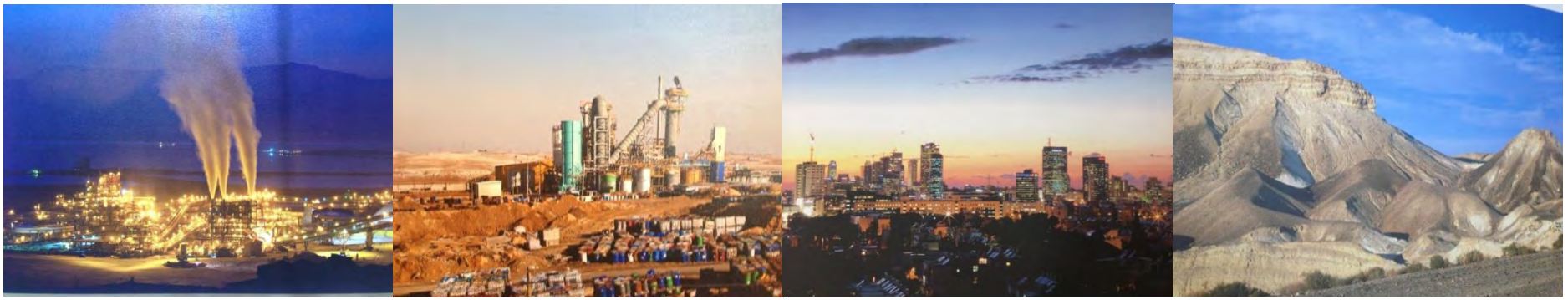


CWW BREF 2016
What is new for the chemical industry?
Part 2

Workshop on CWW BREF, 23/11/2016

Birgit Brahner

Agenda of the workshop

- General Aspects of CWW BREF
  - Scope
  - BAT onWaste water management
  - Comparison CWW 2003
  - Excursus German law
- Stream Inventory
- **CWW – BAT associated emission levels**

What is relevant regarding BAT AEL?

- Specification of monitoring (e.g. measurement frequency, analysis method, …)
- reference periods (e.g. spot measurement, daily or monthly average)
- reference conditions, e.g.
  - the point of reference for waste water (before dilution, at the point of discharge into a sewage system or into a receiving water course)

BAT AEL for emissions to water

- Refer to **flow-weighted yearly averages of 24-hour flow-proportional** composite samples (time-proportional sampling can be used provided that sufficient flow stability is demonstrated)
- Apply at the point where the emissions leave the installations (**direct discharge**)
- Apply if a given **threshold value** given as yearly loads yis passed (derivation from upper BAT value and a yearly waste water volume of 100.000 m^3/a)

  e.g. BAT for TOC: 10 - 33 mg/l → BAT AEL has to be applied for installations with a TOC load of 3.3 t/Yr

BAT regarding the monitoring (I)

- Relevant emissions = identified by the inventory of waste water streams
- Key process parameter have to be monitored at key locations (e.g. influent to pretreatment , influent to final treatment)
- Continous monitoring of
  - waste water flow
  - pH
  - temperature
- Monitoring has to be done in accordance with EN-, ISO-national or other international standards
- Sampling point: where the emission leaves the installation.

BAT regarding the monitoring (II)

Substance/parameter	Minimum monitoring frequency (1)	Standards
Total organic Carbon (TOC)(2)	Daily	s. CWW BAT 4
Chemical oxygen demand (2)		
Total suspended solids (TSS)		
Total nitrogen (TN) (3)		
Total inorganic nitrogen (N_{inorg}) (3)		
Total phosphorus (TP)		

(1) Monitoring frequencies may be adapted if the data series clearly demonstrate a sufficient stability

(2) TOC / COD monitoring are alternatives with TOC monitoring the preferred option because it does not rely on very toxic compounds.

(3) TN / N_{inorg} monitoring are alternatives

BAT regarding the monitoring (III)

Substance/parameter		Minimum monitoring frequency ([1])	Standards
Adsorbable organically bound halogens (AOX)		Monthly	s. CWW BAT 4
Metals	Cr		
	Cu		
	Ni		
	Pb		
	Zn		
	Other metals, if relevant		

BAT regarding the monitoring (IV)

Substance/parameter		Minimum monitoring frequency ([1])	Standards
Toxicity ([1])	Fish eggs (*Danio rerio*)	To be decided based on a risk assessment, after an initial characterisation	s. CWW BAT 4
	Daphnia (*Daphnia magna Straus*)		
	Luminescent bacteria (*Vibrio fischeri*)		
	Duckweed (*Lemna minor*)		
	Algae		

([1]) An appropriate combination of these methods can be used

BAT AEL – TOC/COD (I)

Parameter	BAT AEL (yearly average)	Threshold
Total organic carbon (TOC) ([1])	10 – 33 mg/l ([2])	3,3 t/yr
Chemical oxygen demand (COD) ([1])	30 – 100 mg/l ([2])	10 t/yr

([1]): either BAT AEL for TOC or COD applies. TOC is the preferred option the monitoring does not rely on very toxic compounds

([2]): The lower end of the range is typically achieved when few tributary waste water streams contain organic compounds and/or the waste water contains easily biodegradable compounds

→ In Germany, TOC will be the preferred option

BAT AEL – TOC/COD (II)

Parameter	BAT AEL (yearly average)	Threshold
Total organic carbon (TOC)	10 – 33 mg/l ([3])	3,3 t/yr
Chemical oxygen demand (COD)	30 – 100 mg/l ([3])	10 t/yr

([3]): The upper range of the range may be up to 100 mg for TOC or up to 300 mg for COD if both of the following conditions are fulfilled:

- Condition A: Abatement efficiency ≥ 90% (including both the pretreatment and final treatment)
- Condition B: if a biological treatment is used, at least one of the following criteria is met:
  - A low-loaded biological treatment step is used (i.e. ≤ 0.25 kg COD/kg of organic dry matter of sludge). This implies that the BOD level in the effluent is ≤ 20 mg/l
  - Nitrification is used

BAT AEL – TOC/COD (III)

Parameter	BAT AEL (yearly average)	Threshold
Total organic carbon (TOC)	10 – 33 mg/l ([4])	3,3 t/yr
Chemical oxygen demand (COD)	30 – 100 mg/l ([4])	10 t/yr

([4]): The upper end of the range may not apply if all of the following conditions are fulfilled:

- Condition A: Abatement efficiency ≥ 95% (including both the pretreatment and final treatment)
- Condition B: same as condition B in footnote (3)
- Condition C: The influent of the final waste water treatment shows the following characteristics: TOC > 2 g/l (or COD > 6 g/l) and a high proportion of refractory organic compounds

BAT AEL – TSS

Parameter	BAT AEL (yearly average)	Threshold
Total suspended solids (TSS)	5 – 35 mg/l ([1]) ([2]):	3,5 t/yr

([1]): The lower end of the range is typically achieved when using filtration (e.g. sand filtration, microfiltration, ultrafiltration, membrane bioreactor), the upper end of the range is typically achieved when using sedimentation only.

([2]): This BAT AEL may not apply when the main pollutant load originates from the production of soda ash via the Solvay process or from the production of titanium dioxide

BAT AEL – TN/N_{inorg}

Parameter	BAT AEL (yearly average)	Threshold
Total Nitrogen (TN) (1)	5 – 25 mg/l (2) (3)	2.5 t/yr
Total inorganic nitrogen (N_{inorg}) (1)	5 – 20 mg/l (2) (3)	2.0 t/yr

(1): either BAT AEL for total nitrogen or the BAT AEL for total inorganic nitrogen applies

(2): The BAT AELs do not apply for installations without biological treatment.

The lower end of the range is typically achieved when the influent to the biological WWTP contains low level of nitrogen and/or when nitrification/denitrification can be operated under optimum conditions

(3) The upper end of the may be higher and up to 40 mg/l for TN or 35 mg/l for N_{inorg} if the abaement efficiency is ≥ 70% (including pretreatment and final treatment)

BAT AEL – Total Phosphorous (TP)

Parameter	BAT AEL (yearly average)	Threshold
Total Phosphorous (TP)	0.5 – 3.0 mg/l ([1])	300 kg/yr

([1]): The lower end of the range is typically achieved when phosphorous is added for the proper operation of the biological WWTP or when phosphorous mainly originates from heating or cooling systems.

The upper end of the range is typically achieved when phosphorous-containing compounds are produced by the installation.

BAT AEL – AOX

Parameter	BAT AEL (yearly average)	Threshold
Adsorbable organic-ally bound halogens (AOX)	0.20 – 1.0 mg/l (1) (2)	100 kg/yr

(1): The lower end of the range is typically achieved when few halogenated organic compounds are used or produced by the installation

(2) This BAT AEL may not apply if the main pollutant load originates from the production of iodinated x-ray contrast agents due to the high refractory loads. This BAT AEL may also not apply if the main pollutant load originates from the production of propylene oxide or epichlorohydrin via the chlorohydrin process due to high load

BAT AEL – Chromium, Copper

Parameter	BAT AEL (yearly average)	Threshold
Chromium (expressed as Cr)	5.0 – 25 µg/l (1) (2) (3) (4)	2.5 kg/yr
Copper (expressed as Cu)	5.0 – 50 µg/l (1) (2) (3) (5)	5.0 kg/yr

(1): The lower end of the range is typically achieved when few of the corresponding metal (compounds) are used or produced by the installation

(2): The BAT AELs may not apply to inorganic effluents when the main pollutant load originates from the production from inorganic heavy metal compounds.

(3) The BAT AELs may not apply when the main pollutant load originates from the processing from large volumes of solid inorganic raw materials that are contaminated with metals (e.g. soda ash from the solvay process, titanium dioxide).

(4) The BAT AELs may not apply when the main pollutant load originates from the production of chromium-organic compounds

(5) The BAT AELs may not apply when the main pollutant load originates from the production of copper-organic compounds or the production of vinyl chloride monomer/ethylene dichloride via the oxychloination process

BAT AEL – Nickel, Zinc

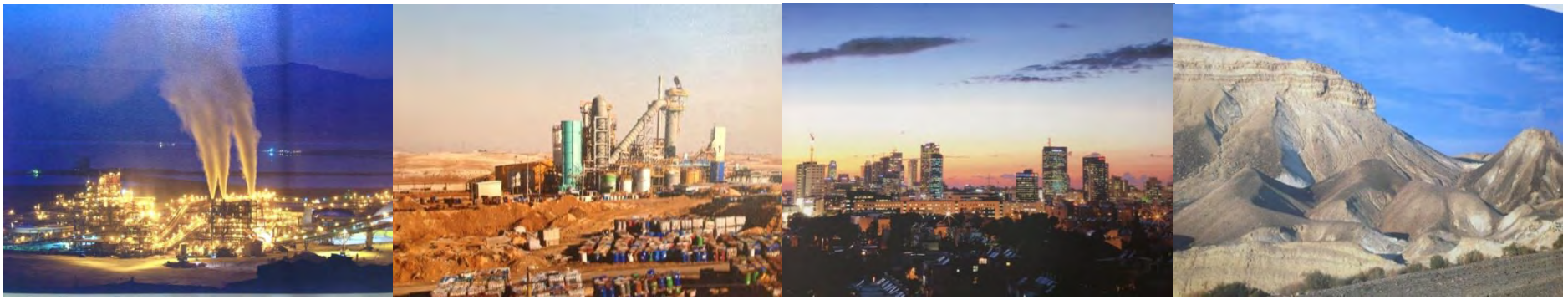
Parameter	BAT AEL (yearly average)	Threshold
Nickel (expressed as Ni)	5.0 – 50 µg/l (1) (2) (3)	5.0 kg/yr
Zinc (expressed as Zn)	200 – 300 µg/l (1)(2) (3) (4)	300 kg/yr

(1): The lower end of the range is typically achieved when few of the corresponding metal (compounds) are used or produced by the installation

(2): The BAT AELs may not apply to inorganic effluents when the main pollutant load originates from the production from inorganic heavy metal compounds.

(3) The BAT AELs may not apply when the main pollutant load originates from the processing from large volumes of solid inorganic raw materials that are contaminated with metals (e.g. soda ash from the solvay process, titanium dioxide).

(4) The BAT AELs may not apply when the main pollutant load originates from the production of viscose fibres



Thank you very much for your attention

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