**

Late visibility into discharge quality

**The monitoring gap makes these water management challenges harder to control.**

# Start from the decision — then design monitoring

**1. What decision**

Route · treat · discharge · investigate

**5. Who acts**

Owner · routine · response

**Operational decision to improve**

**2. What Data**

Parameters · frequency · accuracy

**4. Where to measure**

Source · pond · within process · treatment · discharge

**3. How fast**

Minutes · shift · day · reporting

**Monitoring becomes valuable when the data is linked to a clear operational action.**

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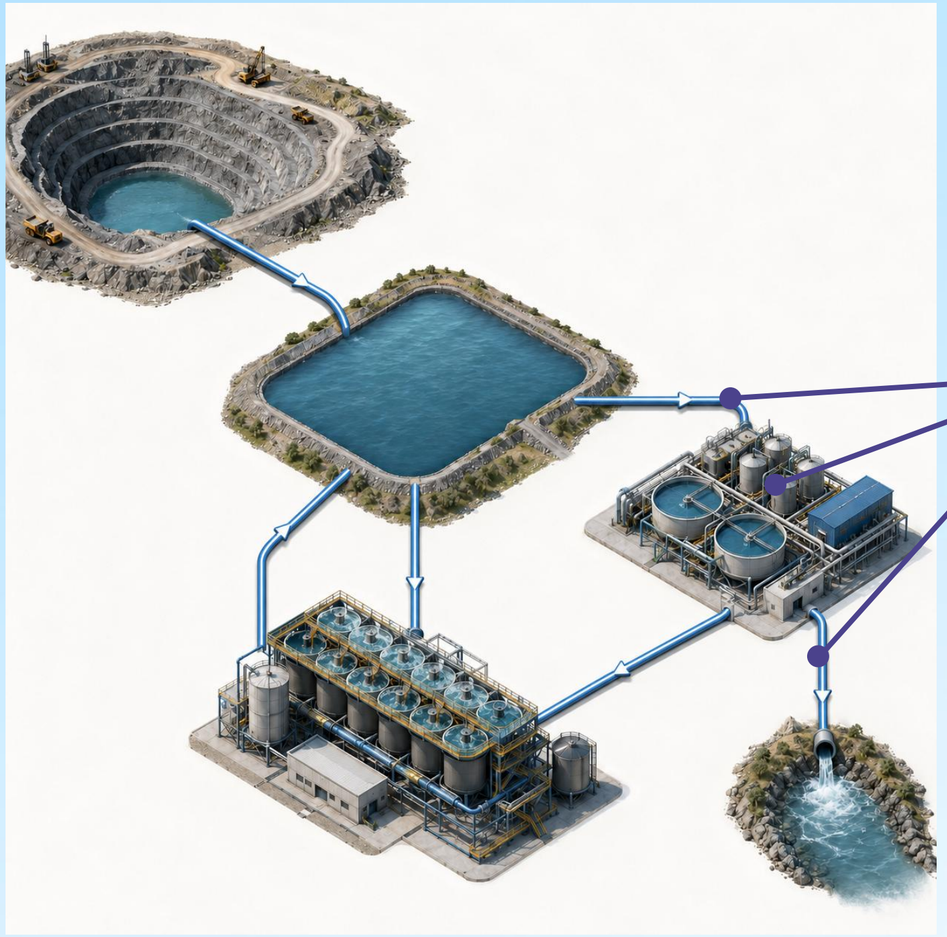
# Use case: Water treatment

**Water treatment OpEx: ~8M€**



**Situation:**

- Incoming water quality changes due to weather, ore variability and water reuse
- Complex water treatment due to low discharge limits

**Missing information:**

- Dissolved metals at input, between treatment steps and after treatment

**Decisions:**

- Adjust chemical dose, flow, settling time according the input quality
- Regenerate or clean IX or RO at optimal time

**Value:**

- **Avoid both undertreatment and overtreatment**
- **Reduce treatment costs**

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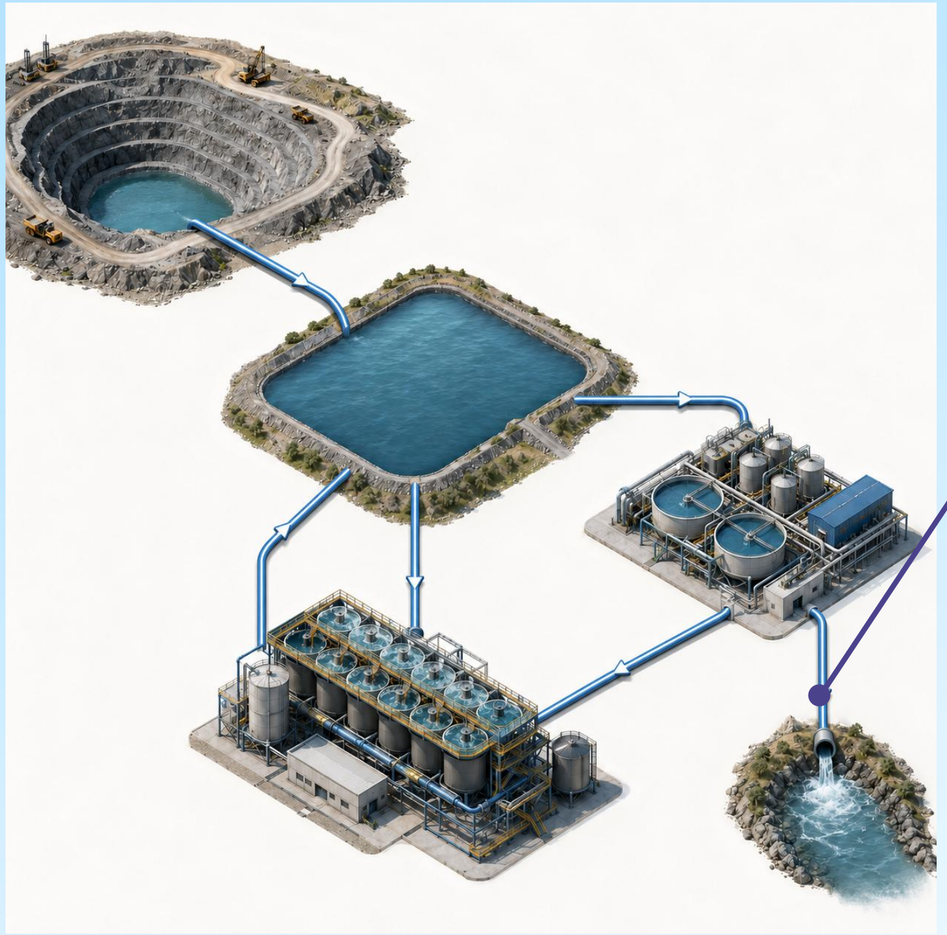
# Use case: Discharge compliance



**Situation:**

- Retention pond is filling during heavy rain, but lab confirmation is delayed.

**Missing information:**

- Are dissolved metal levels below discharge criteria now?

**Decisions:**

- Discharge, hold, or reroute back to treatment

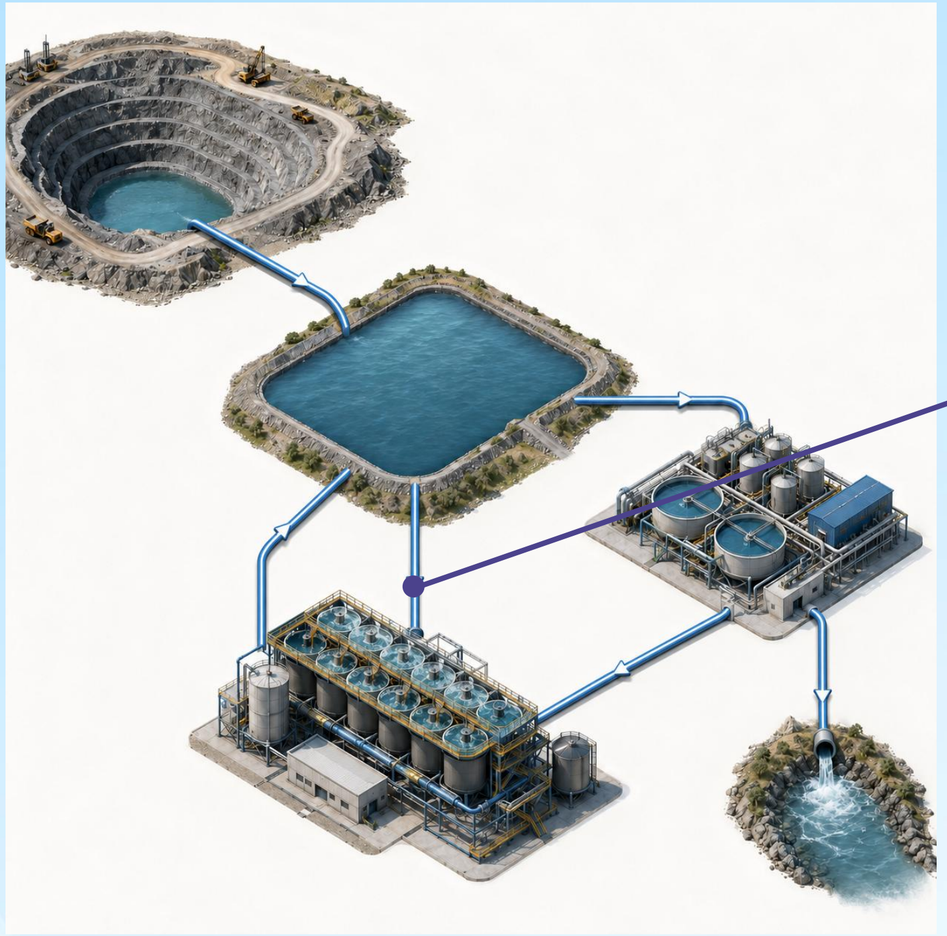
**Value:**

- **Reduce compliance risk and avoid unnecessary water storage.**

# Use case: Flotation

**20% Ni recovery drop in summer[1,2]**

Estimation: Half of the drop is related to process water chemistry changes



**Situation:**

- Dissolved metals and other species accumulate in closed loops due to water reuse and seasonal changes.

**Missing information:**

- Whether process water chemistry is contributing to instability.

**Decisions:**

- Mix waters from different sources (mine, reservoir, treated and raw) for optimal process water quality.

**Value:**

- **Reduce unexplained flotation disturbances and production losses.**

[1]Musuku, Saari, Dahl 2022, Minerals 12, 1406. DOI: 10.3390/min12111406.
[2]Musuku, Kasymova, Saari, Dahl 2023, Minerals 13, 277. DOI: 10.3390/min13020277.

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# Different monitoring solutions solve different parts of the problem

| Solution | Strength | Limitation |
|---|---|---|
| External / internal lab | Relatively reliable, detailed, accepted | Often too slow for operational decisions |
| 24/7 on-site lab | Faster, high-quality data | Expensive staffing and still sample/logistics dependent |
| Online instruments | Continuous data | Usually limited parameters, maintenance-heavy in complex waters |
| Data platforms / dashboards | Visibility and shared overview | Cannot fix missing or delayed chemistry data |
| Multimetal Water Analysis System (MWAS) | Flexible, near-real-time chemistry from many points | Not continuous and not a replacement for accredited compliance lab |

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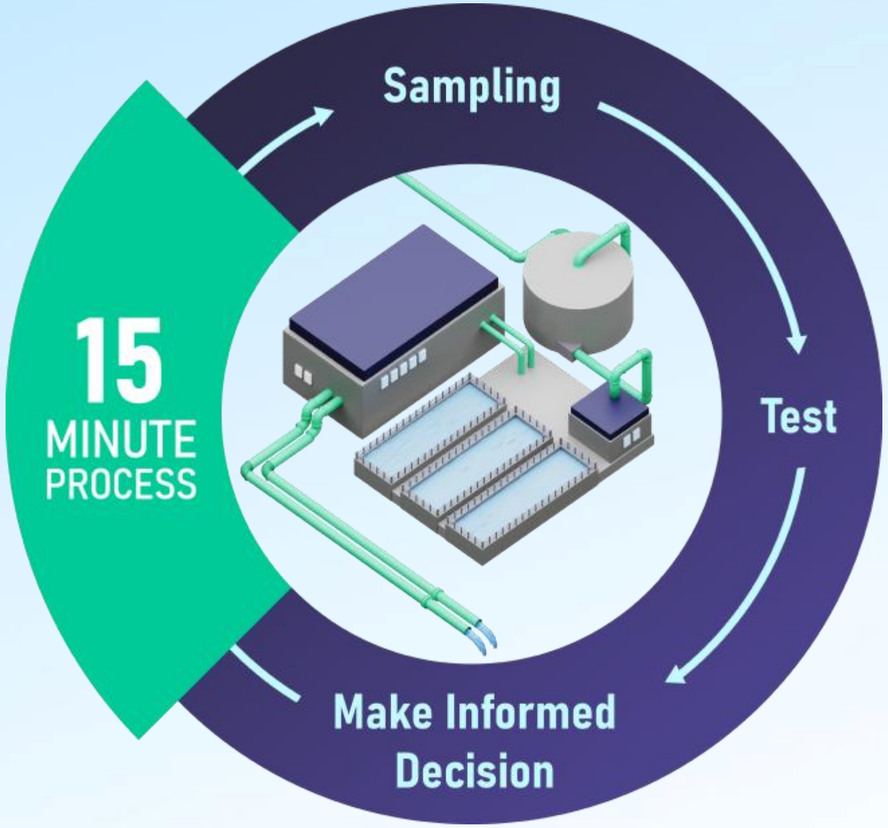
# Where MWAS fits in water quality monitoring

**Act fast**
Actionable insights in under 15 minutes, no more delayed reactions due to outdated information

**Resolve issues**
Detect and resolve problems before they escalate into downtime or environmental hazards

**Optimize processes**
Save in costs by optimizing industrial processes with timely feedback

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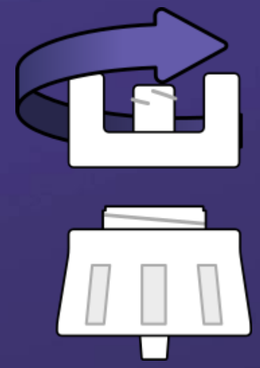
# Multimetal water analysis system

- Dissolved metal on-site
- Results in under 15 minutes
- Typical range: µg/L to mg/L level
- Multiple metals from one sample
- Flexible sampling across water system
- Minimal training required



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# Testing value through a structured pilot

## 1
### Design (1 wk)

- Sampling points
- Target metals
- Frequency
- KPIs

## 2
### Implementation (3 wks)

- Validation
- Hardware delivery
- Training
- Routine setup

## 3
### Field use (2 – 8 wks)

- Independent use
- KPI comparison
- Operational value

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# Key takeaways

### Water quality is operational

Water quality affects treatment, discharges, water reuse and process stability

### More data is not enough

Monitoring creates value only when data supports decisions

### Start from the decision

Define what action should improve — then choose parameters, points, timing and tools.

### Different tools solve different gaps

Labs, online sensors, dashboards and fast on-site analysis all have a role.

**Better water quality monitoring is not about collecting more data — it is about connecting the right data to the right decision at the right time.**

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# Contact information

**TUOMO NISSINEN, CEO**
+358 50 364 3220
tuomo@3awater.com
Microkatu 1M,  70210 Kuopio

3awater.com

**Tuomo Nissinen**

CEO of 3AWater, Fast and easy metal analysis 📏 of waters 💧 f...