Regulation of priority substances in a European perspective
Industrial point of view

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Scope of the presentation

• The Water Framework Directive
• Priority substances and EQS Directive
• The industry point of view
  – The mixing zone concept
  – Substitution
  – Voluntary initiatives
  – Market impact
• Conclusion
The Water Framework Directive

• Objectives
  – protection of all types of waters
  – prevents further deterioration of aquatic ecosystems
  – ensures the progressive reduction of pollution
  – promotes sustainable water use

• River Basin Management Plan

The Water Framework Directive

• MS shall develop a programme of measures:
  – to prevent deterioration, protect, enhance and restore all water bodies
  – to reach good ecological and chemical status
  – to review and, when needed, adapt industrial permits and authorisations
  – to monitor the water bodies and report to the EU
  – to inform and consult the general public
Priority substances and EQS Directive

- Definition of a priority list of chemicals
- Reduction of discharges, emissions and losses of priority substances
- Cessation or phasing-out of discharges, emissions and losses of priority hazardous substances (with PBT characteristics)
- EQS values for annual average and maximum acceptable concentrations
- Addition by the EU Parliament of a list of substances to be further reviewed

Industry point of view: the mixing zone

- The permit generally defines ELV based on the concentration measured in the plant effluent
- The WFD defines EQS, i.e. concentration measured in the water body after some dilution in the surface water
- Need to define a “mixing zone” to avoid the confusion between EQS and ELV
- A guidance is under development
Industry point of view: the substitution

• Phase out would imply substitution of PHS
• Substitution is a risk management option among others and should be compared to others
• The need for substitution should be determined by the risk of a particular chemical in a particular application: **fit to use**
• Economical aspects should be considered not only for producer but also for users
• Successful substitution needs reliable long-term perspective for economical reasons
• Difficulty to compare different types of risk

Industry point of view: the substitution

• Impossible for **unavoidable by-products** like HCB, HCBD or PAH without stopping huge parts of the chemical industry (chlorine and coal tar industry)
• In the case of **pesticides** a toolbox of various Modes of Action has to be maintained for each crop, to avoid the development of pest resistance
• As the available toolbox could vary from country to country, it is almost impossible to find substitutes at European level.
• EU is currently reviewing the list of authorized pesticides
Substitution: a few examples (1)

• Substitution of 1,2-Dichloroethane (EDC) is impossible when used as raw material for vinyl chloride and PVC production but is possible when used as solvent or as raw material for TRI and PER production

• Similarly, benzene can be substituted as solvent but not as raw material for the production of a wide range of aromatic chemicals and as well as by-product of gasoline

Substitution: a few examples (2)

• The substitution of poly-bromodiphenyl ethers leads to a huge number of products each of them being specific for a given application. This implies a complicated management of plastic processing.

• Di(2-ethylhexyl)phthalate (DEHP) can be substituted as plasticizer for PVC by Di(isononyl) phthalate (DINP) and Di(isodecyl) phthalate (DIDP). This is a unique example where the same producers are involved but this move requires large investment.
Substitution: case of cadmium

- The substitution of cadmium in batteries is possible in consumer applications. But NiCd batteries will be substituted mainly based on market/performance/price attributes rather than legislation.
- Substitution of cadmium as pigment, PVC stabilizers, and in brazing and soldering alloys has been accomplished.
- Cadmium based coatings cannot be substituted in many critical applications, but they have been substituted for in automotive applications, large appliances such as dishwashers, washing machines and refrigerators.

Substitution: case of mercury

- Mercury is permanently recycled in the physical, chemical and biological processes in the environment.
- The mercury cell process for producing chlorine and sodium hydroxide can be substituted by the membrane technology, but huge investment are needed.
- Mercury batteries, standard and rechargeable, can now be substituted.
- For mercury based energy-efficient lamps there are no commercially mature alternatives yet available even if LED looks promising.
- Artisanal gold extraction is one of the key mercury source.
- Unavoidable by-product or contaminant in raw materials.
Industry voluntary initiatives

• Well before the WFD, the industry implemented voluntary initiatives to reduce its emissions.
• **Efficient approach**: realistic, economically acceptable, technically feasible, improved image.
• In terms of positive image, much higher benefit of voluntary agreements compared to legally binding approach.
• **Legally binding instruments**: often politically driven with blue sky goals (for example: beyond the BAT, zero level, complete phase out)
• **Difficulty**: poor confidence of authorities, public and NGOs in industry willingness to really reduce emissions. Necessity of an external audit
• Several examples are given here after

Euro Chlor voluntary program (1)

• Include environmental, social and economic factors in all strategic business decisions;
• Optimize energy efficiency in chlorine production;
• Reduce water usage through recycling;
• Continuously reduce polluting emissions to water, air and land;
• Use more hydrogen generated by the industry as a raw material or fuel;
• Give high priority to safe transportation of chlorine.
• Use performance indicators and improvement goals with moving targets, like energy consumption, COC and mercury emission and eco-toxicological knowledge
Euro Chlor voluntary program (2)
COC emissions to air

Euro Chlor voluntary program (3)
Mercury emissions: g / t chlorine capacity
Euro Chlor voluntary program (4)

• By 2010, reduce industry-wide energy consumption by 5.0% in terms of kWh/tonne of chlorine produced compared with the 2001 base year. The target reached in 2006 has been reassessed.

• Provide full eco-toxicological data on 29 chlorinated substances under the ICCA/OECD initiative on HPV

• Publish the industry’s annual performance and progress towards these clearly defined targets.

Vinyl 2010 initiative: the voluntary commitment of the PVC industry

• Responsible “from cradle to grave” management

• Implementation of the “Best Available Technique” (BAT)

• Improve the eco-efficiency of PVC resin by the reduction of their resources consumptions

• Stop using bisphenol A for the production of PVC resin

• PVC additives: plasticizers, stabilizers

• Waste management and PVC recycling
Vinyl 2010 initiative: key achievements

- **Bisphenol A** phased out of PVC production in 2001
- **Phthalate** risk assessments completed (2005) and published (2006). DEHP replaced
- **Stabilizers:**
  - Cadmium stabilisers phased-out in EU-15 (2001) and in EU-27 in 2007
- **Recycling:** Several technologies available
  - exponential increase from 18kT in 2004 to 200kT in 2008
  - recycling of pipes, windows, flooring, roofing and waterproofing membranes, coated fabrics

Other industry initiatives

- **VECAP** commitment of EU, US and Japan producers and users of brominated flame retardants to monitor and reduce their emissions and to keep authorities, stakeholders and the general public informed on the progress made.
- Under the **CONCAWE** umbrella, the Western European oil refineries are regularly carrying out surveys on refineries' effluent. These surveys show a continuous 98.3% reduction of oil discharges since 1969: from 44 000 tonnes (from 73 refineries) to 747 tonnes (from 84 refineries) in 2000. Oil discharged has been reduced to 1.42 g oil per tonne of oil processed.
Market impact

- Chemicals are on a B to B market, consequently there is a very negative commercial impact of "black lists": avoid provisional lists and foresee de-selection process
- Producers are not keen to propose a substitute outside its product line! Substitution generally induces move from one producer to another
- Demonstrate "fit to use" and promote comparative risk assessment
- Investment and profitability need for a long term perspective: avoid frequent changes in legislation
- Some uses or downstream applications could disappear.

Conclusion (1)

- The chemical industry is committed to reduce emissions and to protect the aquatic environment
- The industry got the opportunity to participate in the prioritisation of chemicals and in the determination of EQS values
- Phasing out and zero emission level for certain substances is unfeasible or at least unrealistic. This was imposed for political/ideological reasons
- Substitution should be driven by "fit to use" approach and comparative risk assessment
Conclusion (2)

• Voluntary initiatives developed by industry to reduce emissions and/or uses of certain chemicals are generally efficient and realistic.
• But the lack of confidence of stakeholders limits their use and requests external audit.
• Legally binding instruments should take into account the technical and economical constraints and avoid ideological positions.

Thank you for your attention

Documents on substitution and on voluntary agreements are available on request at

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