apeiron

Boric acid emissions to the environment:

What we know &
What we don't know

Hiram Moerman
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- The contents are intended to provide a general guide to the subject matter only and should not be treated as a substitute for specific advice concerning individual situations.
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DRIVING THE TRANSITON

Starting from safe use of chemicals,
Apeiron guides its clients to
sustainable, future proof business operations.

What if …

Your expectation

is a clear conclusion on

the environmental impact of boric acid?

I will tell you …

What know

What we don't know

Cr(III) electroplating bath
functional-decorative

Cr(III)	?
Additives	of no concern?
+ Boric Acid	SVHC

SVCH, Reason enough for Concern?

- Investment to exchange one SVHC by another SVHC

  = impossible to become "sustainable taxonomy aligned" (Regulation (EU)2020/852), because

  1. Requirement to Do No Significant Harm (DNSH) cannot be met: "*This activity does not lead to the manufacture, placing on the market or use of [...] a substance [...] that meets the criteria laid down in Art 57 of REACH, except where their use has been proven to be essential for society*"

     Remark: The requirement is also not met as long as Cr(VI) is used. But, ...

  2. Investment (Capex) into a Green process (without SVHCs) improves the % taxonomy alignment
     → Investment into Cr(III) with boric acid is investment in the wrong direction
     → Sust. Tax. Regulation as driver to invest in research towards greener/safer alternatives

SVCH, Reason enough for Concern?

- Not just an SVHC, but more
  - recommended by ECHA for inclusion in authorisation list
  - cut-off concentration for classification of mixtures recently reduced from 5,5% to 0,3%
  - Why would the regulator do this if there would be no concern?

SVCH, Reason enough for Concern?

- Can the risk be reduced?
  - Actions taken to minimize exposure & emissions to non-detectable levels (more than 100x < BOEL)
  - Is it OK to exchange one very well controlled risk with an uncontrolled to risk?
  - When the remaining risk is demonstrated to be so very low, is the introduction of another SVHC acceptable?

- Let's try to calculate the potential for improvement from a shift to Cr(III) technology

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functional-decorative

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60-100 g/L	

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Boric Acid

- Entrainment with H_2 bubbles
- Entrainment via air flow for mixing
- Entrainment with foam from mist suppressants when article is dipped
- Frequent electrolyte replacement (impurities)

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Uncontrolled Boric Acid emissions
Exposure to general population ?

Boric Acid

current
on-site
STP

Boric Acid

$(Boric\ Acid)_{in} = (Boric\ Acid)_{out}$ (mobility)

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(Volume boric acid) / (Volume Cr(III)) per year ???

Boric Acid

current on-site STP

Uncontrolled Boric Acid emissions
Exposure to general population ?

Boric Acid

$(Boric\ Acid)_{in} = (Boric\ Acid)_{out}$ (mobility)

Empirical value of 6-7 kg BA per 10.000 Ah applied current

2 kg BA / kg Cr(III) used

Boric Acid

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functional-decorative

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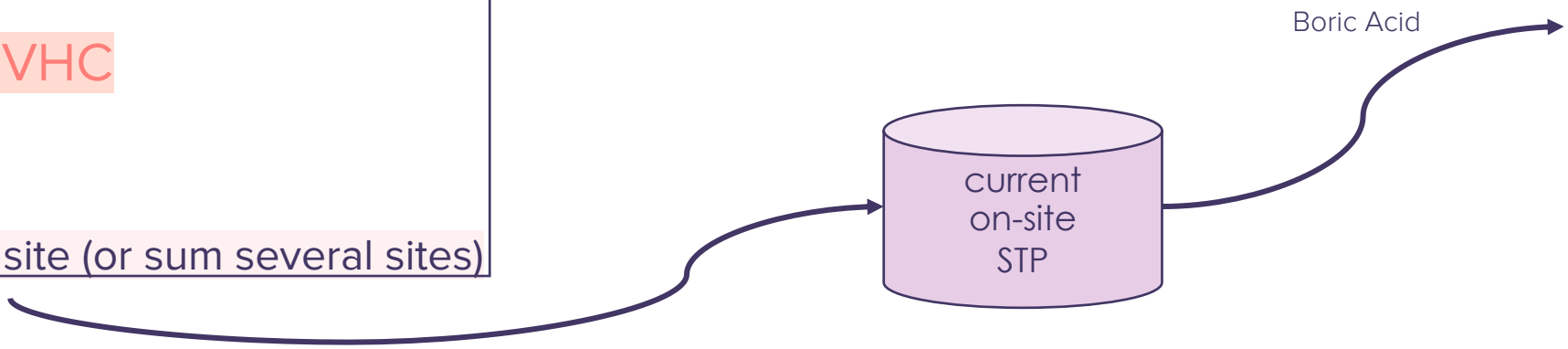
40tpa Cr(III) production site (or sum several sites)

Boric Acid

360 mg Boron/L

>>> $PNEC_{add\ STP\ (registr.\ dos)}$ = 10 mg B/L



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Standard
STP setting

current
on-site
STP

Boric Acid

3,6 mg Boron/L

> $PNEC_{add\ fresh\ water\ (registr.\ dos)}$
= 2,9 mg B/L

>>> $PNEC_{add\ fresh\ water\ (NL,\ AT)}$
= 0,18 mg B/L

Standard
river flow rate

Boric Acid

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Drinking water
conc. 0,1-0,3 mg B/L
(NL risk assess)

Limit value:
WHO ('98): 0,5 mg B/L
2009 tox data: 0,29 mg B /L

Background Boron
< 0.017 to 0,6 mg B/L
(NL risk assess)

0,065 mg B/L @1880 locations
(Eurometaux, surface water IT)

There is evidence to suggest that

release to the environment

could cause risk

= RISK to CAUSE HARM FOR SOCIETY ?

Thus … the alternative

is not (yet) suitable?

cfr. ECHA guidance on authorisation