Recovery of Tungsten, Niobium and Tantalum occurring as by-products in mining and processing waste streams

(TARANTULA)

D2.5 Technical guidelines for entering information on primary resources to the RMIS

WP number and title	WP2 – Identification of European resources of refractory metals
Responsible partner	ICA
Contributor	EM
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TABLE OF CONTENTS

The TARANTULA project has received funding from the European Union's EU Framework Programme for Research and Innovation Horizon 2020 under Grant Agreement No 821159 - https://h2020-tarantula.eu

LIST OF FIGURES

LIST OF TABLES

The TARANTULA project has received funding from the European Union's EU Framework Programme for Research and Innovation Horizon 2020 under Grant Agreement No 821159 - https://h2020-tarantula.eu

ABBREVIATIONS AND ACRONYMS

DG	Directorate-General
DGGROWTH	General directorate for Internal Market, Industry, Entrepreneurship and SMEs
EC	European Commission
GDPR	General Data Protection Regulation
GKR	Geological Knowledge Representation
JRC	Joint Research Centre
RMIS	Raw Materials Information System
TL	Task Leader
ToC	Table of Content
WP	Work Package
WPL	Work Package Leader

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EXECUTIVE SUMMARY

The Raw Materials Information System (RMIS)[1] is an instrument of the European Commission, developed by the Directorate-General (DG) Joint Research Centre (JRC)[2] in cooperation with the DG for Internal Market, Industry, Entrepreneurship and SMEs (GROWTH)[3]. The RMIS is the Commission's reference web-based knowledge platform on non-fuel, non-agricultural raw materials from primary and secondary sources and provides an overview of the European raw materials context. The information generated during TARANTULA project – in compliance with all pertinent laws and regulations - will feed into the Raw Materials Information System (RMIS) which will boost the impact of the project far beyond the current consortium.

This deliverable aims at providing guidelines on how to prepare the information on primary resources of W, Ta, Nb across EU, to be provided to RMIS. This knowledge can be used in support to the development of the most important EC RMIS dossiers, such as the 'EU criticality assessment'.

Current recommendations done by past projects includes the usage of UNFC classification for mineral resources. This classification system provides data regarding occurrences regardless if its classified as reserve or resources and is valid classification to harmonize data from occurrences of Ta, Nb or W across Europe. However, the UNFC does not provide the level of detail that has been achieved in the exploration works under WP2 development.

TARANTULA will provide data regarding Ta, Nb or W occurrences in EU. The data will be reported as comma-separated values (CSV) for the easiest exchange and interoperation. CSV file is a delimited text file that uses a comma to separate values. A CSV file stores tabular data (numbers and text) in plain text, in which case each line will have the same number of fields.

Fields of interest can be grouped in: Location, Occurrence, Mineralogy and Hazards.

Under these 4 groups the characterization of the occurrence will include all the relevant information to assess the deposit such as: nature, type of operation, method of exploitation, morphology, type of deposit, geometric model, economic and social viability, field project status and feasibility, main substances and minerals, secondary substances, potential contamination, severity and environmental impacts, or UNFC code.

Excel files will be reported to RMIS with the information obtained regarding the different occurrences across EU obtained on the exploration works in WP2. The template produced now based on the ongoing results will be filled with the final data. The final deliverable based

[1] https://rmis.jrc.ec.europa.eu/
[2] https://ec.europa.eu/jrc/en
[3] https://ec.europa.eu/growth/index_en

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on the works of this task will provide a table of the deposits and indices regarding the specification and categorization of each occurrence.

Additionally, TARANTULA will provide the data in an easy and democratic visualization format with *.kmz files to be used by GIS software such as free available Google Earth, which will allow precise location of each of the occurrences. The main information relating to these occurrences will be summarized in a balloon attached to the coordinates of the points.

The standards of these two types of files make possible to envisage the integration of information into any computer system, database or GIS. In addition, these files are also directly usable by any user by free downloadable software; this universality will allow a wider dissemination.

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1. OBJECTIVES

The aim of Task 2.4 is to produce technical guidelines related to the compatibility of collected data with the JRC's Raw Materials Information System (RMIS) to feed, for instance, the W, Nb and Ta profiles in the Raw Materials Scoreboard and Criticality Assessment studies. These guidelines will consider best practices from past/ongoing EU-funded projects and will be communicated to the involved partners and made freely available for dissemination.

The information generated during TARANTULA project – in compliance with all pertinent laws and regulations - will feed into the Raw Materials Information System (RMIS) which will boost the impact of the project far beyond the current consortium.

This deliverable aims at providing guidelines on how to prepare the information on primary resources of W, Ta, Nb across EU, to be provided to RMIS. TARANTULA will feed the RMIS with the most relevant findings and research results of the project. ICAMCYL presented an outline of the project and expected results and plans to provide novel data in a meeting with RMIS. As a result of TARANTULA & RMIS meeting and information exchange, the main data sets, knowledge and novel information expected where categorized and assessed in terms of interest for RMIS platform. RMIS expressed their priority interest in the data regarding occurrences of deposits of W, Ta, Nb in Europe, therefore this deliverable is focused on this information and the most appropriate way to make this available for RMIS including data harmonisation.

This knowledge can be used in support to the development of the most important EC RMIS dossiers, such as the 'EU criticality assessment', the Material System Analysis (MSA) study and the Raw Materials (RM) Scoreboard that could be used by the EU commission to develop future policy and strategies for EU sustainable development.

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2. INTRODUCTION

2.1 RAW MATERIALS INFORMATION SYSTEM (RMIS)

The Raw Materials Information System (RMIS)[4] is an instrument of the European Commission, developed by the Directorate-General (DG) Joint Research Centre (JRC)[5] in cooperation with the DG for Internal Market, Industry, Entrepreneurship and SMEs (GROWTH)[6]. The RMIS is the Commission's reference web-based knowledge platform on non-fuel, non-agricultural raw materials from primary and secondary sources and provides an overview of the European raw materials context.

The RMIS responds to the need of strengthening the European Union Raw Materials Knowledge Base and acts as the core access point to such knowledge and as interface for policy support. The EC RMIS provides a structured repository of knowledge, related legislation at EU Community and Member States levels, with a view of identifying further needs, gaps and recent national legislation updates in the EU Member States. The overarching goal of the RMIS is to facilitate:

- The availability, coherence and quality of knowledge required by specific EU raw materials policies and EC services.
- The knowledge needs of the EU criticality assessment, the Raw Materials Scoreboard, trade, defence, Circular Economy, due diligence/conflict minerals and other raw materials specific policies.
- Access to key raw materials information, within and beyond Europe, which complements the knowledge currently essential for policy support.

RMIS has the aim of establishing a continuous exchange of knowledge with national, EU-level and global knowledge providers. Fulfilling the wide range of raw materials knowledge needs requires a broad spectrum of different knowledge providers. In this respect, Horizon 2020 projects as TARANTULA are at the core of RMIS' knowledge providers.

ICAMCYL, as leader of Task 2.4, has been in contact with RMIS for the development of the task and associated deliverables. ICAMCYL also took part of the last RMIS Workshop entitled "Channelling knowledge from European projects into the Raw Materials Information System (RMIS)" on the 3rd of December 2020. The event brought together key representants of the European Commission representatives, JRC, EASME and RMIS leaders as well as representatives of a total of 12 EU-funded projects. Participants discussed the most

[4] https://rmis.jrc.ec.europa.eu/
[5] https://ec.europa.eu/jrc/en
[6] https://ec.europa.eu/growth/index_en

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relevant knowledge needs on raw material value chains (both primary and secondary). Plenary discussion among the participants on how to increase awareness of project outputs and how best these can support the RMIS developments. During the workshop ICAMCYL, representing TARANTULA, was provided a general overview of the technical / IT related aspects that need to be considered in order to facilitate the efficient knowledge transfer from H2020 projects to RMIS. All outputs of the workshop have been carefully considered for the benefit of the task and deliverable.

This is key for an optimum interaction between TARANTULA and the EU JRC to generate and transfer valuable data generated during the project (Figure 1) and make it FAIR and accessible for the RMIS development and how to best proceed.

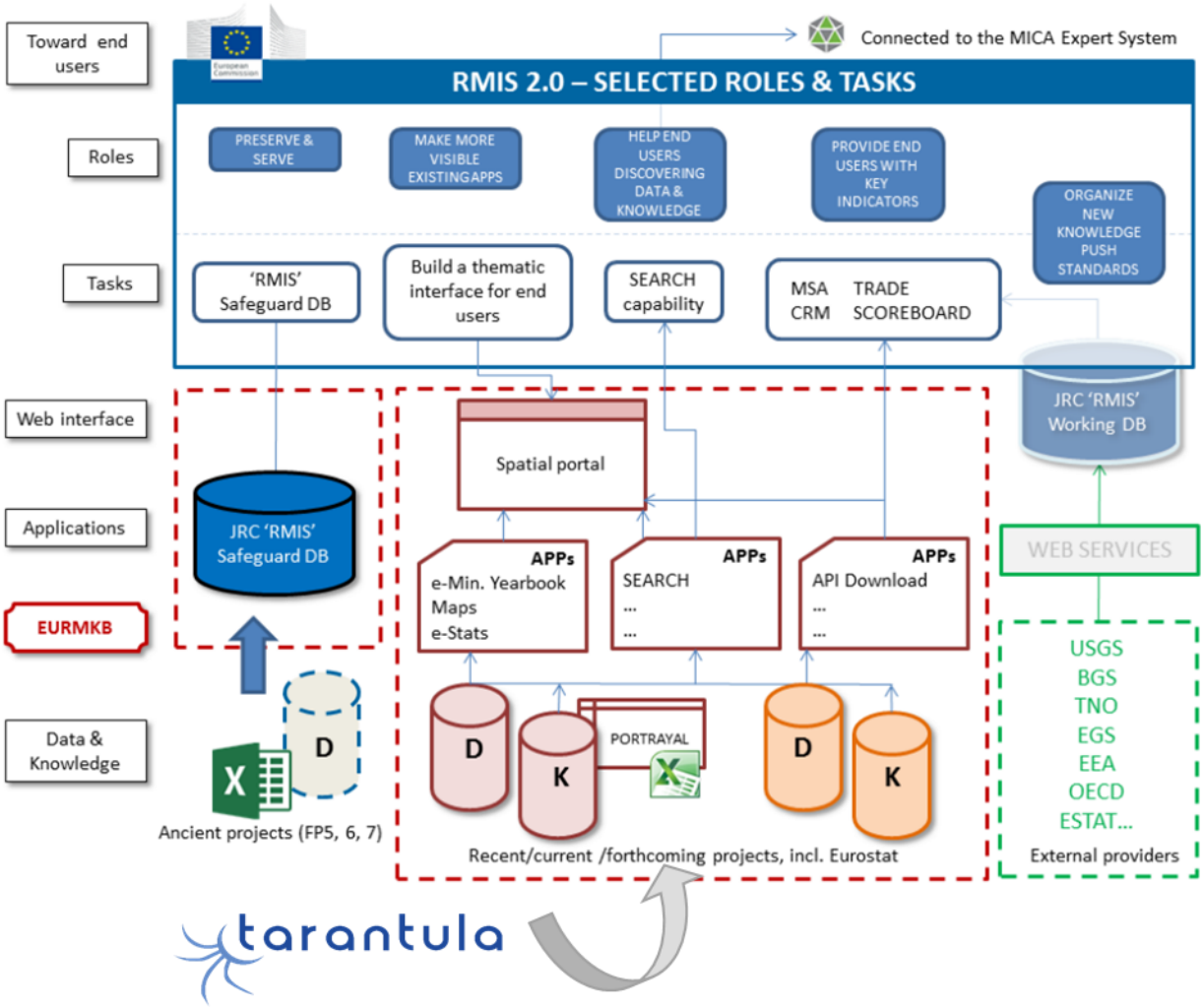

FIGURE 1. TARANTULA ROLE AND RELATIONSHIP TOWARDS RMIS (ADAPTED FROM MINTELL4EU)

Currently developments for the future RMIS 2.0 are focused on improving visualization tools while continue updating and improving data sourcing and intelligence in raw materials.

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2.2 SUMMARY OF RECOMMENDATIONS BY PREVIOUS PROJECTS REPORTING MINERAL RESOURCES

The analysis will follow the guidelines provided by previous projects analysing primary and secondary raw materials value chains that have also included the aim of feeding information into RMIS (Table 1).

TABLE 1. SUMMARY OF BEST REFERENCE PROJECTS

ORAMA
The ORAMA project seeks to optimise the collection of data related to primary and secondary raw materials within the EU. ORAMA analyses data collection methods and recommendations from other European projects to identify best practices, develop practical guidelines and provide training to meet specific needs. ORAMA also demonstrates how the recommendations contribute to the creation of more robust Material Systems Analyses and reliable Sankey diagrams for stocks and flows of specific raw materials. https://orama-h2020.eu/
ProSUM
ProSUM (Horizon 2020 research and innovation programme, grant agreement No 641999, 2015-2017), funded by the European Union and the Swiss Government, produced the EU Urban Mine Knowledge Data Platform (EU-UMKDP) providing user-friendly, seamless access to data and intelligence on secondary raw materials for BATT, ELV, WEEE and MW. The ProSUM portal gives centralised access to charts and maps and includes a search engine currently covering over 800 data sources and documents structured by the ProSUM project. Data available for Waste Electrical and Electronic (WEEE), batteries and vehicles, which includes stocks in the urban mine and waste flows by composition, mainly regarding base metals, precious metals and CRMs. http://www.prosumproject.eu/urban-mine-knowledge-data-platform
MINERALS4EU
The Minerals4EU project is designed to meet the recommendations of the Raw Materials Initiative and will develop an EU Mineral intelligence network structure delivering a web portal, a European Minerals Yearbook and foresight studies. The network will provide data, information and knowledge on mineral resources around Europe, based on an accepted business model (Figure 2. Overview of M4EU DB tables in this guideline excluding codelist tables.), making a fundamental contribution to the European Innovation Partnership on Raw Materials (EIP RM), seen by the Competitiveness Council as key for the successful implementation of the major EU2020 policies.

UE funded project ORAMA performed an extensive study of the main projects contributing to raw materials data sourcing and harmonization. ORAMA conducted a review of data collection and reporting practice across Europe for PRM in order to identify examples of good practice. This focused on examples that were widely used and contained the most up-to-date and comprehensive data. It is hoped that these examples can be used to aid organisations responsible

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for data collection and provision in improving methods as well as to understand the current limitations of this data within Europe.

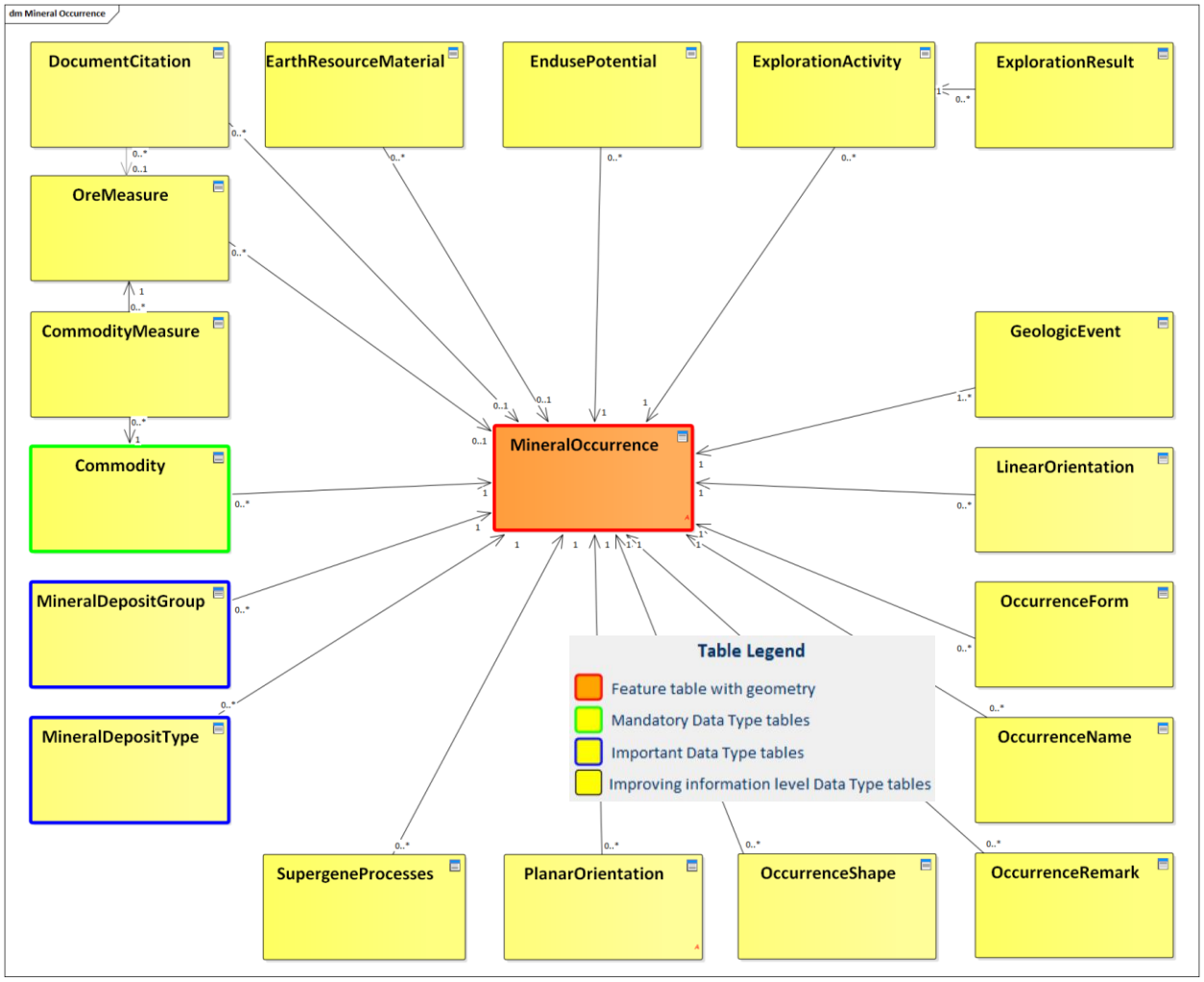

FIGURE 2. OVERVIEW OF M4EU DB TABLES IN THIS GUIDELINE EXCLUDING CODELIST TABLES.

ORAMA has set the basement for data treatment and harmonisation based also on a summary of previous projects recommendations. ORAMA pointed out two main issues regarding European resource and reserve data. The first is data collection and provision, as some countries produce excellent detailed and comprehensive data whereas others publish no data at all. The second is harmonisation of published data, where data may be available at a national level, it may not be comparable with other national datasets due to different standards being applied.

There is currently a serious issue regarding harmonisation of European resource and reserve data where much of the available data are reported to non-comparable standards and reporting systems. The ORAMA project recommends the use of the UNFC as a tool for resource data harmonisation.

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2.3 UNFC CATEGORIZATION SYSTEM

The use of the UNFC system as a standard way of classifying mineral resources is a solution to the lack of harmonised data at European level. Use of UNFC overcomes the issue of multiple non-comparable resources and reserves reporting codes and standards in use across Europe by producing data that is harmonised for resources and reserves at the EU level. It is not suggested that individual countries should change their current systems of working, many of which have a legal foundation. At the national level, all countries would be able to continue with other systems of reporting to suit their internal purposes, but when figures are reported to a central point for EU level compilation (e.g. European Minerals Yearbook) and in order for them to be consistent and comparable they would need to be converted to a harmonised system such as UNFC.

The UNFC for Fossil Energy and Mineral Resources (UN, 2010) is a global classification system developed under a mandate from the UN Economic and Social Council and serviced by the Expert Group on Resource Classification (EGRC) of the United Nations Economic Commission for Europe (UNECE). The UNFC is a flexible classification system that is capable of meeting the requirements for application at national, industrial and institutional level, as well as to be successfully used for international communication and trans-national assessments. It should be emphasised that UNFC is a classification and not a full reporting standard. It provides no guidance on data quality or validation, or on methods or formats of reporting.

In the UNFC system quantities are classified using a numerical coding scheme for three fundamental criteria: economic and social viability (E); field project status and feasibility (F); and uncertainty, mostly related to geological knowledge (G). Combinations of these criteria can be displayed and visualized in three dimensions, or in two dimensions (Figure 3 and Table 2).

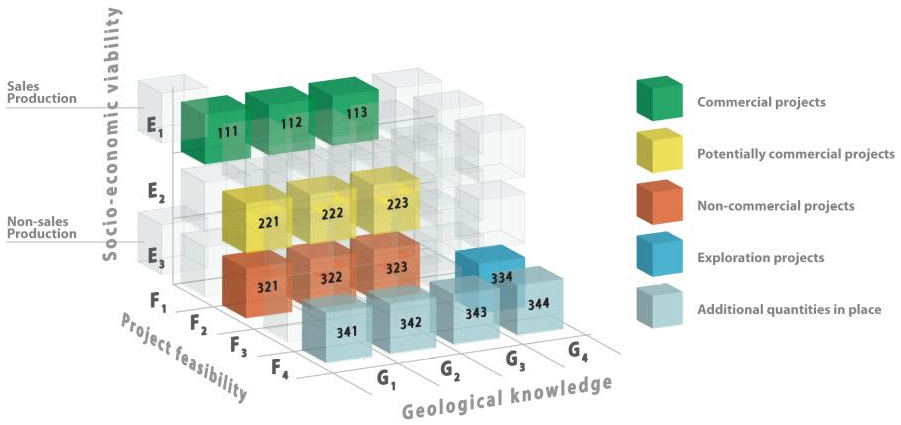

FIGURE 3. ABBREVIATED VERSION OF UNFC-2009, SHOWING THE PRIMARY CLASSES.

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TABLE 2. ABBREVIATED VERSION OF UNFC-2009, SHOWING THE PRIMARY CLASSES

Total commodity Initially in Place	EXTRACTED	SALES PRODUCTION			
		NON-SALES PRODUCTION			
		Class	Categories		
			E	F	G
	Future recovery by commercial development projects or mining operations	Commercial Projects	1	1	1, 2, 3
	Potential future recovery by contingent development projects or mining operations	Potentially Commercial Projects	2	2	1, 2, 3
		Non-Commercial Projects	3	2	1, 2, 3
	Additional quantities in place associated with known deposits		3	4	1, 2, 3
	Potential future recovery by successful exploration activities	Exploration Projects	3	3	4
	Additional quantities in place associated with potential deposits		3	4	4

Current recommendations done by past projects includes the usage of UNFC classification for mineral resources. This classification system provides data regarding occurrences regardless if its classified as reserve or resources and is valid classification to harmonize data from occurrences of Ta, Nb or W across Europe. The UNFC system has been designed to create mineral inventories in harmonised ways that can be easily combined across regions and national borders for the purpose of developing mineral policies and planning. UNFC can accommodate resources that are not economic to extract under current market conditions. The UNFC system does not use the term ‘reserves’, rather all categories are considered ‘resources’. However, the UNFC does not provide the level of detail that has been achieved in the exploration works under WP2 development that are further explained in section 3.

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3. TARANTULA RAW DATA COMPILATION AND HARMONIZATION

The exploration works develop by EM under WP2 in TARANTULA uses a specialist software (Figure 4) called GKR (Geological Knowledge Representation). The software allows entering large amount of information that is classified, indexed and stored in different tables with a simple organisation.

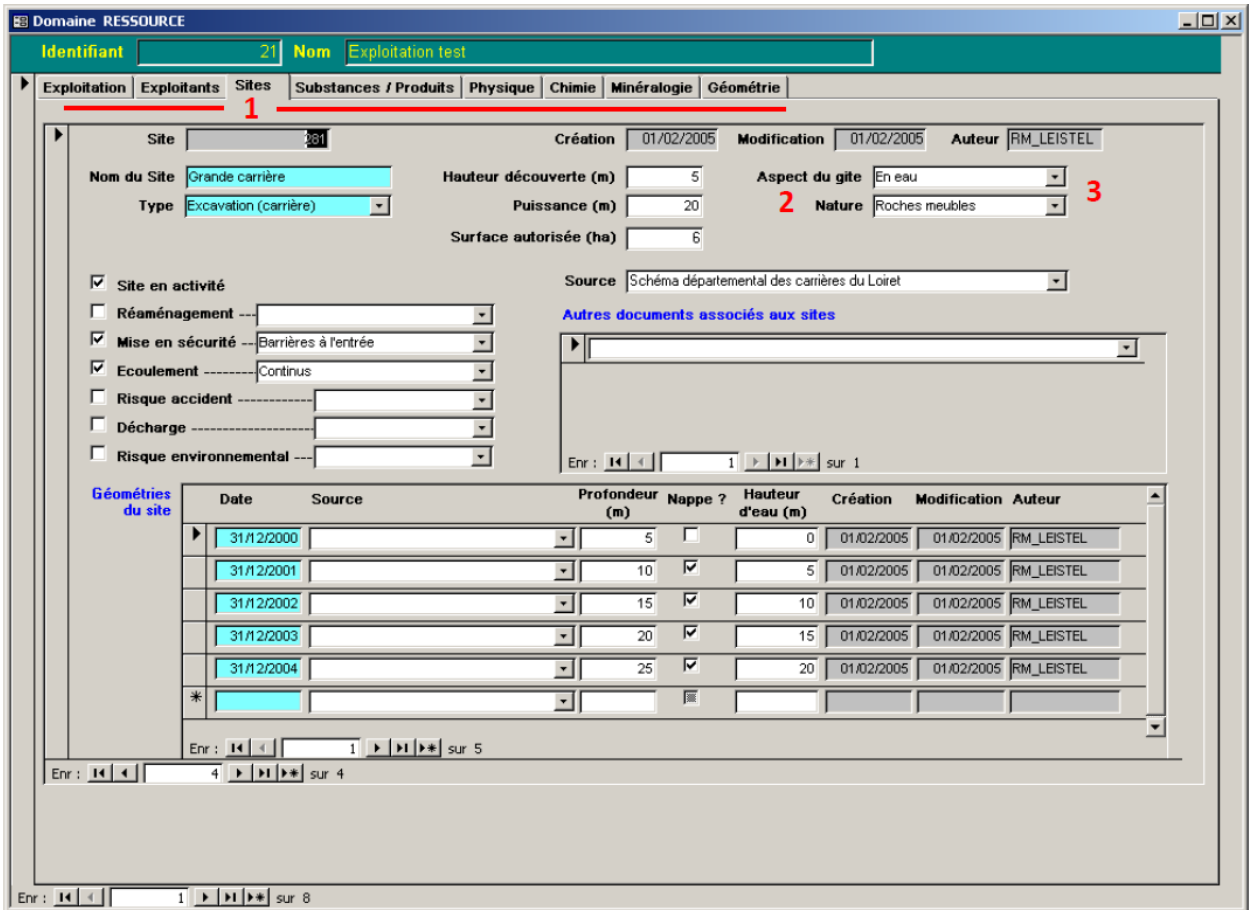

FIGURE 4. SCREENSHOT OF EXPLORATION DATA SOFTWARE USED IN TARANTULA

The software allows the data to be exported into comma separated values or ASCII tables that can be treated with popular program Excel, but also with a variety of open software.

TARANTULA uses a defined classification system based on the available data that has been included in the GKR. For a better standardisation of the data TARANTULA will add UNFC classification as per previous projects recommendations. Moreover, the data set includes more detail than what can be achieved with UNFC system. The data has been obtained from a variety of sources from different countries reporting in different systems and formats and harmonised on a first exploration step using the GKR software.

Europe has experienced centuries of mining activity, but it is only recently that the criticality of refractory metals has become evident, therefore there are a good number of occurrences

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that were neglected upon the time and have been now investigated and reported. The geological services of the countries have established mining inventories listing the known deposits and indices in their respective territories. In total, more than 68,000 records were identified and stored in a data integration system, the GKR. The exploitation of this large amount of information, however, requires an extensive harmonization phase. Indeed, if harmonization exists today in part on significant deposits, it remains very approximate in terms of occurrences, which are however the potential source of new discoveries. Indexing by ontologies of the terms used in all the files collected in the public databases. The information collected can thus be manipulated without the limitations linked to the language of their original entry and by using semantic clusters allowing queries based on terms not used by the authors of the files. Thus, the same search using the same criteria can be applied to all selected files.

The data has been selected country by country, of the whole EU, to assess the total potential in refractory metals. Beyond national inventories, new deposits or occurrences were added, mainly by detailed mineralogical studies of deposits of other resources investigated by EM in Task 2.1.

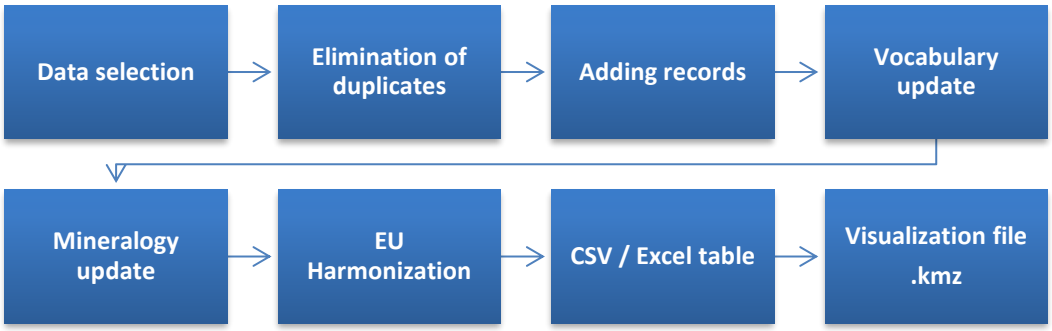

FIGURE 5. DATA PROCESSING SCHEEME

The mining potential and / or reprocessing of wastes is estimated country by country using the same evaluation criteria with a view to harmonize data on a European scale (Figure 5). For this we have established for each of them:

- A list as exhaustive as possible of all known occurrences, mineral deposits and ore deposits for these metals. The data sources have been filtered to eliminate as much as possible the duplicates and errors that appeared during their integration. The geographic coordinates have been corrected, where possible, using Google Earth which today offers ground accuracy that did not exist when the source data was created.
- Exploration works, historical works, old mining works have been grouped in the occurrence rank. The size of the deposits mined in the traditional way for tin and tungsten do not allow today to anticipate the existence of a deposit without the resumption of exploration work.

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- Old mines or positive exploration work will be classified as deposits. For the most part, these mines closed after Chinese dumping in the 1980s and the deposits, then exploited with much higher cut-off grades than today, are very likely not to be exhausted.
- Study of the ore and gangue parageneses to determine:
    - Recoverable metals
    - Potential contaminants (heavy metals, arsenic, radioactivity, etc.)

Occurrences and deposits are examined according to the metals contained, the potential for recoverable metals, but also in relation to the environmental hazard which would be attached to the reopening of old works or the reprocessing of wastes. Duplicates can be found when using different sources and need to be addressed. These duplicates come either from errors in the published databases, or from an incorrect use of the terms described in Table 3. The correction of these entries subsequently imposes a search and the elimination of the duplicates caused according to the criteria specified in Table 3.

TABLE 3. MAIN TYPES OF DUPLICATES

Nature of the duplicate	Symptom	Remediation
True double	• Match the same target • Same name or not • Coordinates may be different	• Merge records • Fix coordinates
Homonymy	Another target with the same name already exists • Could be near the other one • Could exploit another commodity	• Keep the record • Establish hierarchy with the mine inside the GKR • Check/Fix coordinates
Confusion between mine and deposit	• could have the same name • could have the same coordinates	• Merge records • Fix coordinates
Several mines operating the same deposit	• could create false duplicate with other mines in the same Vein field • Possible confusion with “true” duplicate	• Keep the record • Modify the name if needed • Establish hierarchy with the mine inside the GKR • Check/Fix coordinates
Confusion between deposit and district having the same name	A mine and/or a deposit has the same name as a district in the same region	• Keep the record • Change the name of the district by adding “District” after the name.
Confusion between occurrence and deposit or mine	A record for the occurrence was made before the construction of the mine	• If the occurrence corresponds exactly to the mine site: merging records for the benefit of the mine. • If the occurrence is distant from the mine or deposit: Keep the record by changing the name.

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Harmonization of vocabulary

One obstructive factor in the harmonisation of these data types is a lack of consistent terminology. To overcome this issue, standard dictionaries or glossaries must be developed and used when reporting figures. There are several internationally recognised examples, such as that set out by the INSPIRE directive or EarthResourceML (a XML-based data transfer standard for the exchange of digital information for mineral occurrences, mines and mining activity). These, however, need regular updating and input from end users to ensure sufficient resolution exists and therefore require clearer definitions for terms used in metadata. The use of a vocabulary common to all the records of deposit and occurrences. It should be noted that there is a blurring between the terms used to describe the mining activity and the geological objects which concern it. The GKR will use the vocabulary for geology and mining operations (Table 4).

TABLE 4. RELATION BETWEEN GEOLOGY AND MINING OPERATION

GEOLOGY		Mining Operation
Province	Scale = 100 km. A mineralized province generally corresponds to a geological formation enclosing numerous mineral deposits that can be grouped into districts	Reconnaissance
District	Scale = 10 km. A mineralized district generally corresponds to a geological event generating numerous mineral deposits that can be grouped into fields.	Prospecting
Vein field	Scale =1-10 km. Grouping of deposits generally associated with the same mineralizing phenomenon. Can give rise to many operation sometimes grouped under the name of a single mine.	General exploration
Mineral deposit	A significant concentration, sometimes large, of ore or industrial minerals. The level of knowledge does not make it possible to define whether the economic conditions are favourable for exploitation in the short or medium term	Old mine Exploration
Ore deposit	A mineral concentration that is economically exploitable under the conditions existing at the start of the operation.	Mine (active/dormant) Detailed exploration
Ore body	Part of a deposit that can be exploited selectively. The ore bodies of the same deposit may have different morphologies.	Mining
Occurrence	A visible indication that mineralization exists, whether in the form of an outcrop or a mineralized boulder.	Old mining works Outcrop

EU Harmonization needs to be done using the same classification system for all countries across EU, using the same description vocabulary, adding UNFC classification categories, and integrating it into data log. The data integration system used in TARANTULA WP2 allows partially to achieve this and export the data for further harmonisation treatment. Full details of the data description and classification is defined in the next section.

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4. TARANTULA TEMPLATE FOR MINERAL OCCURRENCES DESCRIPTION

Occurrences and deposits are examined according to the metals contained, the potential for recoverable metals, but also in relation to the environmental hazard which would be attached to the reopening of old works or the reprocessing of wastes. The document intends to be a repository of mining exploration data, beyond this, the information provided may allow a prior assessment of the economic and environmental risk incurred.

The software used in the exploration works in TARANTULA project allows exporting the results as a database in Excel format presenting the main characteristics of the indices and deposits (georeferenced WGS 84). For each country, the results are provided in the form of an electronic annex which includes different characterization fields of interest that can be grouped in four groups as described in Table 5.

TABLE 5. MINERAL OCCURENCE CHARACTERIZATION

Location	Occurence	Mineralogy	Hazards
• Usual name • Other names • TARANTULA inner code (GKR ID) • Country • Geographical reference WGS 84 • date	• Nature • Type of operation • Method of exploitation • Morphology • Type of deposit • Geometric model • Economic and social viability (E); • Field project status and feasibility (F) • UNFC code	• Type Minerals • Main substances • Secondary substances • Uncertainty, mostly related to geological knowledge (G) • Chemical composition	• Potential contamination source • Trace elements • severity of contamination • Environmental impact

There is a general unexploited mining potential in the European territory. The important geodiversity conditions the existence of an important diversity of mineral raw material deposits, some of which have already been intensely benefited. The justification for the potentiation is based on the treatment of four variables that are listed in Table 5. On the one hand, the mineral evidence, that manifestation or occurrence of a mineral or group of minerals in a specific territory, on the other hand, the potentiality of the outcropping geological formations, in addition to the effective presence of active exploitations.

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The template for feeding information to RMIS is designed in a way that can be easily transposed to the M4EU database. It consists in a list of the occurrence with 24 main attributes than characterize the deposit, including UNFC, as listed in Table 5. Figure 6 shows a screenshot of the current draft template for feeding information to RMIS.

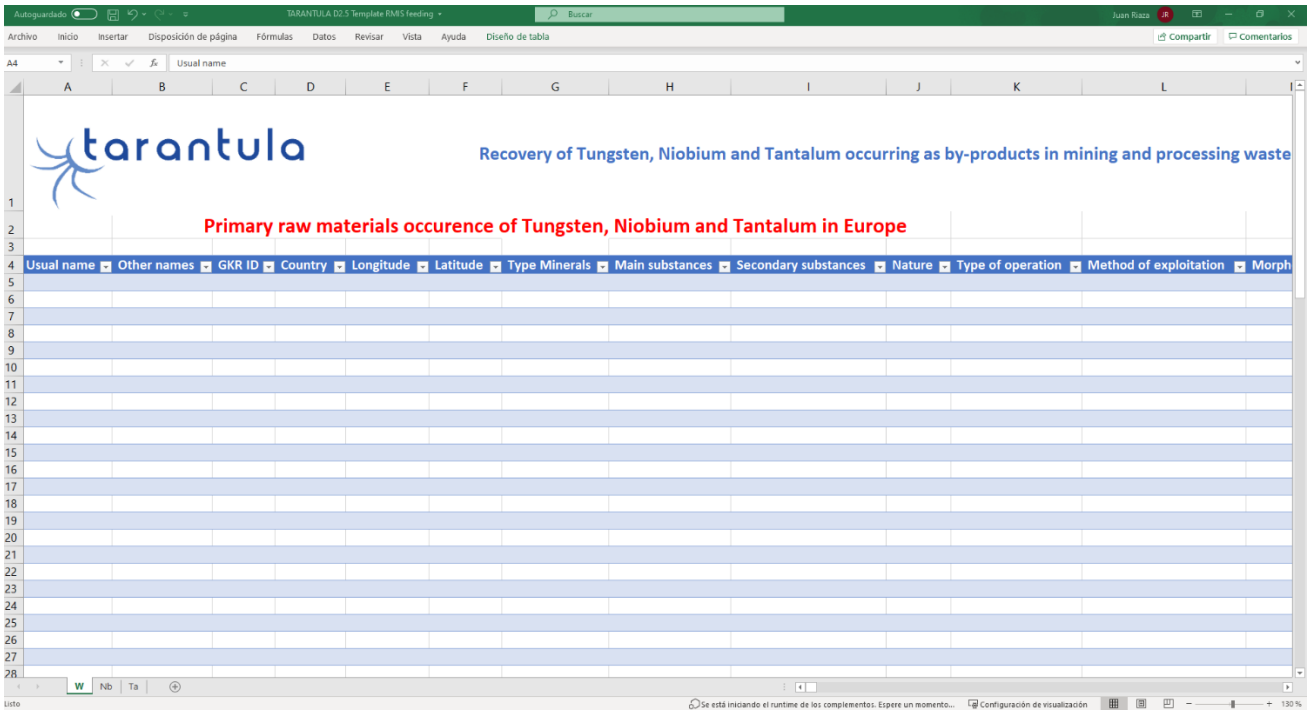

FIGURE 6. SCREENSHOT EXCEL TEMPLATE FOR DATA FEEDING TO RMIS

The current list of parameters does not pretend to be a limit but a minimum requirement. Therefore, if either the exploration works or RMIS suggest including any other parameter it will be considered and easily included into the excel template.

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5. TARANTULA GRAPHICAL AND INTERACTIVE DATA VISUALIZATION

It is very difficult to assess the reality of occurrences across EU concerning the primary and secondary resources of W Nb and Ta through database on documents of the text type, such as the .pdf, .docx, .xls standards. Therefore, TARANTULA will also report data to RMIS in a visual form, so that the information provided can be easily used by RMIS or general public.

Data will be shared in a .kmz files, that can be opened with Google Earth Pro software (downloadable free on the internet). This allows users who do not have a G.I.S. to easily access a very precise geographic location of all the referenced sites (Figure 7). It will be recalled that the opening of such files requires the download of the free application "Google Earth" to the user's computer. Different files will be generated for different regions for faster execution of the areas of interest (Figure 8). However different .kmz files can be integrated into the same consultation session so it is possible to see the complete information altogether.

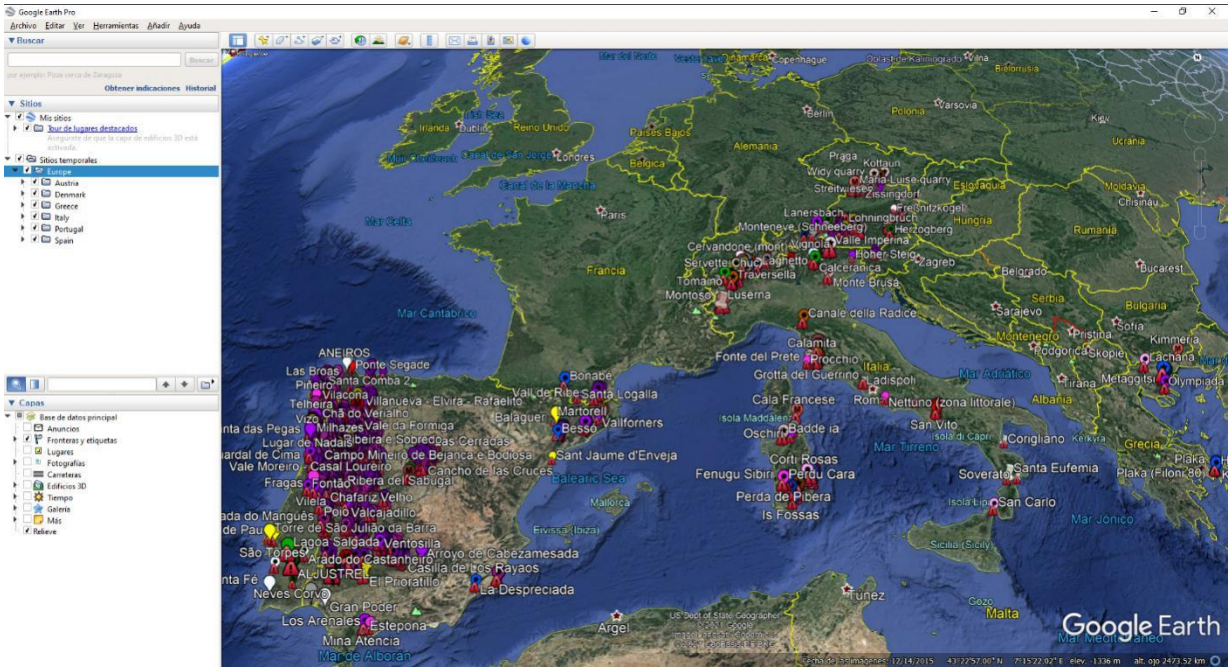

FIGURE 7. SCREENSHOT OF VISUALIZATION DATA USING GOOGLE EARTH

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FIGURE 8. EXAMPLE OF A MINING OCURENCE VISUALIZATION IN GOOGLE EARTH

The file will be accompanied by a briefing instructions and explanations for easier user interpretation of the data and better experience with the Google earth map. The briefing will include instructions and legends for the different types of icons and colours used.

The file is an interactive map that gives access to three types of information displayed in 3 types of bubbles by clicking on the corresponding icon (Figure 9):

- The "Deposits & Occurrences" bubble (blue icon), which summarizes the main geological and economic characteristics of each site.
- The "Hazard" bubble (red icon) which summarizes the various environmental impacts associated with each site.
- The "Minerals" bubble (diamond icon) which lists all the minerals present in the ore and the gangue of each site.

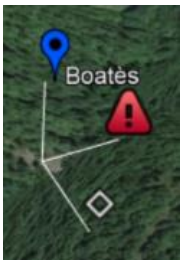

FIGURE 9. EXAMPLE OF BUBBLES DISPLAY

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6. CONCLUSIONS

Previously EU-funded projects have set the basis for data exchange between different mineral resources repositories and classification systems. The examination of the deliverables of these projects has benefit TARANTULA to produce this technical guideline. Based on conversations with RMIS, the most interesting data from the project outcomes has been identified, being this the complete data of the occurrences of W, Ta and Nb across EU. Under this task, TARANTULA has examined the best way to report this data and elaborated a template for feeding this high-quality information produced under the exploration works in WP2 into RMIS. This will include data regarding W, Nb and Ta occurrences with technical information and characterization to the highest degree of detail and accuracy available. The information generated during TARANTULA project – in compliance with all pertinent laws and regulations - will feed into the Raw Materials Information System (RMIS), specially on the 3 CRMs profiles in the Raw Materials Scoreboard and Criticality Assessment studies for the RMIS. These guidelines have been produced under close communication with the involved partners and will be made available for dissemination.

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8. ANNEX

The link to the .XLS file associated to this deliverable is the following:

https://tecnaliaresearchinnovation.box.com/s/sohof4xa51370wwnio8aff443hfintkc

The file contains the template to feed information into RMIS with all columns regarding the characterization of each occurrence.

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