MICRO POLLUTANTS

There are currently 100 000 commercially registered compounds in Europe and residue from the majority of these will eventually end up in the water cycle.
MICRO POLLUTANTS
• Very small particles or molecules of polluting material that are non-biodegradable and therefore end up in our water cycle
• Increased focus on micro pollutants due to increasing environmental footprint of human behavior
• Examples include heavy metals, micro plastic, medicine remains, carcinogenic substances, multiresistant bacteria
• Norlex is devoted to reduction of micro pollutants in the environment
HEAVY METALS

• Too much of anything is not good
• All transition metals are highly toxic to life at low levels, but at the same time some, such as manganese, iron, cobalt, nickel, copper, zinc and molybdenum, are essential micronutrients needed for the human body to function properly
• Heavy metals exist in a soluble and insoluble form
• Accumulate in the body
Norlex Integrated Systems

- Norlex builds integrated systems combining:
- CSS with integrated chemical treatment (Physico-chemical)
- Lexinite heavy metal absorption
- Dewatering equipment for sludge treatment
- Examples include heavy metal reduction in laundry wastewater and treatment of slop oil from refineries and oil production
ORGANIC MICRO POLLUTANTS

- Examples include phenols, PAH, medicine, other toxic organic compounds
- To remove abovementioned compounds, a powerful oxidation is needed
- Oxidation of a compound means that aggressive oxygen cuts the molecules into pieces, eventually ending up with $\text{CO}_2$ and $\text{H}_2\text{O}$
IntenseOX

- IntenseOx is Norlex’ technology for oxidation of wastewater. It incorporates oxidative gas, addition of oxidation boosters and state-of-the-art mixing and nanobubbles.

- As the IntenseOx technology can be used on a wide spectrum of applications, the following is chosen as main focus:
  - Removal of organic micropollutants from wastewater and sludge; e.g. phenols, PAH, formaldehyde
  - Treatment of hospital wastewater
Bubbles

• MNB, micro-nano-bubbles are ideal for gas-liquid mass transfer
• Prolongs the effect of e.g. ozone in the water – exceptional removal of small particulates
• On-edge science – Norlex has developed a tool which accurately predicts gas transfer rates as a function of bubble size
Slop oil treatment — Crude Unit

- State of the art 3-phase decanter system
- Can be delivered as a full non-man entry tank cleaning system for large oil tanks
- Fully flexible and mobile
- Capacity up to 20 m³/h oily sludge, with excellent results!
Membrane filtration

- Norlex Systems’ designs complete membrane systems using either polymeric or ceramic membranes
- Ranges from NF to MF
- Especially suitable for:
  - Oily water filtration (less than 2 mg/L of oil in permeate)
  - Frac water recycling (SS < 1 mg/L, turbidity <0,5 NTU)
  - Pesticide and heavy metal removal using nanofiltration
  - Food and beverage
Phenol removal

- Phenols are used in a wide range of industrial applications
- Phenols are highly toxic and carcinogenic
- Regulations are tightening for amount allowed to discharge
- Norlex Systems experience:
  - IntenseOx systems installed at large manufacturer – in combination with oil and heavy metals removal
PAH removal

• PAH is a term for more than 100 aromatic hydrocarbons. Some are highly toxic and carcinogenic
• Ongoing tests for PAH reduction in sludge from municipal WWTP
• IntenseOx is expected to be able to reduce PAH in primary sludge from treatment plants by 95%
• Norlex Systems is working on response units, to be able to remove excess amounts of PAH in sludge
Wastewater disinfection

- Disinfection of wastewater to remove multiresistant bacteria
- IntenseOx can target specifically bacteria, not the organic matter otherwise present in the water
- Medicine remains will be greatly reduced
- State-of-the-art monitoring system is developed to ensure correct dosing
Norlex Systems A/S

Your partner within:

- Industrial waste water treatment
- Water reuse
- Sludge concentration
- Oily sludge treatment
- Installation, commissioning and training
- Advanced control
- Membrane filtration
- Chemical dosing
- Advanced Oxidation
Thank you for your attention