

Emissions of chlorate from chlor-alkali units

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[#eurochlor2017](#)

Euro Chlor Environmental Working Group (EWG)

- Group of experts from Euro Chlor member companies
- *Scientific* support on environmental issues relevant to industry
- Work on
 - PBT/POP assessment
 - Passive sampling
 - SETAC
 - Effluent screening



Current EWG project:
*Support for BREF process on emissions of
 chlorate from chlor-alkali units*

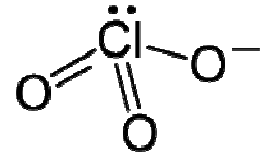
Euro Chlor EWG

- 2014
 - Chlor-alkali production ‘vertical’ BREF
 - Under emissions directive
- *Extensive* discussions on chlorate emissions to water
- Includes information on mercury *etc.*



What is chlorate?

- Can form in chlor-alkali units by reaction of Cl_2 with OH^-
 - Above 60°C
 - Particular issue in membrane cells
 - Forms in anolyte (depressed by adding HCl)
- Toxicology
 - Forms harmless chlorides upon reduction
 - Interacts with proteins in the body (thyroid)
 - Acutely toxic to brown aquatic algae ($<0.1\text{mg/L}$)



- 5 • Highly 'political' substance

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2014 BREF

- Extensive discussions on chlorate emissions to water
 - Lack of data to set this value!
 - Not representative/ sufficient/ reliable
 - No BAT-AEL agreed upon
- Requirement added to monitor chlorate emissions
 - Data to derive chlorate BAT-AEL in future BREF processes
 - *Highly likely to be set somewhere!*
 - *CAK BREF?*
 - *Waste BREF?*

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EWG project - concept

- Data collected from members with membrane plants
 - Emission concentration/ flow rate
 - Receiving water (flow rate/ type etc.)
- 22 companies provided data
 - **Thanks to those who helped!**
- ARCHE model; expected environmental concentration
 - Effluent concentration ÷ dilution factor
 - Dilution factor = 'flow rates' (receiving water/ effluent)



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PNEC = Predicted No Effect Concentration

EWG project - data analysis

- Compare with chlorate PNEC (1ppm)
 - Concentration at which chemical has 'no toxic effect'
 - From REACH dossier for freshwater environments
- Compare with chlorate LVIC BREF emission limit (water)
 - Equivalent to 117g chlorate/ kT chlorine
- Performance 'benchmark' / expected environmental impact
 - What is likely chlorate concentration in the environment?

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EWG project - observations

- No specific information - data confidential!
- Preliminary assessment only
 - Companies with/ without measures to reduce chlorate
 - Wide range of concentrations in receiving waters
 - Most 'issues' observed at low receiving water flow rates
- Provided an additional tool to help BREF discussions

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EWG project - limitations

Data accuracy?		Other local chlorate sources?
Sampling time?		Volume/ rate/ chemistry?
Receiving water variation?		Impact of sampling location?
Effect of chlorate rapid degradation?		

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Advanced ARCHE models not ran – data collection concerns...



EWG project - next steps for you...

- Chapter 5 of BREF
 - By 11 December 2017
 - Monthly monitoring of chlorate in water emissions
 - By ion chromatography (mg/L)
 - Where emission leaves the installation
- Needed so you can update 'local permit' by deadline
- *Start monitoring!*

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EWG project - next steps for everyone...

- Need more data!
 - Better understand what is happening...
 - Derive *reasonable* emission levels to protect the industry
- Technological challenge?
 - Reduction of chlorate?
 - Change conditions to minimise production?
 - Seven methods listed in BREF (one must be implemented!)
- Unknown when BREF process will begin
 - Part of other BREF documents?

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An Industry Group of  **cefic**



Thank you very much

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