

UNFC case study and guidance from Finland

Session 10: UNFC in action: Progress towards a modern view on integrated resource management

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RESOURCE MANAGEMENT WEEK 2021

ENABLING SUSTAINABILITY PRINCIPLES IN RESOURCE MANAGEMENT



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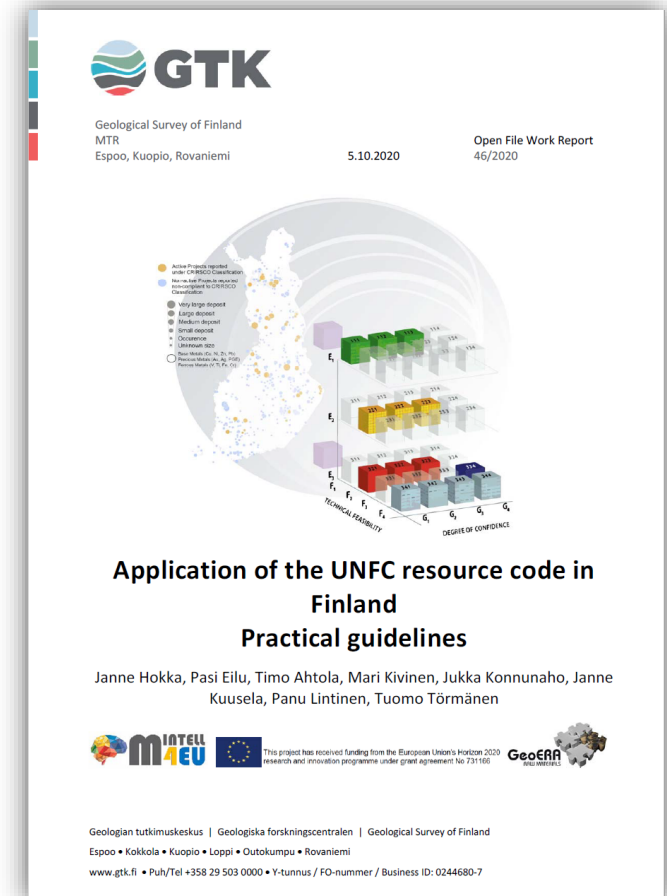
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UNFC Guidance for and from Finland

https://tupa.gtk.fi/raportti/arkisto/46_2020.pdf



- Guidance on mapping current and historical mineral inventories into UNFC in Finland
- The report provides:
 - Tool for experts (evaluators) to conduct consistent and coherent mapping of inventories into UNFC-2019
 - Criteria of classification for various commodities through a variety of case-examples from active and non-active projects
 - Criteria of applying UNFC-2019 directly for internal reporting (exploration target estimates)
- As part of Mintell4EU (UNFC-pilot) GTK produced aggregated resource figures for all commodities in national deposit database, based on transparent and consistent classification



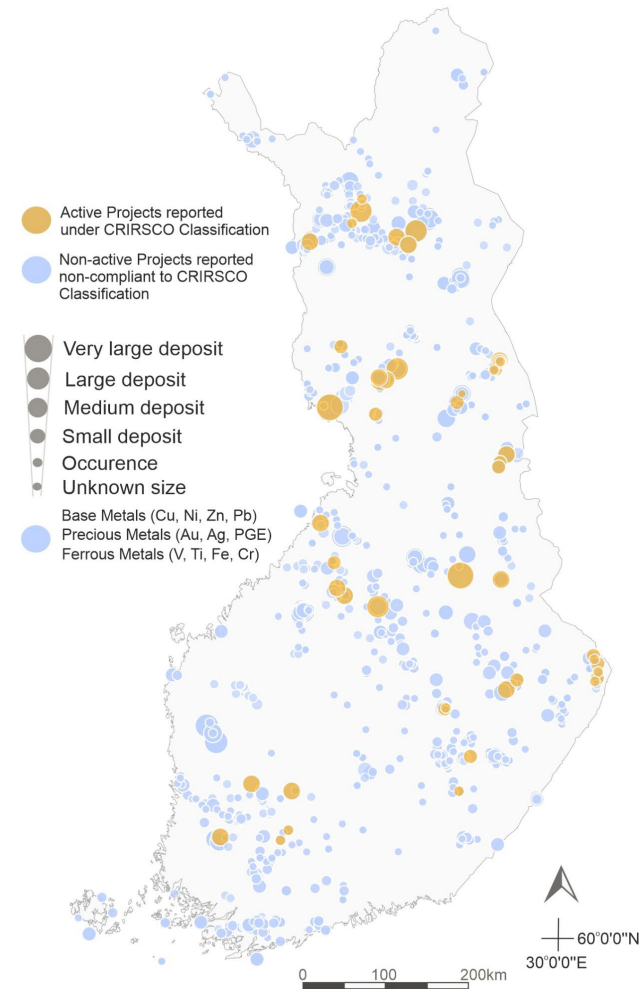
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Mapping 'historic' resources into UNFC-2019



- These are non-compliant to CRIRSCO
- **Bridging document cannot be used**
 - No competence and responsibility (CP/QP)
 - Missing description of QA/QC, if anything such was done at all
 - Chemical assay data, feasibility and beneficiation studies (if any done), permitting, and references to commodity prices (sensitivity analysis) are outdated fully or for most parts
 - Holder of the deposit has been changed since, often more than once

=> E-axis value at 3, F- and G-axis values at 3 or 4



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Challenges in mapping 'historic' resources into UNFC code (+ some solutions)



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- Old reporting **documents and related data can be scanty to non-existent** => Hard to assess the quality and data density => high numbers for UNFC categories
- Some commodities reported in an older but not in the latest resource => **Different UNFC categories in a deposit for individual commodities** (e.g., 223 + 343)
- CRIRSCO-compliant resource >10 years ago, then the company left the prospect, the possible **new owner has not released a new resource** => Change from 221, 222, 223 to 321, 322, 323 or to 331, 332, 333 (= compliant → non-compliant resource!)
- Typical Industrial Mineral deposit: overall resource only given, only in an Environmental Impact Assessment (EIA) => all goes into 1,2,2 or 1,3,3 (if active project or a mine, and permit granted) or 3,3,3 (if non-active and not permitted)?

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Jouhineva Co-Cu-Au deposit, Finland: a 1984 mineral resource mapped into UNFC-2019



- 1950s-1970s: Regional geophysical and till geochemical surveys
- 1980-1984: 61 diamond drill holes (total 9,152 m, 25 m drill spacing)
 - Beneficiation tests, test mining (5,000 t of possible ore), economic and technical feasibility evaluation, mineral resource estimated

	Ore (t)	Au ppm	Ag ppm	Cu %	Co %	UNFC
Indicated Resource	73,000	0.78	21	2.20	0.19	332
Inferred Resource	377,000	0.90	5.36	0.54	0.18	333
Indicated + Inferred	450,000	0.88	7.9	0.81	0.18	333

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Jouhineva Co-Cu-Au deposit, Finland: 1984 mineral resource mapped into UNFC-2019



- **What was done:** Drilling, global ‘in-situ’ resource estimate without consideration of dilution block modelling, beneficiation tests, test mining (5,000 t of ore), economic and technical feasibility evaluation
- **What is not there:** No QP (such definition did not exist then), inaccuracy in location of data points (collar and down-hole surveys), no QA/QC information (incl. verification of sample representativity and recovery), no permitting (nothing regarding E-axis issues)
- **What is outdated:** Beneficiation, feasibility studies (especially economic ones), ESG assumptions, possibly also the chemical analyses
⇒ **UNFC 3,3,2 + 3,3,3**
- **F3.1(?)**, as site-specific studies have identified a potential development with sufficient confidence to warrant further testing
- **F3.1** is supported by the fact that the current holder of the deposit is actively exploring it (www.europeancobalt.com/jouhineva-co-cu-au)

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Harmonizing issues, data gaps and challenges



- Projects are either **active or non-active** and **project maturity varies** from prospective to viable projects.
- UNFC mapping should always **reflect the confidence/uncertainty of the project, without interpretation of the evaluator**
 - Evaluators (e.g., Geological Surveys) are not operators and, therefore, rely on publicly available information (Public Reports). **If tonnage & grade estimates have not been disclosed, no UNFC categories can be given**
 - **Mapping of UNFC quantities and forecasting of future projects should not be mixed.** Forecasting related to UNFC classification is strictly derived from the information given by the operator.
- Relevant Bridging Documents should be used when performing UNFC mapping (e.g. CRIRSCO-compliant estimates to UNFC-2019)
- When mapping CRIRSCO non-compliant estimates (“historical estimates”) the mapping should be transparent, consistent and coherent

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Harmonizing issues, data gaps and challenges



- **Evaluator's competence** is required when mapping problematic cases
 - Active project to non-active project: e.g., in case of mine closure (e.g., company goes bankrupt, or slump in commodity markets puts the mine in care & maintenance)
 - Option 1: Active project => Non-active project (mine closure)
 - **CRIRSCO**: Mineral Reserves and Mineral Resources (RPEEE) no longer valid
 - **UNFC-2019: 111;112 and 221;222;223 => 331;332;333**
 - Option 2: Active project (mine in care & maintenance) company puts the asset on hold but no change in ownership
 - **CRIRSCO**: Mineral Reserves => Mineral Resources
 - **UNFC-2019: 111;112 to 221;222**
 - If company reports plans on mine closure, the UNFC-2019 classification changes accordingly, from **221;222** to **331;332**

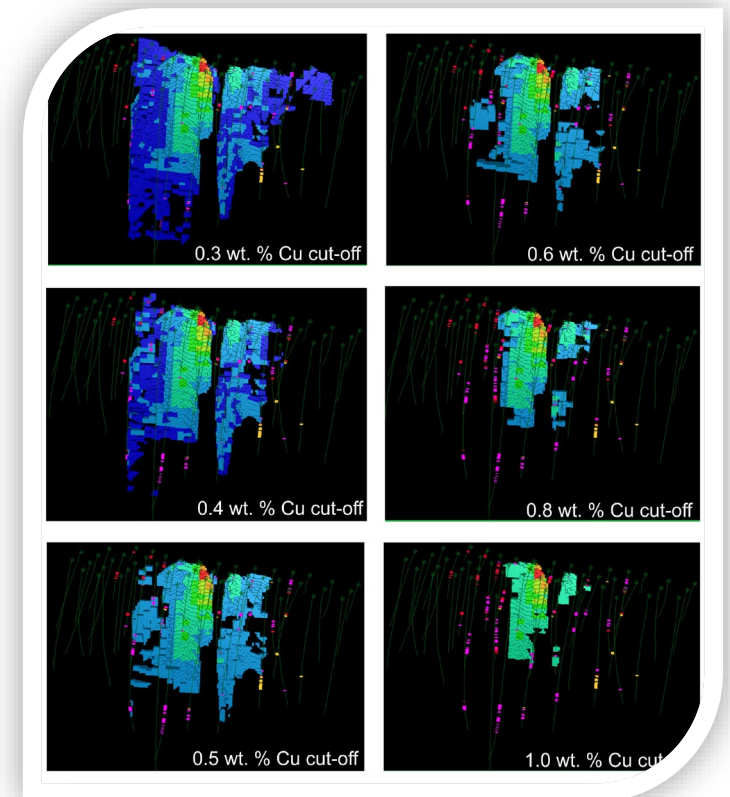


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Harmonizing issues, data gaps and challenges



- Mapping of resource quantities into UNFC-2019 must be consistent and coherent in all EU countries to achieve:
 - Reliable Pan-European resource aggregation to assist, e.g., long-term perspective that supports activities to secure future sustainable raw material supply
 - Sustainable resource management (e.g., resources accounting, policy formulation)
- Resource management needs continuous re-classification of resource quantities according to project status
 - Prospective to Potentially-Viable and Viable Projects
 - Viable projects to Potentially-Viable and Non-Viable Project



Thank you!

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