Main scientific and regulatory responses and commitments for the metals in the environment

2nd TFTEI annual meeting – Catania, 20 May 2016

Violaine Verougstraete
Annalisa Bortoluzzi

Europe’s non-ferrous metals industry
Driving EU economic growth and innovation

€120bn annual turnover
500,000 direct employees
3,000,000 indirect jobs along the EU value chain

47 million tonnes of annual production
Representing over a fifth of global production

Non-ferrous metals: Endlessly recyclable

52% of base metals and alloys come from recycled sources
13% of the Earth’s crust is made up of non-ferrous metals
To cover:

1. Metal specificities in chemical management

2. IED: NFM BAT Conclusions & BREF improvement

3. IED & REACH

4. OECD – PRTR: diffuse sources
Science as an ally

• Science is the basis of Eurometaux’ technical advocacy in a number of Environmental and Health issues

• Eurometaux has been promoting ‘science-based risk and hazard assessments’
  ⇒ generating data & methodologies
  ⇒ launching projects bringing in scientists, academics
  ⇒ setting panels (HeTAP, ETAP) & supporting scientific conferences
  ⇒ resulting in peer-reviewed publications (about 15 over the last 10 years)
  ⇒ Credibility & impact

• Eurometaux has also used science as ‘advocacy vehicle’ for metal-specificities
If risk of chemical = properties of chemical x exposure to chemical

Metals having significant hazards, we should go for:

• No exposure/emissions
• Substitution
• Limited exposure

However, metals present specificities that make this complex/impossible, e.g.

• Natural occurrence → Background
• Essentiality
• Bioavailability
• Biomonitoring
• Interaction with environment (fate)

Metal specificities: Natural occurrence

Metals are naturally occurring constituents in the environment and vary in concentrations across geographic regions

Humans, other animals and plants have evolved in the presence of metals and are adapted to various levels of metals

Many animals and plants exhibit geographic distributions that reflect variable requirements for and/or tolerance to certain metals

Care should be taken to understand and distinguish among naturally occurring levels, current background levels and contributions to current levels from specific activities of concern

FOREGS Geochemical Atlas for Europe:
http://weppi.gtk.fi/publ/forgegsatlas/index.php

GEMAS Geochemical mapping of agricultural and grazing land soil:
http://gemas.geolba.ac.at/
Metal specificities: Essentiality

Some metals (Fe, Zn, Cu, Mn, Cr, Mo, Se) are essential for maintaining proper health of humans, animals, plants and micro-organisms.

Impact on dose-response relationship:

Metal specificities: Bioavailability

The toxicity of metals is associated to a large degree with the release of metal ions and their interaction with ‘targets’ (environmental organisms, human body): bioavailability.

https://vimeo.com/125676240

Eurometaux’ video released in 2015 explains how to consider bioavailability of metals when setting EQS.

Backup slide: Bioavailability in waters
Publication of NFM BATC

- The final draft NFM BREF was made available on 9 October 2014
- 7th Article 13 Forum meeting provided its opinion on the final draft of the NFM BREF on 4 December 2014
- 9th Article 75 Committee meeting in December 2015 gave positive opinion on the NFM BAT Conclusions
- Member States had until 1 April 2016 to comment the translated versions
- Publication was initially foreseen in the 1st quarter of 2016 (May ?)
The NFM BREF >>> UNECE Workshop, 20 – 22 April 2016, Berlin / Germany

The Structure of the NFM BREF

Preface
Scope
1. General Information
2. General Processes and Techniques
3. Processes to produce Copper and its Alloys from Primary and Secondary Raw Materials
4. ... Aluminium
5. ... Lead and Tin
6. ... Zinc and Cadmium
7. ... Precious Metals
8. ... Ferro Alloys
9. ... Nickel and Cobalt
10. ... Carbon and Graphite Electrodes, Cathodes and Shapes
11. Best Available Techniques Conclusions
12. Concluding Remarks and Recommendations for future Work
13. Annexes
Glossary
References
In the “Concluding remarks and recommendation for future work”:

- The production of sulphuric acid from non-ferrous metals installations is within the scope of the LVIC-AAF BREF. For the sake of consistency and to avoid overlaps the TWG during the final meeting decided that production of sulphuric acid is removed from the scope of the NFM BREF.

- During the final TWG meeting, it was acknowledged that in the LVIC-AAF BREF (2007) Table 4.24 the upper end of the BAT-AEL range for SO2 emissions from the production of sulphuric acid from non-ferrous metals production in a double contact/double absorption plant needs to be corrected: the value should be 770 mg/Nm$^3$ instead of 680 mg/Nm$^3$ (as a daily average).

"The Commission is currently in the final stages of adopting the Implementing Decision with the BAT conclusions for the non-ferrous metals industries (NFM).

- Concerning the issue of SO2 emissions from the production of sulphuric acid, we will point this out in a message to the Member States experts represented in the IEEG once the BAT conclusions are published in the Official Journal.

- The Commission will consider taking this issue forward in the context of the new BREF on, for which the preparatory work will start later this year. Common Waste Gas Treatment in the Chemical Sector (WGC).

(Aneta Willems, HoU, European Commission, DG ENVIRONMENT, Unit C4 - Industrial Emissions)

The BREF Improvement work within the IEA

Industrial Emission Alliance: an industry forum (created in 2006) on emission regulations which covers now 20 industrial sectors, part of the Art.13 Forum

IEA sub-group on BREF improvement explores areas where the BREF process as well as the end product (the BAT Conclusions) can be “improved” →

Products:

- BREF check list
  - Lessons learned and guidance for industry → options for contributing in the most effective way to ongoing or future BREF revisions
  - Structure follows the main steps for drawing up and reviewing a BREF as in the so-called Guidance (Commission Implementing Decision 2012/119/EU)
  - It includes general recommendations on the BREF process, a glossary of abbreviations and a list of useful links (e.g. ‘Support any position on derivation of BAT-AEL ranges with reliable and representative data’)

- IEA contribution to the Berlin workshop (October 2014)

- “Methodology for derivation of BAT AELs” presented at the last IED Article 13 Forum meeting (10/2015)
Methodology for derivation of BAT AELs

We think a systematic approach for deriving suitable BAT AEL ranges is needed, because of

- Its legally binding nature and implication at permitting process level
- Lack of a clear methodology in deriving the draft BAT conclusions submitted to the TWG
- Lack of a common understanding in TWG about what BAT AELs are → lengthy and frustrating “negotiation” process at final TWG meeting

We propose a systematic approach which should help deriving in a straightforward way both ends of the BAT AEL range:

- The upper end should always be set on the basis of the maximum observed emissions of the plants applying BAT for the pollutant at stake
- The lower end should always be set above the lowest maximum observed emissions of the plants applying the BAT after discarding all performances that only occur under specific circumstances

Backup slide: IEA Methodology for derivation of BAT AELs

- Article 15(1): derogation clause 'achievement of BAT AELs as described in BAT conclusions would lead to disproportionately higher costs compared to the environmental benefits' → ELVs > Upper AEL
  without prejudice to Article 18

- Article 15(3): 'The CA shall set ELVs that ensure that, under normal operating conditions, emissions do not exceed the BAT AELs as laid down in the decisions on BAT conclusions' → ELV ≤ Upper AEL

- Article 18: 'Where an EGS requires stricter conditions than those achievable by the use of the BAT, additional measures shall be included in the permit, without prejudice to other measures which may be taken to comply with EGS.'
  → e.g. restrictions on the use of materials, level of activity, etc. not necessarily affecting ELVs which may (not shall) be set lower than lower AEL

- Article 16(4): 'Without prejudice to Article 18, the CA may set stricter permit conditions than those achievable by the use of the BAT as described in the BAT conclusions. MS may establish rules under which the CA may set such stricter conditions.'
  → ELV < Lower AEL and/or maximum emitted load...
Use of information generated by REACH/CLP and other legislation to ensure safe use of chemicals

- An attempt has been done to link REACH and IED, i.e.
  - Check whether REACH/CLP information could be used to support compliance under other legislations
  - Enhance common understanding of interactions
  - Enhance information use, reduce unnecessary work
  - Identify support needs and develop tools


  Why this case?
  - Typical process where chemicals are used
  - Wide range of chemical types and hazards, and process operations typical to many sites
Use of information generated by REACH/CLP and other legislation to ensure safe use of chemicals: case study (2)

Starting point:
- the REACH exposure scenarios (ES): ‘cookbook’ explaining how the substance should be produced and used (risk management measures, operational conditions)
- IED situation: application for a permit/baseline reports
- Hypothetical company

Question: can the information reported in the ES be used to apply/support application for a permit?

Conclusions:
There are potential ways to use REACH information in IED baseline reports, but there are barriers:
- Different terminologies used in the different regimes
- Traditional / Established working practices

Need for more cooperation REACH-IED acknowledged
Specific follow-up with IED in relation to REACH data: not so clear yet how to carry this out? (dialogue ECHA / DG ENV / JRC)

We are following this up as we would like to make use of the REACH data

Backup slide: the REACH exposure scenarios
Backup slide: ECHA case study

Case study – example

Technical criteria conditions and measures to reduce or limit discharges, air emissions and releases to soil
Waste water:
- On-site wastewater treatment in a physico-chemical treatment plant by chemical precipitation, sedimentation, filtration or a combination. (Efficiency 90 – 99%)
- Off-site waste water treatment plant, community sewer system for ES 1 (Efficiency 40%)

ES1 freshwater discharge to STP: 3779 gT (median)
ES2 freshwater discharge: 5779 gT (median)
ES3 marine direct discharge: 3779 gT (median)

Air:
- Treatment of stack air emissions by wet scrubbers. (Efficiency 70%)
- ES2, E4: release factor after onsite treatment 1.03 gT (median)

IED permit
Description of the proposed technology and other techniques for preventing or, where this is not possible, reducing emissions from the installation.

OECD PRTR & Diffuse sources metals
TFTEI - Catania, 20 May 2016
**Diffuse sources**

Metals exist naturally, however emissions and potential accumulation from anthropogenic sources may alter their concentrations in the environment, relative to the natural background.

**Definitions:**

- **Point sources** are defined as being channeled through structures and resulting in emission of substances at an identifiable point in space, e.g. effluent emissions, stack emissions.
- **Diffuse emissions** are resulting from the use of substances in products that are exposed to environmental conditions, e.g. building materials, material wear and corrosion, agricultural uses, household waste waters. Diffuse emissions are usually dispersive in nature.

For metals, **diffuse sources** can be very significant, linked to:

- **Product releases** (e.g. corrosion, wearing of brakes)
- **Unintended impurities** (e.g. metals in fuel and inorganic fertiliser)

---

**Diffuse sources, PRTR, commitments**

OECD has debated recently about extending the PRTR schemes to include **product and non-point source releases (diffuse)** → make the pollutant registers possibly more relevant for risk prioritization and regional risk assessment.

PRTR registers are increasingly used for **risk priority setting schemes** under chemical management programs to ensure a more risk based rather than a hazard based prioritization.

Good quality **Diffuse Sources datasets** are therefore critical to:

- understand regional & continental backgrounds for chemicals management purposes
- help defining the most relevant appropriate **Risk Management Measures** if needed

**The metal sector committed to OECD to** prepare and publish:

- a summary of **metals diffuse sources knowledge** in a key peer review publication providing overviews, comparisons between different sources and drivers
- **horizontal fact sheets** by use

And to prepare a **template format to screen** new exposure information to assess **quality and relevance**.
**Diffuse sources: Deliverables up to now**

- Overview of the total regional emissions for the **different metals**

![Graph showing emissions for different metals](image)

- Overview of the total regional emissions for the **different sources**

![Graph showing emissions for different sources](image)

**Summary on metals diffuse emission knowledge**

**Metal emission loadings by source (examples)**

- **Industry**
  - Cu: 30.0%
  - Pb: 12.6%
  - Zn: 11.9%
  - Mo: 10.0%
  - Ni: 8.4%
  - V: 7.9%
  - Co: 4.8%
  - Cd: 3.5%

- **Waste management**
  - Cu: 78.2%
  - Pb: 2.5%
  - Zn: 2.3%
  - Mo: 1.9%
  - Ni: 1.8%
  - V: 0.1%
  - Co: 0.3%
  - Cd: 0.1%

- **Agriculture**
  - Cu: 68.6%
  - Pb: 5.0%
  - Zn: 4.2%
  - Mo: 1.5%
  - Ni: 1.2%
  - V: 1.1%
  - Co: 0.4%
  - Cd: 0.3%

- **Households**
  - Cu: 53.4%
  - Pb: 13.4%
  - Zn: 13.4%
  - Mo: 6.0%
  - Ni: 0.4%
  - V: 0.4%
  - Co: 0.4%
  - Cd: 0.1%

- **Traffic**
  - Cu: 31.9%
  - Pb: 23.6%
  - Zn: 10.0%
  - Mo: 5.6%
  - Ni: 1.1%
  - V: 0.1%
  - Co: 0.8%
  - Cd: 0.1%

**The compilation of emissions per source helps defining most relevant contributors and potential RMM if relevant**
Diffuse sources: SETAC Nantes

Publication close to be finalised

Presentation in SETAC Nantes (26th Annual Meeting, 22-26 May 2016)

- Making the link between loadings (ton/year) and metal specific chronic environmental toxicity reference values (e.g. HC₅)
- The relevance load-impact results for risk-based prioritization approach will be further discussed

Overview of Toxic Unit Loadings:
- Metal differences rather limited except for Mo

OECD PRTR: BAT project

Why this OECD project?
- Bilateral discussions show there is appetite in exchanging information on policies aiming at preventing and controlling industrial emissions
- National or international approaches are often based on an appraisal of what is feasible using advanced available technologies – in the EU BAT
- In a globalised economy, such technologies might emerge and be implemented at different times in different countries
- OECD Member Countries and Partner Countries are key players regarding technological development
Objectives & timeline of the BAT project

- Support Countries developing or implementing policies based on BAT or similar concepts
- Information sharing would cover:
  - How national policies and legal systems are designed
  - How this has been applied to a selection of sectors of industry
  - Advanced techniques used
  - Effects on emission levels
- Enable an informed decision on whether there is added value in deepening this work

3 years – each year a focus on one aspect / Activity

- Activity 1 (2016): Compiling information on policies using BAT across the world
- Activity 2 (2017): Compiling experiences on how information on advanced techniques is gathered, and how techniques are identified for developing BAT
- Activity 3 (2018): Evaluating policies using BAT by using emission data and other related information (e.g. PRTR information, monitoring data)

Each year information exchange, workshop, drafting of document

---

Expert Group on BAT

A new expert group established:
- under direct supervision of the Joint Meeting;
- close collaboration with the TFEA and TF-PRTRs

Joint Meeting

Expert Group on BAT
- oversee the project
- draft and review documents
- organize workshops

Task Force on Exposure Assessment

Task Force on PRTRs

The TF were invited to provide comments on the organisation of the project and nomination of expert group