Experiences on good methods and tools from Finland

Paula Lindell
Helsinki Region Environmental Services Authority

Project BEST – Better Efficiency for Industrial Sewage Treatment
Workshop on hazardous substances, 20 -22 November 2018

Wastewater treatment plants and industrial Wastewaters

- In Helsinki Region 15% of the influent is industrial originated wastewater
- Different kinds of industries – different kinds of substances
  - Food industry
  - Surface treatment
  - Paint
  - Textiles
  - Chemicals and Graphic Industries
  - Health Care
  - Laboratories
  - Waste treatment plants and Yards
  - Power generation
  - Laundries
  - Workshops, Construction Sites, Landfill, Soil contamination waters..

Industrial wastewater - The main things to keep in mind considering sewage network and receiving WWTP

- Occupational Safety and Health
  - People working in pumping stations etc.
- Sewage network
  - Clocking, corrosion
- Wastewater treatment plant
  - Biological treatment
- Reuse of sludge – circular economy
- Receiving water after treatment
  - Treatment results

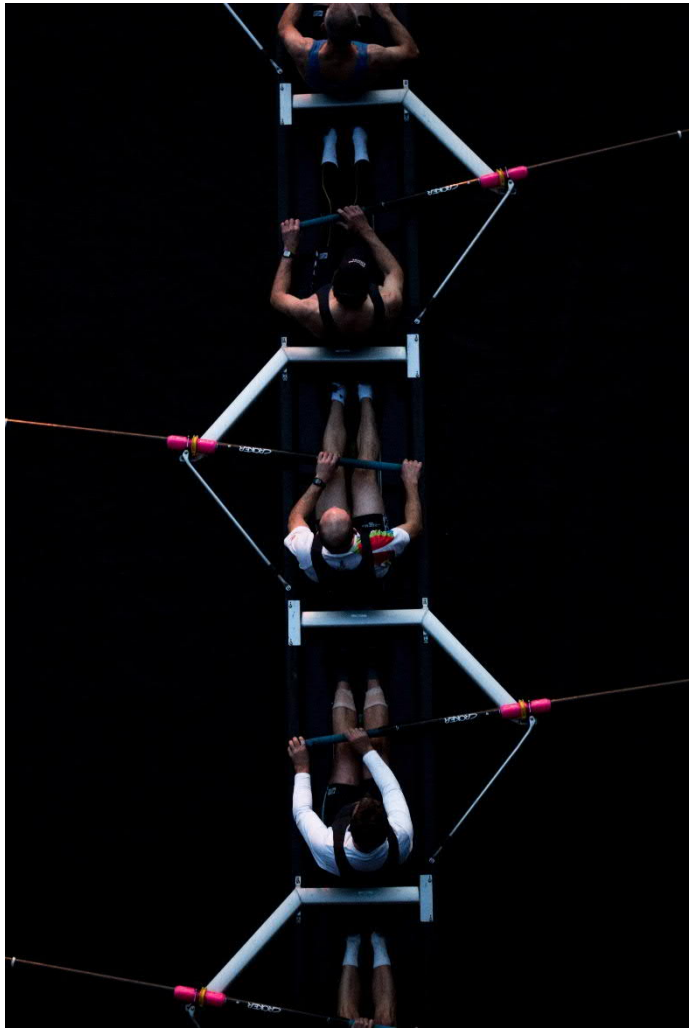
Industrial wastewater quality

Content of the wastewater?

Harmful or hazardous substances?

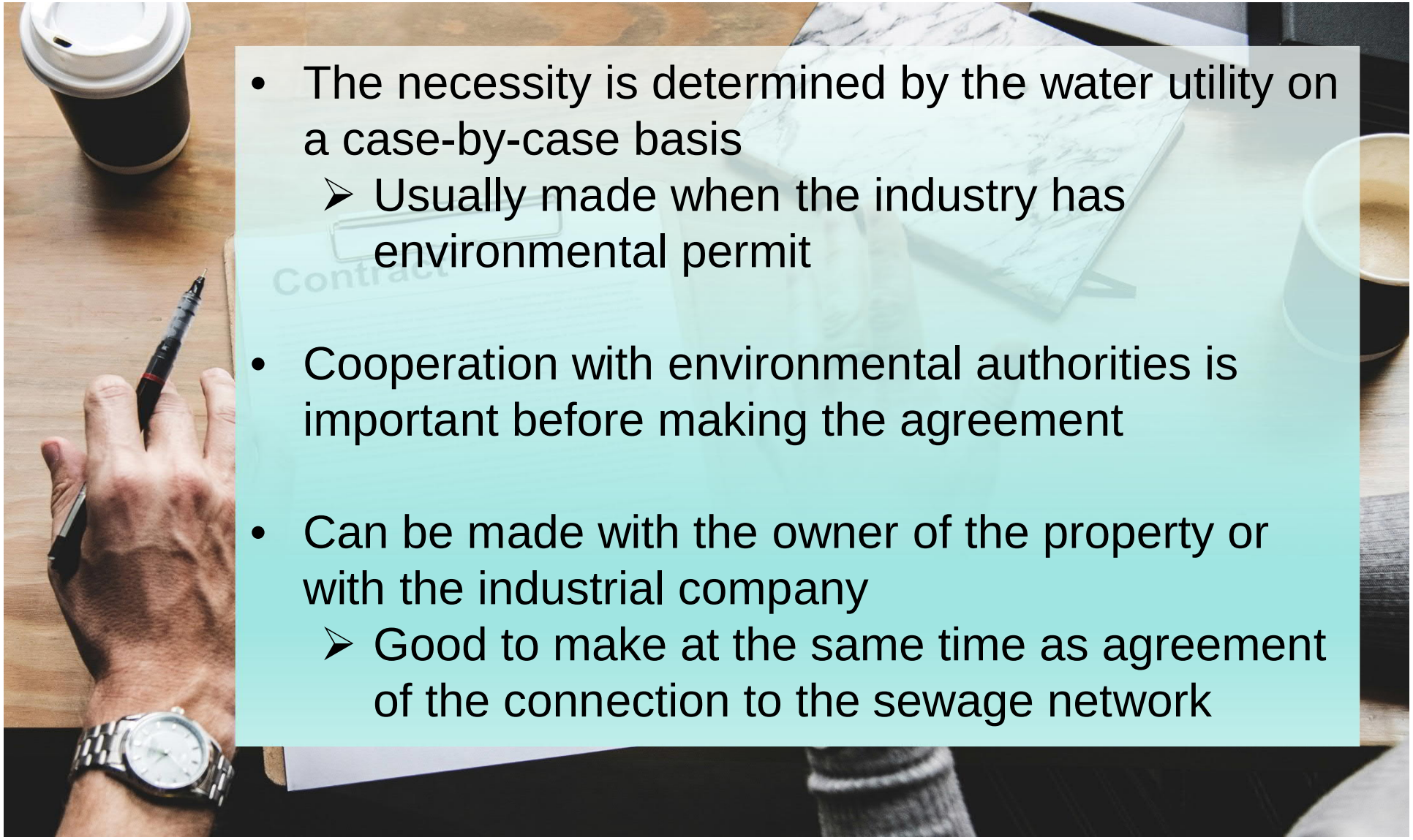
- Can we treat it?

Good Practices – Examples on what we have found usefull



1. Industrial agreements
2. Co-operation with environmental authorities
3. Open reporting and informing from our side
4. Risk assessed based sampling schedule to different industrial actors
5. Educative approach towards different actors on the field

1. Industrial agreements



- The necessity is determined by the water utility on a case-by-case basis
  - ➢ Usually made when the industry has environmental permit
- Cooperation with environmental authorities is important before making the agreement
- Can be made with the owner of the property or with the industrial company
  - ➢ Good to make at the same time as agreement of the connection to the sewage network

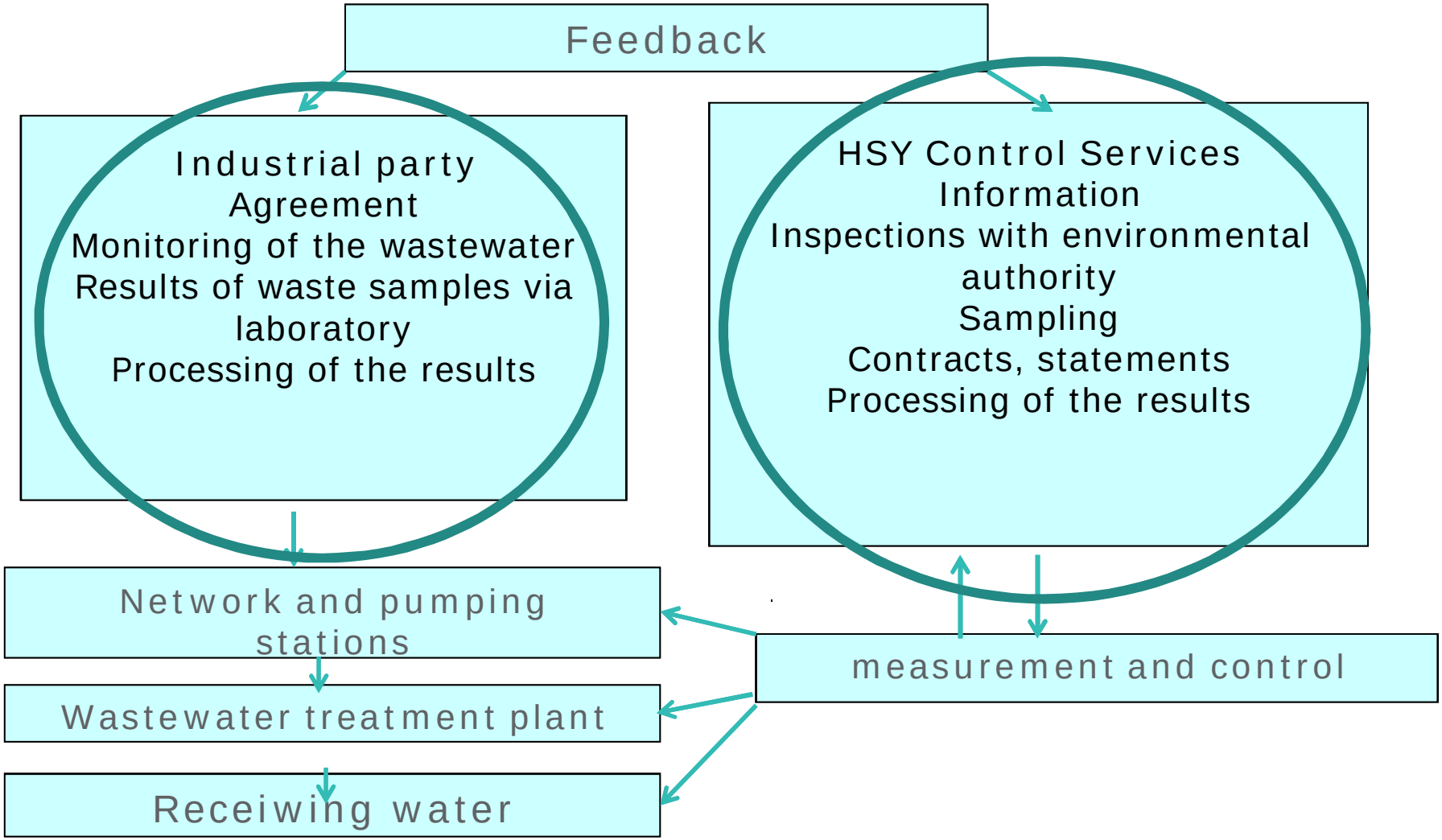
The Industrial Wastewater Agreement is needed when….

1. The amount or quality of industrial wastewater can have an impact on **workers' safety,** the state of the **sewerage system**, the **wastewater treatment process**, the **quality of the sludge** or **receiving water**

2. It is necessary to set processing requirements, limit values, monitoring programs for industrial wastewater

3. The waste water load is high and wastewater charge is higher than normal fee

Industrial wastewater control at HSY



How to make an agreement with an industrial party

The water utility sends the application to Industry

The customer reports issues related to wastewater: chemicals, process, volumes

The water utility estimates the need for the agreement

No agreement

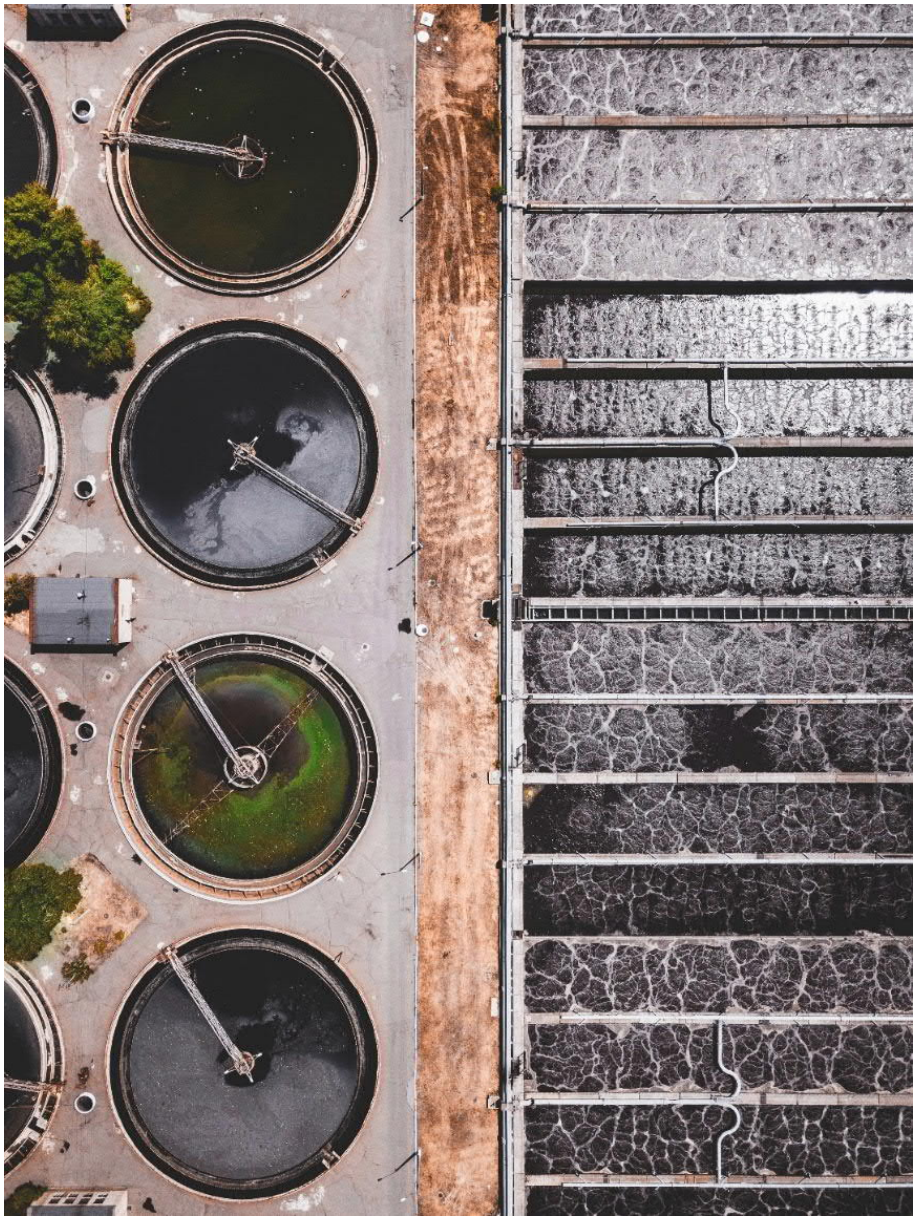
Customer follows general instructions

Agreement

HSY prepares contract, which the customer accepts

Industrial wastewater agreements

- The permit conditions set limit values for wastewater for example to heavy metal, fat and solids waste water
- Wastewater monitoring program is drawn up by agreement. The monitoring program records the sampling site, sampling frequency and the subjects
- In addition, the industrial plant complies with general wastewater limit values



Industrial Waste Water Contracts in the HSY area

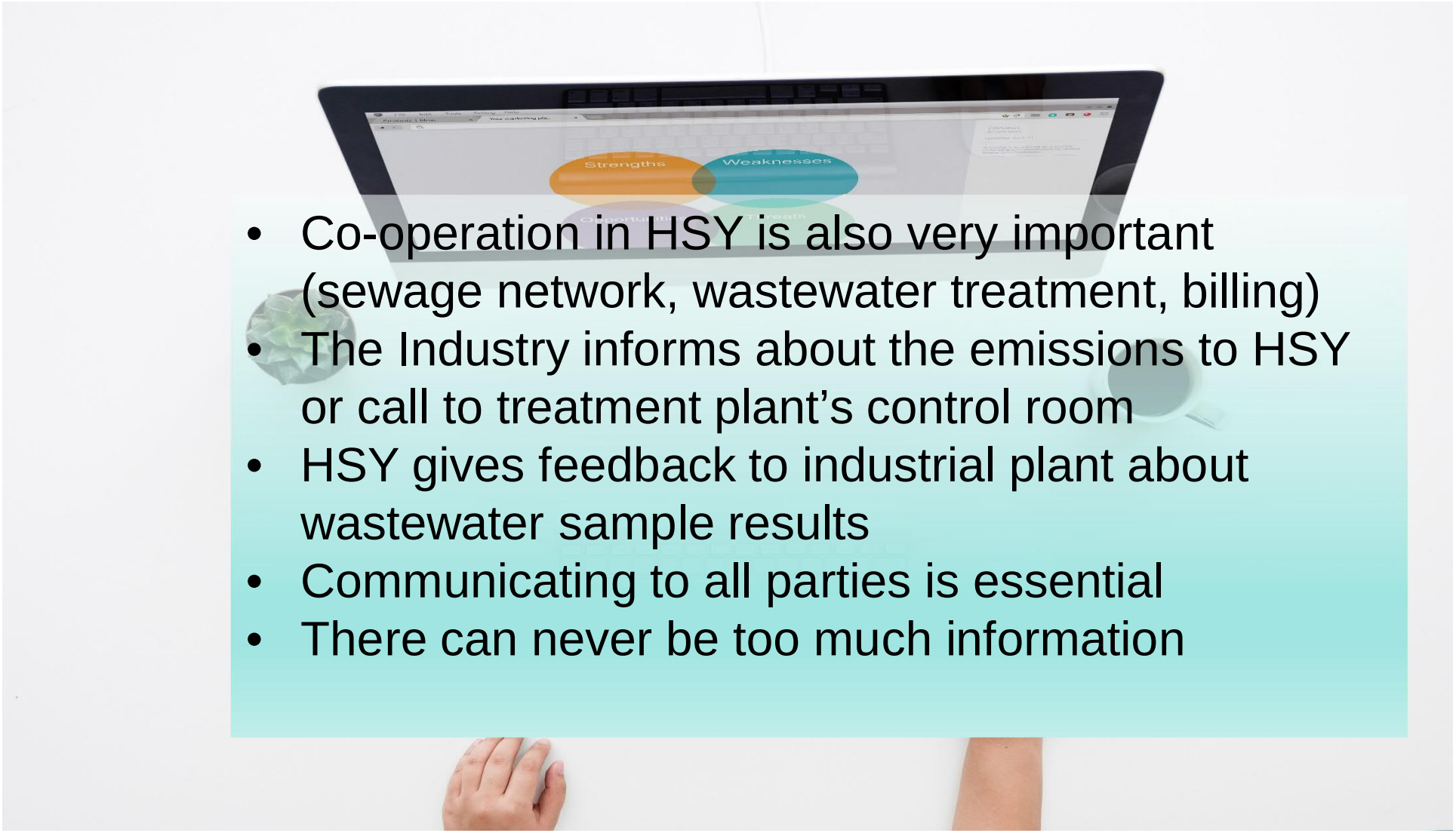
Food industry (juice factory, confectionery, meat processing, fish processing plant, bakery)
Surface treatment, machinery industry (metal, paint, color paint factory)
Washing industry, concrete factories, research institutes, container washing
Techno-chemistry and Pharmaceutical industry
Treatment Hazardous Waste
Port operations
Energy production

Approximately 80 contracts in the area

2. Co-operation with environmental authorities

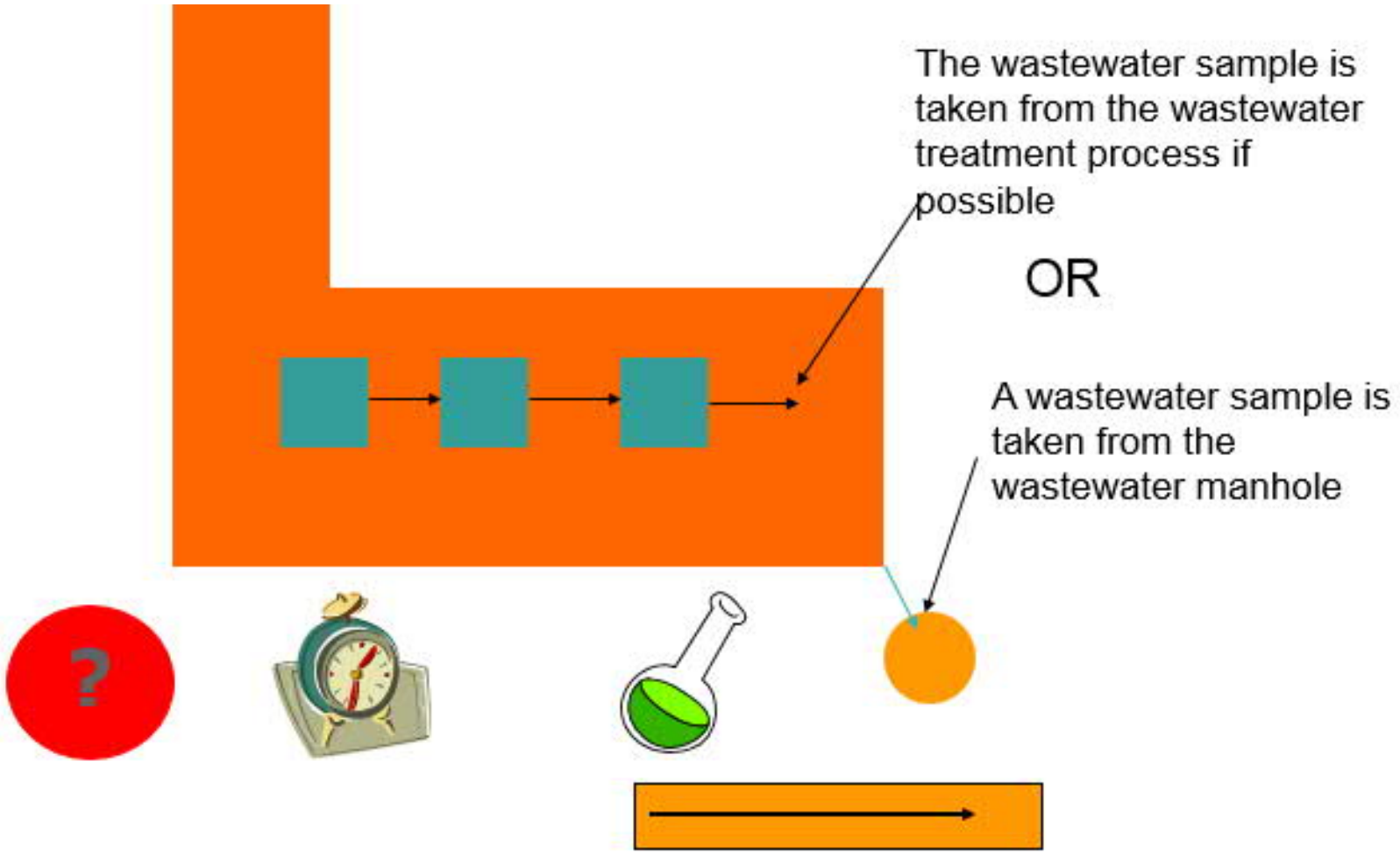
- Permitting process – feed back from the Water utility, Water Services take on the environmental permit if relevant
- Regular meetings
- Communicating to all parties
- Maintaining contact information, information available

3. Open reporting and information sharing



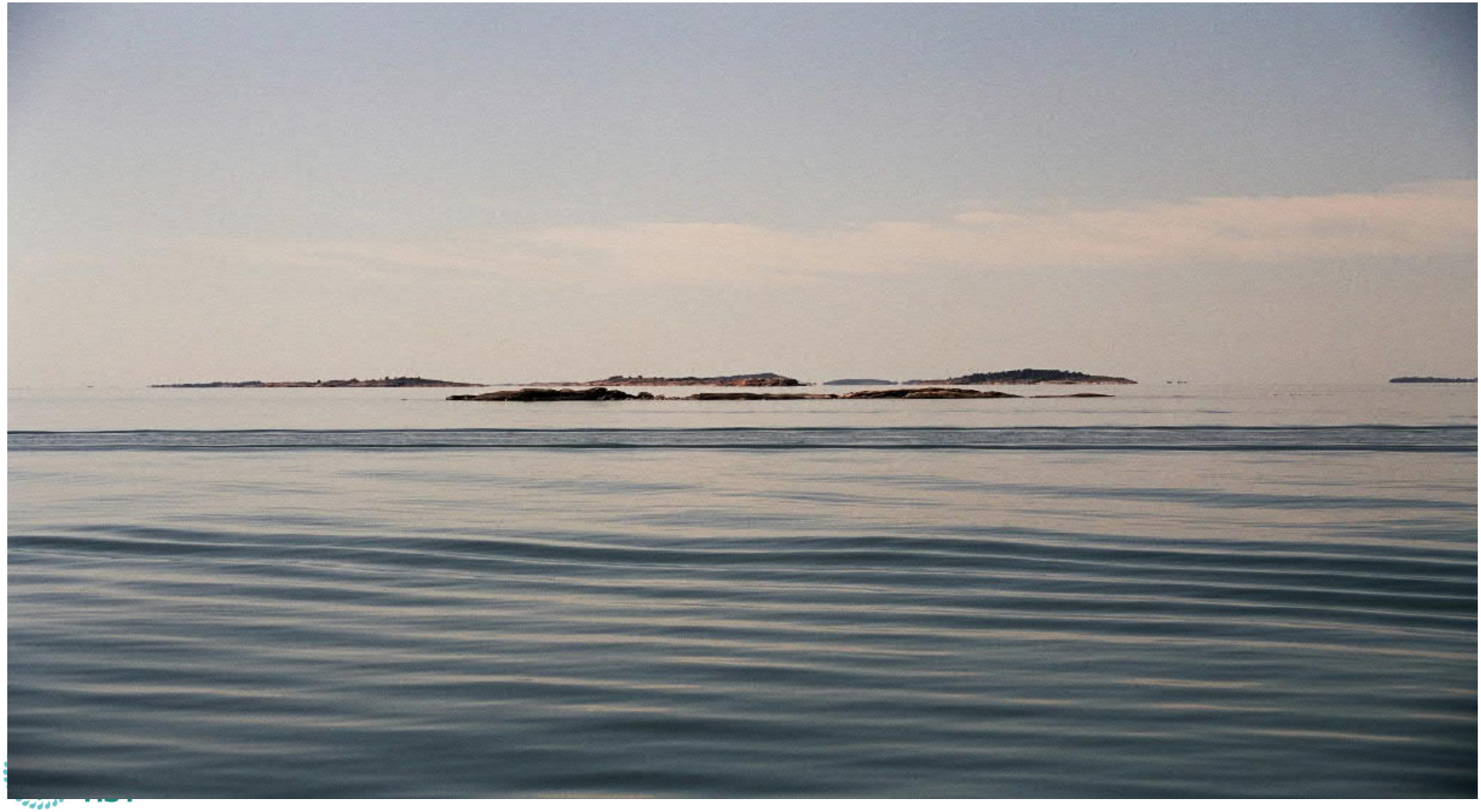
- Co-operation in HSY is also very important (sewage network, wastewater treatment, billing)
- The Industry informs about the emissions to HSY or call to treatment plant's control room
- HSY gives feedback to industrial plant about wastewater sample results
- Communicating to all parties is essential
- There can never be too much information

4. Risk assessed based sampling schedule to different industrial actors



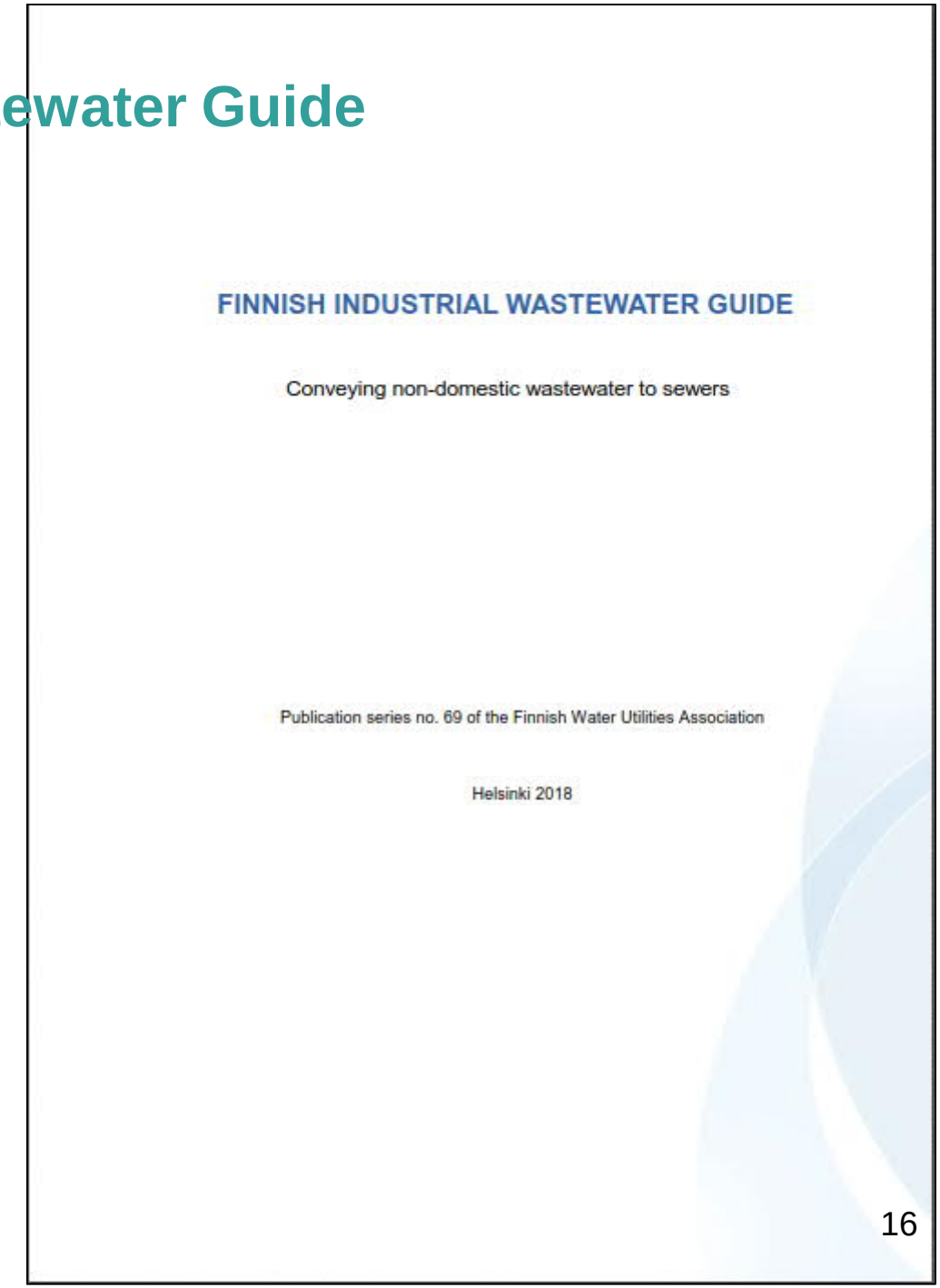
5. Educative approach towards different actors on the field

- Giving information on the effects of the substances and practices of the actors to the environment



Finnish Industrial Wastewater Guide

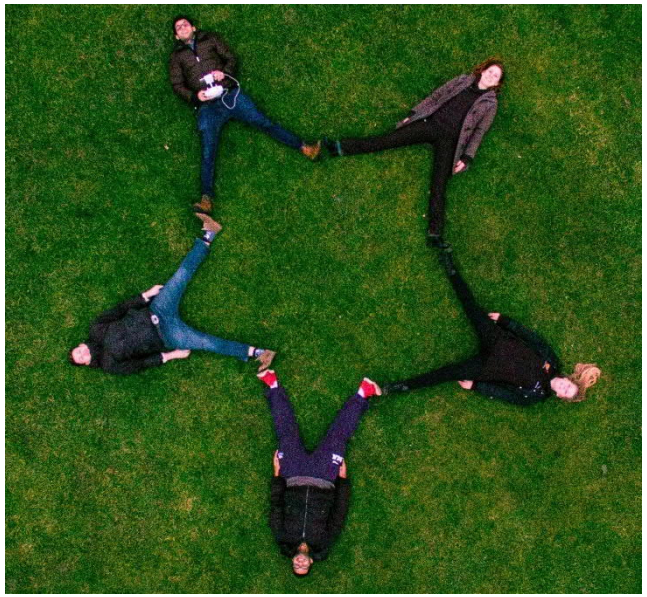
- Finnish practices for managing industrial wastewater
- The cooperation model between municipalities, industrial enterprises and water utilities
- The various stages in drawing up an industrial wastewater agreement
  - Matters that have to be taken into account in preparing the agreement



Contents of the Guide

1. Introduction
2. Regulations and Agreements on Industrial Wastewater
3. Parties Involved with, and documents related to industrial wastewater
4. Preparation and contents of an industrial wastewater agreement
5. Industrial wastewater fees
6. Setting restrictions on different parameters
7. Monitoring of industrial wastewater
8. Characteristics of industrial wastewater
   - Different fields of industries
9. Illicit releases

Finnish Industrial Wastewater Guide



- Legislation applicable to industrial wastewater
- Information on quality restrictions
- Contractual matters
- Fees
- Cost distribution between partners
  - Capital costs
- Monitoring and practical examples on functioning solutions

- Substances inhibiting nitrification

- https://www.vvy.fi/site/assets/files/1110/finnish_industrial_wastewater_guide.pdf

Substances inhibiting nitrification

APPENDIX 14: Substances inhibiting nitrification

Abbreviation	Explanation
IA	inhibiting ammonia oxidation (nitrification)
IN	inhibiting nitrate oxidation
LV	limit value
AS	activated sludge
BR	biorotor
PC	pure culture / axenic culture
VSS	volatile suspended solids

www.vvy.fi/site/assets/files/1110/finnish_industrial_wastewater_guide.pdf

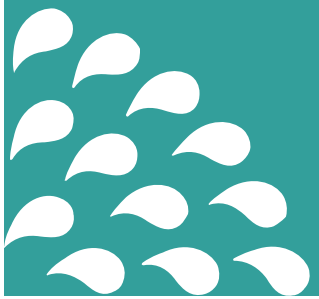
HSY

SUBSTANCE	CHEMICAL FORMULA	INHIBITION (%)	C (mg/l)	SOURCE
Acetamide	C2H5NO	IA=0	100	Hockenbury & Grady 1977
Acetone	C3H6O	IA=75	2 000	Tomlinson et al. 1966
		IA=50	8 100	Hooper 1973
		Nitrification inhibition	804	Oslislo et al.1985
Acetonitrile	C2H3N	IA=0	100	
Allyl alcohol	CH2:CH.CH2OH	IA=75	19.7	Barnes & Bliss 1983
		75	19.5	Stensel, McDowell & Ritter
Allyl isothiocyanate	CH2:CHCH2NCS	IA=75	1.9	Tomlinson et al. 1966
Allyl chloride (3-Chloroprene)	C3H5Cl	IA=75	180	Tomlinson et al. 1966
		IA=0	120	Wood et al.1981
Allylthiourea	C4H8N2S	IA=100	2	Abendt 1983, Young 1973
		IA=100	5	Raff 1981
		IA=100	3–5	Reimann 1973
		IA=38	1.16	Wood 1981
		IA=82	0.12	Hooper 1973
4'-Aminopropiophenone (para-aminopropio-phenone)		IA=75-100	100	Hockenbury 1977
Aniline	C6H5NH2	IA=75	7.7	Barnes & Bliss 1983
		IA=89	5	Hockenbury & Grady 1977
		IA=88	11.6	Hockenbury & Grady 1977
		IA=76	2.5	Hockenbury & Grady 1977
		IA=75	7.7	Tomlinson et al. 1966
		IA=54	2.3	Hockenbury & Grady 1977
		IA=50	<1	Hockenbury & Grady 1977
		75	7.7	Stensel, McDowell & Ritter
Arsenic	As^{3+}	IA=50	292	Beg 1980
		IA=10	32	Beg 1980

Puhtaasti parempaa arkea | En rent bättre vardag | Purely better, every day

Thank you for your attention!

www.vvy.fi/site/assets/files/1110/finnish_industrial_wastewater_guide.pdf



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Samkommunen Helsingforsregionens miljötjänster
Helsinki Region Environmental Services Authority