Substance identification of complex inorganic UVCBs

UVCB substance meeting with Eurometaux

January 22, 2014 / (C2)

Background

- SID has come up in the Eurometaux-ECHA meetings but has not been explicitly addressed
- C2 has processed Art(26) inquiry dossiers where issues with the strategy taken by the sector have become apparent
- Presentations given in previous meetings and also the current meeting indicate that it would be useful to clarify
  - The role of EINECS in SID
  - Merging EINECS entries/EINCES description
  - SID of UVCBs according to REACH and the Guidance on SID

Principle

- Identification of the substance is the starting point of REACH and CLP
- Identification of the substance must give a solid handle to the registrant and to regulatory authorities so that they can ensure the safe use of the substance in all its grades and in all its uses
- Definition, principles and requirements of REACH and the guidance with regard to SID aim at providing this reliable handle

Some comments on the SID approach proposed

Approach highlights

- importance of source and process for identification of UVCBs
- Relevance of chemical speciation
  - i.e. Cu ≠ CuO ≠ CuS ≠ $CuSO_4$

Implementation challenges

- Defining the source and the process
- Variability in the source and the process
- Elemental analysis precedence over speciation
- Reporting information

UVCB (1)

A UVCB is identified by means of its name and its description

The **UVCB description** depends on:

- the starting materials it originates from,
  - i.e. the mineral sources (described in generic terms such as primary material, secondary feeds, etc.);
- the production process step(s) from which it results,
  - i.e. the type of refinement step (described in a generic way, e.g. smelting, refining, precipitation, etc.); and
- the "known" main constituents of the UVCB

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UVCB

Four **parameters** of variability :

- **Elemental** (chemical) composition
  - => mainly driven by the sources
- **Speciation** of the (chemical) elements
  - => mainly driven by the processes
- **Concentration** ranges of elements/constituents:
  - => driven by sources and processes
- Physical **appearance**:
  - => driven by sources (e.g. concentrate) and processes

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Comments on how the approach seems to have been implemented

Taking "slimes and sludge, copper electrorefining" as an example

- Merging EC entries
- Revising EINECS descriptions
- Scope of the process
- Information provided on composition
- Concentration ranges

Scope of the substance registered

- EINECS entries have been merged
- EINECS descriptions have been revised

EC n°	EC name	(Original) EC description	Other EC n°, names and descriptions covered	Adjusted description
266-972-5	Slimes and sludges, copper electrolytic	A complex combination of insoluble compounds which precipitate during copper electrolytic refining	slimes and sludges, copper electrolytic refining, decopperized (305-433-1); slimes and sludges, copper electrolitic refining, decopperized, arsenic-rich (309-772-6) and nickel sulfate (295-859-3)	Complex combination of insoluble compounds produced by precipitation during the Copper electrolytic refining or wining processes. It consists typically of various metals such as e.g. precious metals, copper, antimony, tin, selenium, tellurium, arsenic, lead and nickel), as well as their oxides and/or sulfates

Illustration: Cu slime case Composition

- **Legal entity specific composition = across year(s)**, for each elemental constituent:
  - LE Typical concentration = +/- average concentration
  - LE Minimum concentration
  - LE Maximum concentration (without "outliers")

- **Generic composition = across industry** (used to derive verified classification), for each elemental constituent:
  - Typical concentration = average of LE typicals
  - Minimum concentration = minimum of LE typicals
  - Maximum concentration = maximum of LE typicals or (generic/specific) concentration limit

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Illustration: Cu slime case

Grade 1: generic composition

Constituent	Typical concentration	Concentration range	Remarks
copper EC no.: 231-159-6	<= 8.0 % (w/w)	>= 0.0 — <= 73.0 % (w/w)	refers to % element. Cu is present as CuSOx (sulfates)
silver EC no.: 231-131-3	<= 16.5 % (w/w)	>= 0.003 — <= 40.4 % (w/w)	refers to % element. Ag is present as Ag metal (only minor % is in inclusions)
arsenic EC no.: 231-148-6	ca. 2.1 % (w/w)	>= 0.0 — <= 4.0 % (w/w)	refers to % element. As is present mainly as As2O3
nickel EC no.: 231-111-4	<= 1.0 % (w/w)	> 0.37 — <= 4.0 % (w/w)	refers to % element. Ni is present as (intermetallic) sulphates
lead EC no.: 231-100-4	<= 20.5 % (w/w)	>= 0.1 — <= 46.0 % (w/w)	refers to % element. Pb is present as sulphates
cobalt EC no.: 231-158-0	<= 0.003 % (w/w)	>= 0.0 — <= 0.02 % (w/w)	refers to % element. Co is typically present as (intermetallic) sulphates
zinc EC no.: 231-175-3	<= 0.7 % (w/w)	>= 0.0 — <= 3.7 % (w/w)	refers to % element. unknown mineralogy/species (WC ZnSO4 assumed)
etc			

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Guidance on SID for UVCBs

4.3.1.2 Main identification parameters – name, source and process

- "*The consequence of defining a substance as UVCB is that any significant change of source or process would be likely to lead to a different substance that should be registered again*."
- UVCB substance "*shall in general be identified by its name, its origin or source and the* ***most relevant steps*** *taken during processing*".
  - Source: needs to be defined
    - Change in source could trigger a new substance
  - Process: refinement given as an example in the Guidance
    - Further refinement of slimes would trigger a new substance
    - Decopperization may be regarded as refinement

Relevance of process and source

- Substances with variability in composition and/or unknown constituents
  - Process and source are then integral to the identification
  - Why: process and source fix the composition and thus the identity of the substance
  - Where process and/or sources are varied, composition variation is unknown and generic (e.g. 0-73 % Copper)
  - Identity of the substance is poorly defined which makes it impossible to ensure its safe use

  - Intrinsic variability in source for a given process acceptable (e.g. ores from different regions for copper smelting)

Guidance and the approach proposed

UVCB (1)

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How "process" has been defined

- **UVCB enriched metal concentration**, e.g. blister/anode copper, doré, lead bullion. The type of process defines these UVCBs. The commonality of this group of UVCBs is the higher metal concentration. Their elemental composition is known and relevant information can be provided by speciation.
- **UVCB non-enriched metal concentration**, e.g. slags, flue dusts, drosses. These are mainly residues that are grouped as residues with the same constituents that can potentially come from different furnaces/reactors but that are always "removed" in the same way (e.g. tapping, exhaust, leaching, etc.). The commonality of this group of UVCBs is the lower metal concentrations. The additional information on the speciation of the elemental constituent is less important.

- We have noted that for both types, the reported variations in composition are very large
  - E.g. lead bullion (Pb 10-90 %, Sb 0-60 %, Sn 0-60 % Cu 0-40 %, zinc 0-30 %, Fe 0-30 % etc.)
  - Flue dust (Cu 0.1-75 %, lead 0.1-65 %, Zn 0.1-75 %, As 0.001-36 %, oxide 0-60%, Fe 0-35 %, etc.)
- Not clear: proposed grouping of residues based on same "method of removal" although they would come from different furnaces/reactors

- Sources and processes are not independent variables
- Processes cannot be overly generic (e.g. Flue dust)
- Sources cannot be overly generic (e.g. an ore is not the same source as scrap metal)
- Composition is reported per LE
- Elemental analysis alone is not sufficient for the composition
- Broad concentrations ranges are a flag that more than one substance is being registered
- EINCES/ELINCS entries are fixed – SID cannot be redefined and still keep the EINECS/ELINCS entry
- EINECS descriptions cannot be revised.

Proposed risk assessment strategy

Starting point

- Proposed approach needs to be applied to substances as identified following the principles derived from REACH and the Guidance on SID

Thank You.