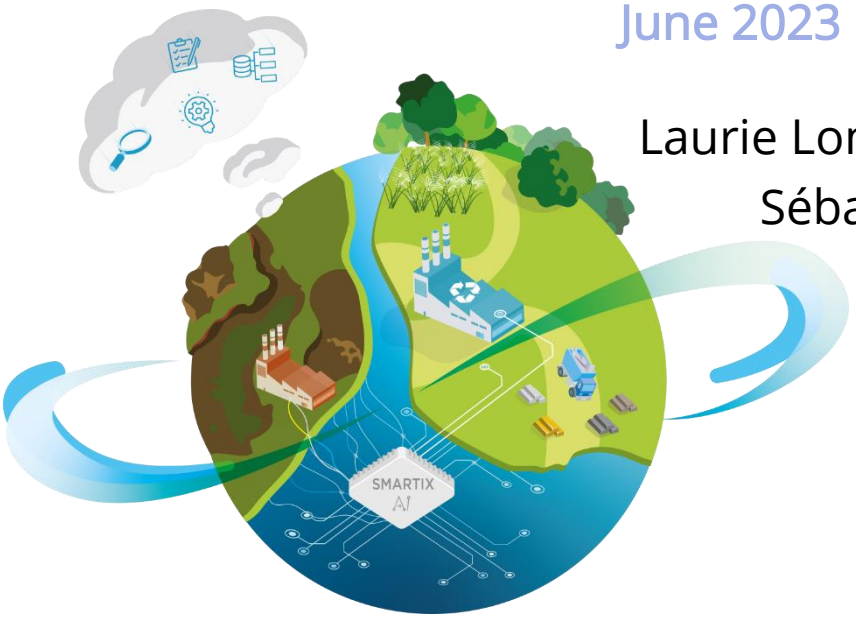
Interreg North-West Europe NWE-REGENERATIS

European Regional Development Fund

DT1.1.2. MEtallurgical Sites Inventory Structure (MESIS), a full guidebook

June 2023



Laurie Lommel, Renaud De Rijdt, Sébastien Moreaux, Sophie Lejeune

ATRASOL, SPaQuE

SUMMARY

1 INTRODUCTION

With the decline of metallurgical and industrial activities and the progressive relocation of these activities outside Europe, many metallurgical sites and deposits have been left abandoned in North-West Europe (hereafter named “Post Metallurgical Sites and Deposits – PMSD). In 2013, the number of metallurgical sites with metal recovery potential was estimated at 100000 by JRC. Given that the European supply of metals and raw materials is at risk of being undermined, these past metallurgical site and deposits could provide a new source to recover secondary raw materials. However, this emerging opportunity faces many challenges.

There is currently a lack of standardised framework that would allow public and private stakeholders to make economically informed decisions to launch a raw material recovery project on PMSD in all NWE regions. Besides, traditional methods assessing the viability of a recovery project are expensive and require costly analyses and sampling. Moreover, the available inventories for PMSD were rather created to contain information useful for the rehabilitation of these sites (remediation, environmental aspects, history, etc.), but they did not necessarily address the potential of these sites for the recovery of secondary materials.

The NWE-REGENERATIS project therefore seeks to tackle the territorial challenges highlighted above and focuses two key objectives. Firstly, the creation of the REMICRRAM methodology (i.e. the NWE-REGENERATIS methodology) intend to provide a cost-effective and quick way to estimate the potential and fix methods for site valorisation. Secondly, the project aims to assist stakeholders in creating standard inventories and databases that are tailored to the PMSD, including all the necessary fields for material recovery projects, and which will enable efficient management of the data needed for REMICRRAM methodology tools to function effectively.

1.1 THE REMICRRAM METHODOLOGY

The NWE-REGENERATIS project has created a 3-step methodology named REMICRRAM to evaluate the site potential for material recovery. This process determines whether further investment is worthwhile, thus preventing unnecessary expenses when the site recovery potential is insufficient. The 3-step methodology involves using 3 tools, one at each step (see Fig. 1):

- Step 1: SMARTPHOENIX - a generic site selection (quick scan) tool based on relevant easy-to-obtain information,
- Step 2: SMARTIX - an AI-based technical and economical site and processes selection tool,
- Step 3: Business cases software - a complete cost-benefit analysis tool that includes evaluating the economic, social and political impacts of a given project.

The site's interest is determined based on 4 different types of valuable materials:

- The metal recovery potential of a site,
- The mineral recovery potential of a site,

- The potential for improving soil fertility at a low cost to grow biomass, a.o. for ecocatalysis production,
- The potential for ecocatalysts production at the site.

REMICRRAM provides a quick and cost-effective estimation/quantification of a site's material recovery potential. This methodology 1) facilitates the selection and characterization of PMSD, 2) demonstrates the recovery potential of secondary raw materials from PMSD, and 3) enables the creation of site-specific plans using an AI tool called SMARTIX.

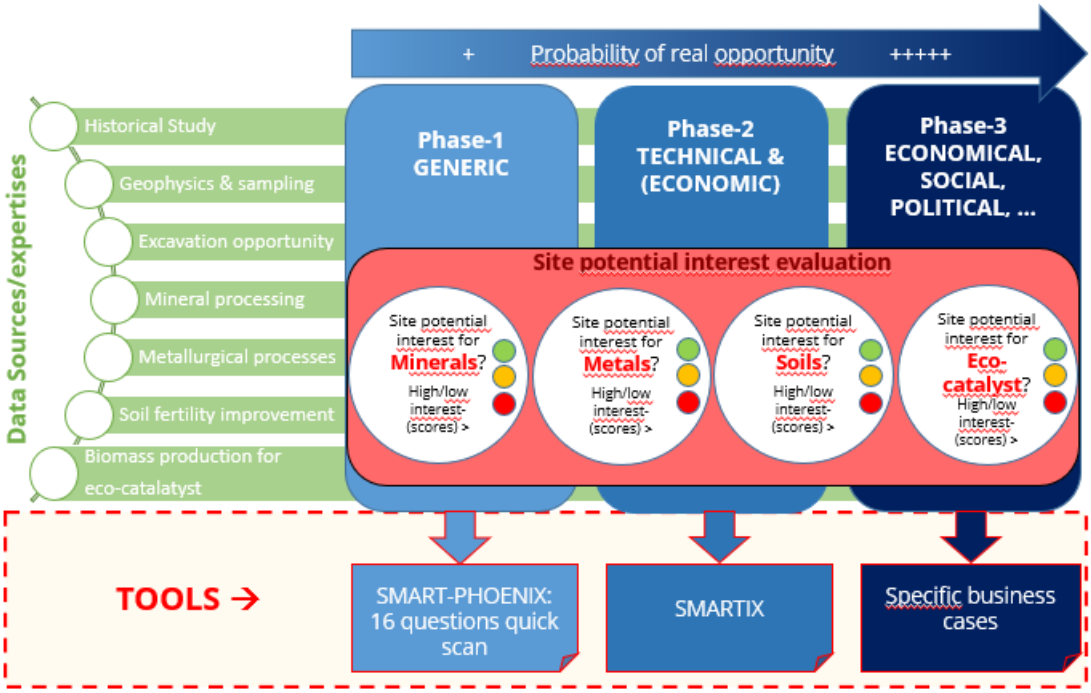


Figure 1: REMICRRAM general overview

1.2 METALLURGICAL SITES INVENTORY STRUCTURE FOR POLLUTED SITES

The lack of a standardized framework for making economically informed decisions on launching raw material recovery projects on Past Metallurgical Sites and Deposits (PMSD) presents a significant challenge. Current inventories for PMSD were rather created to contain information useful for the rehabilitation of these sites (remediation, environmental aspects, history, etc.), but they did not necessarily address the potential of these sites for the recovery of secondary materials. Moreover, traditional methods used to assess viability are expensive and require costly analyses and sampling, which further complicates the process. All these aspects make it difficult for stakeholders to assess the suitability of their site for material recovery projects.

To address this challenge, it is necessary to establish a suitable inventory that collects all the key parameters relevant for recovery projects. The MEtallurgical Sites Inventory Structure (MESIS) is an inventory structure developed by the NWE-REGENERATIS project team. It is intended to be used directly as a structure to create an inventory or to supplement an existing one. It contains crucial parameters for developing material recovery projects from PMSD and includes some parameters that are also required to use the REMICRRAM tools.

The MESIS structure is a valuable resource for stakeholders who are considering launching recovery projects on PMSD, as it includes historical studies, site visits, pre-investigation estimates, and other relevant data. Please note that MESIS does not contain any datasets or analysis results. And must be filled by PMSD stakeholders

The decision to launch a recovery project depends on various drivers, such as economic, environmental, and social factors, all of which are included in MESIS and comes from historical studies, site visit, pre-investigation estimates. What is MESIS ?

In parallel with the assessment of a site's potential for material recovery, the establishment of a suitable inventory structure that collect all the important parameters relevant for recovery projects is needed for stakeholders. The MEtallurgical Sites Inventory Structure (MESIS) is an inventory structure developed by the NWE-REGENERATIS project. MESIS is intended to be used directly as such, i.e. as a structure to create an inventory, or whose fields can be included in an already existing inventory.

As MESIS contains key parameters for the development of material recovery projects from PMSD, it also implies that some parameters included in REMICRRAM tools are also part of MESIS. Thus, even if the purpose is not the same, a clear link between MESIS and REMICRRAM still exists where we will see that the SMART PHOENIX is indeed included in MESIS.

2 THE MESIS STRUCTURE

The MESIS structure is provided in the form of the excel file “NWE-REGENERATIS_MESIS.xlsm” which is composed of 6 main sheets by default (as a minimum): (1) Welcome to MESIS, (2) General PMSD ID-cart, (3) Surrounding and site, (4) Deposit 1, (5) Data sources, (6) SMART PHOENIX. The Deposit sheet can be duplicated up to 5 times depending of the number of deposits identified on a site (up to five) (Figure 2).

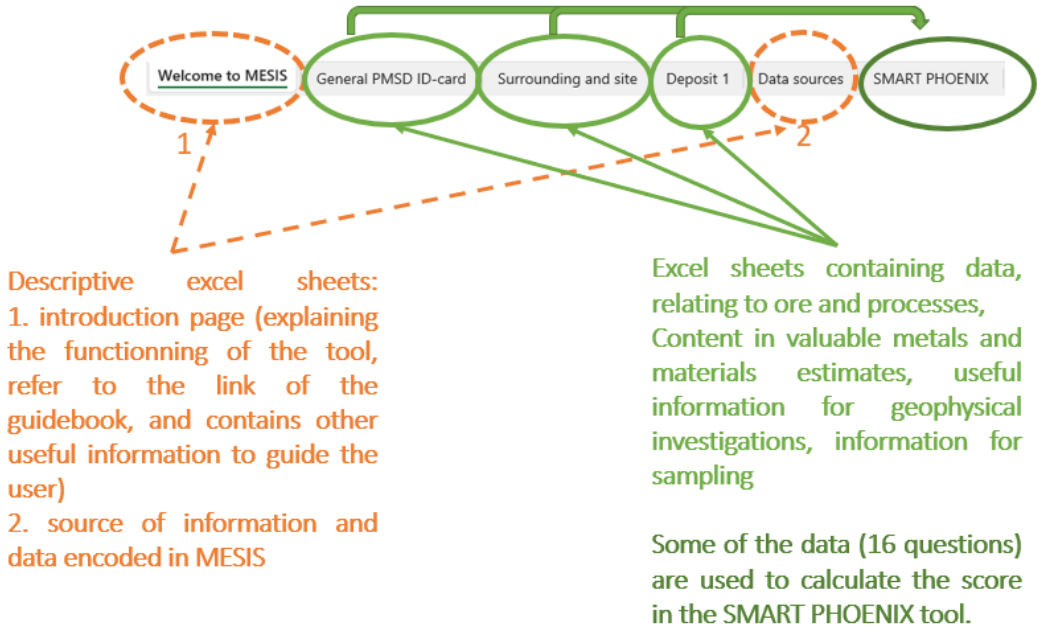


Figure 2: MESIS general structure

The spreadsheet includes some macros to duplicate the deposit sheets and to links some MESIS input fields to the SMARTPHOENIX inputs (and avoid double encoding). We recommend allowing the use of macros for this the workbook.

Every sheet is protected by the option *review/protect sheet* 

to avoid any unwanted changes.

This protection can be switched off for advanced users to allow modification of the workbook.

2.1 STRUCTURE OF A SHEET

Except for the first sheet, each subsequent sheet comprises user-fillable fields. These fields are visually distinguished by their white colour and are not protected from editing. Some fields are annotated with a red number, indicating their utilization by a decision support system, specifically:

- ① SMART PHOENIX questions,
- ② SMARTIX questions

Occasionally, a field may be marked with hatch, indicating that no input is expected in that particular field. This serves as a visual cue to users that the field should be left blank.

Additionally, the fields on each sheet are thoughtfully structured and grouped according to their respective topics, enhancing the overall organization and ease of use.

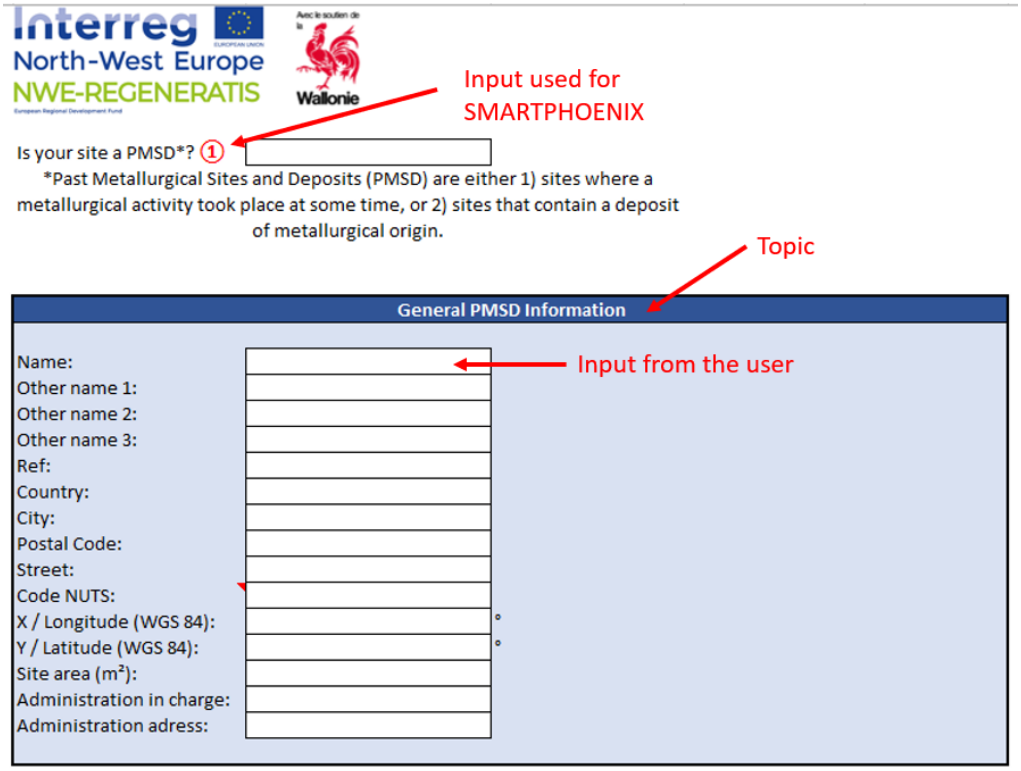


Figure 3 : structure of a MESIS sheet

2.1.1 Excel sheet content explanation

2.1.1.1 Welcome to MESIS

The first sheet of the MESIS spreadsheet serves as an introductory guide and provides an overview of the tool's functionalities. Its purpose is to familiarize users with MESIS and demonstrate how to effectively use the tool.

This introductory sheet does not require any input from the user and serves as a reference point to understand the overall structure and usage of the MESIS tool. Additionally, it introduces the SMART PHOENIX tool and provides guidance on interpreting its results. The SMART PHOENIX tool consists of 16 questions specifically designed to estimate the resource recovery potential of a PMSD. While it can be used in conjunction with MESIS, it is also capable of functioning as a standalone tool.

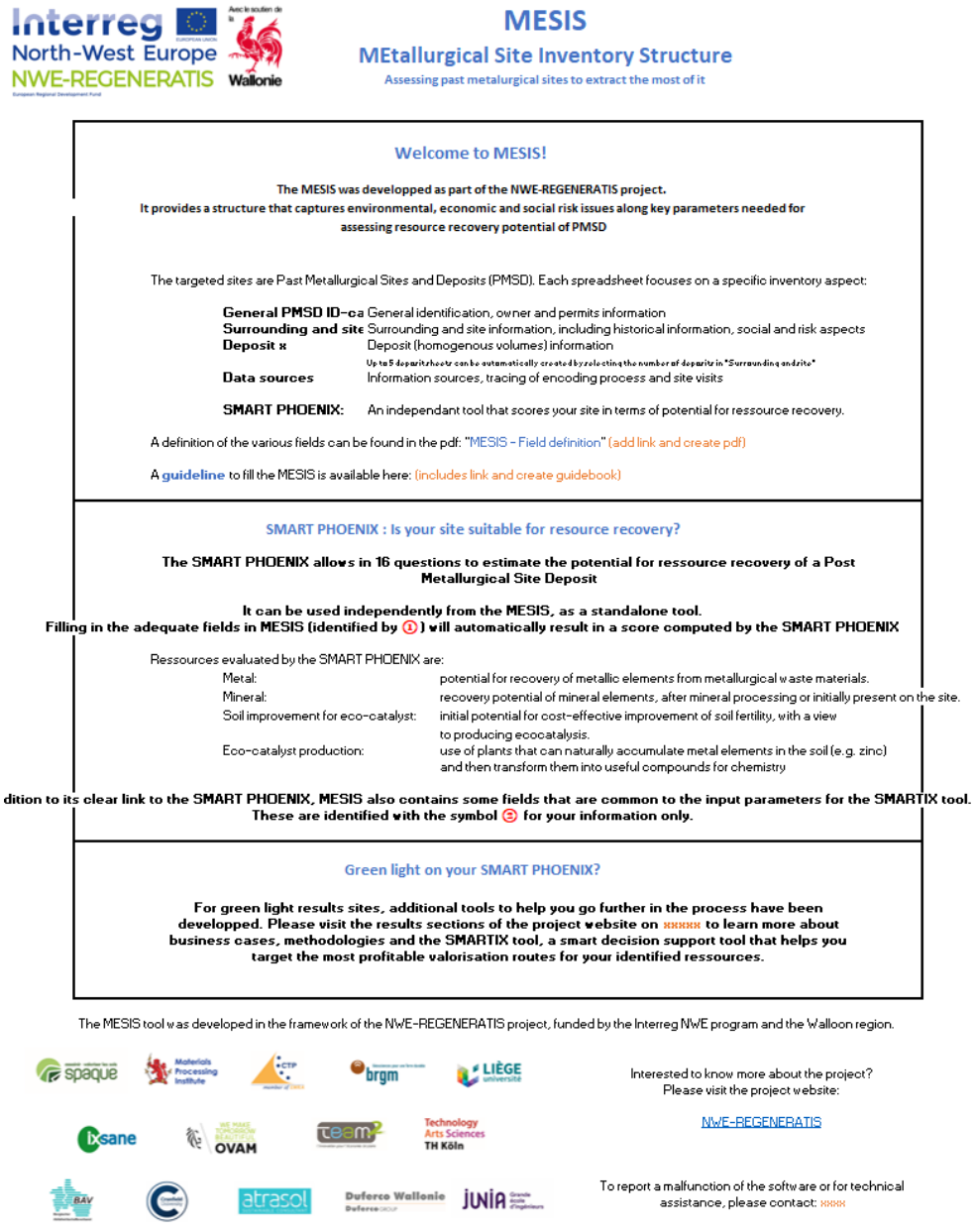


Figure 4 : Welcome to MESIS

2.1.1.2 General PMSD ID-cart

The second sheet of the MESIS tool is dedicated to capturing general and administrative information related to the PMSD (Past Metallurgical Site Deposit). Users can fill this sheet with key details about the site, including its identification such as name, address, coordinates, surface area, and the responsible administration overseeing it.

Furthermore, this sheet enables users to record the historical and current ownership and operation of the PMSD. It provides a space to document the relevant names, specify whether the owner/operator is public or private, indicate the start and end dates of their involvement, and include the corresponding NACE code.

Additionally, the sheet allows users to list the permits and authorizations associated with the PMSD. Users can provide references for each permit, specify the authorisation dates, indicate the expiration date, describe the nature of the permit, and include the name of the permit/authorisation holder.

By collecting this comprehensive set of information, the second sheet of the tool ensures that users have a well-rounded understanding of the general and administrative aspects of the PMSD.

Is your site a PMSD*? ①

*Past Metallurgical Sites and Deposits (PMSD) are either 1) sites where a metallurgical activity took place at some time, or 2) sites that contain a deposit of metallurgical origin.

General PMSD Information	
Name:	
Other name 1:	
Other name 2:	
Other name 3:	
Ref:	
Country:	
City:	
Postal Code:	
Street:	
Code NUTS:	
X / Longitude (WGS 84):	°
Y / Latitude (WGS 84):	°
Site area (m^2):	
Administration in charge:	
Administration adress:	

Current/ past ownership and operation					
Name	Owner or operator	Public/private	Start date (year)	End date (year)	NACE code

Permits and authorisations list						
N°	Reference	Date (year) of autorisation	Expiration date (year)	Nature of permit	Permit description	Permit/ Authorisation Holder
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						

Figure 5 : Structure of the General PMSD ID-cart

2.1.1.3 Surroundings and site

The third sheet of the tool is dedicated to describing the site surroundings and other information about the site in general. It provides comprehensive information not specific to a single deposit but covering various aspects related to the entire site and its surroundings. The following topics are included:

- General site and surrounding information
  - Before investigation:
    - Does the site contain a landfill, deposit or backfill with possible metallic residues (mainly Pb, Cu, Zn and Fe)?

        - Must the site / an area of the site be rehabilitated?
        - Is there a known interest for the reconversion of the site (public or private projects/interests) ?
        - Is the site registered in a database ?
        - Is there historical data available?
        - Surface occupied by low vegetation
        - Surface occupied by constructions
        - Surface occupied by trees
        - Is the site easy to access for trucks and heavy equipment?
        - Is the site considered as hazardous?
    - Complementary information on the site :
        - Total site area (m^2) occupied by residues from metallurgical origin (before investigation)
        - Total estimated volume (m^3) of all the deposits (before investigation)
        - Soil and groundwater restriction (related to the presence of hazard)
        - Have any soil pollution investigations happened on the site?
        - Have any remediation actions happened on the site?
        - Does the site still need to be remediated?
        - Urgency of need for remedial actions
        - Did the site receive metallurgical waste from other industries?
        - Does the site have any infrastructure of historical, architectural, or aesthetic (or potential) heritage interest?
        - Presence of a wastewater treatment plant
        - Presence of a railway access nearby (loading dock)
        - Presence of a waterway nearby (loading dock)
        - Area of bare land (ha)
        - Bare land fertility aspects
        - Sealed area (ha)
- Social aspect
    - Current use :
        - Current status (legal use) of the site
        - Current use of the site, regardless of its official use
        - Which activities are currently done on the site?
        - Territorial strategy aspects
        - Intended future site use.
    - General risk evaluation:
        - Severe risk for human health
        - Olfactory pollution
        - Distance from the nearest housing (m):
    - Surroundings,
    - Social support.
- Description of industrial processes (historical information)
- Soil pollution investigations and remedial actions:
    - Soil pollutions investigations done in the past (e.g. studies investigating and delimiting the presence of pollution, risk studies, ...),

- Remedial actions done in the past,
- Remedial actions planned.

SURROUNDING AND SITE

Legend
(1) SMART PHOENIX questions
(=) SMARTIX questions

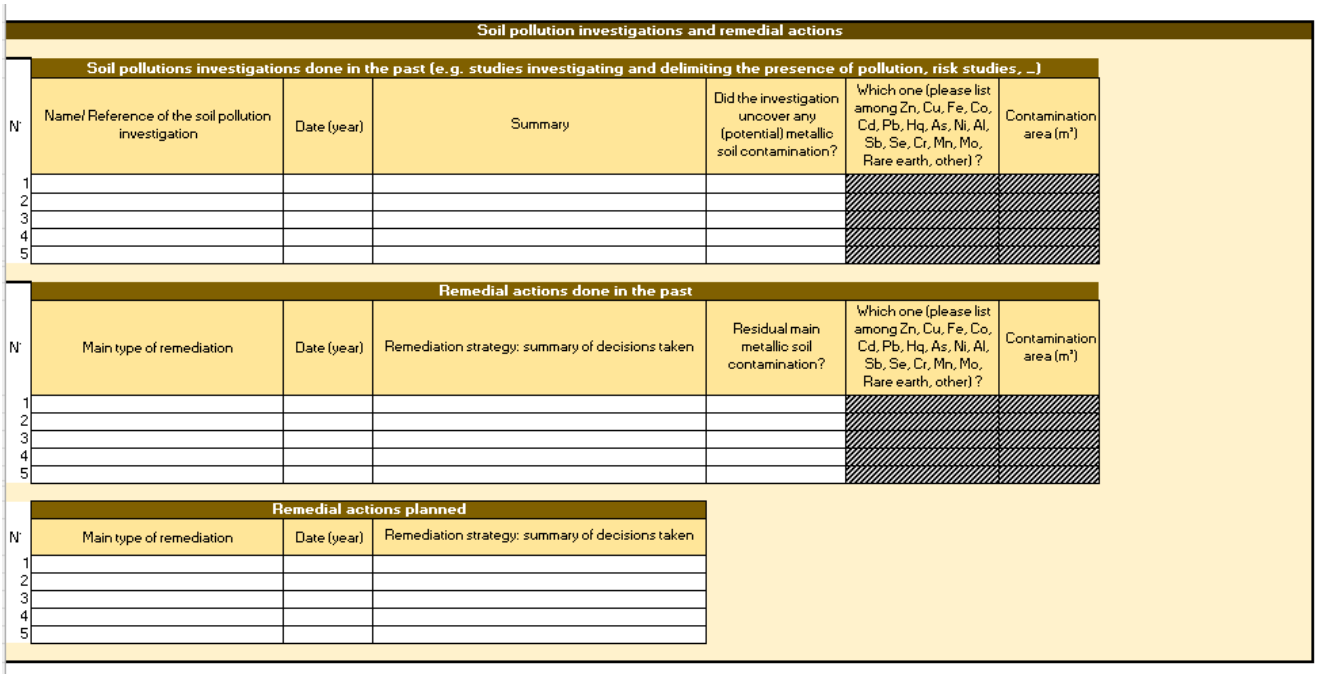
Key information:
How many deposits (homogeneous volumes) are there o 1

General site and surrounding information		
Before investigations	Answer	Confidence level
Does the site contain a landfill, deposit or backfill with possible metallic residues (mainly Pb, Cu, Zn and Fe)? (1)		
Must the site / an area of the site be rehabilitated? (1)		
Is there a known interest for the reconversion of the site (public or private projects/interests) ? (1)		
Is the site registered in a database? (1)		
Is there historical data available? (1)		
Surface occupied by low vegetation: (1)		
Surface occupied by constructions: (1)		
Surface occupied by trees: (1)		
Is the site easy to access for trucks and heavy equipment? (1)		
Is the site considered as hazardous? (1)		
Complementary information on the site		
Total site area (m²) occupied by residues from metallurgical origin (before investigation):		
Total estimated volume (m³) of all the deposits (before investigation):		
Soil and groundwater restriction (related to the presence of		
Have any soil pollution investigations happened on the site?		
Have any remediation actions happened on the site?		
Does the site still need to be remediated?		
Did the site receive metallurgical waste from other industries?		
Does the site have any infrastructure of historical, architectural or aesthetic (or potential) heritage interest?		
Presence of a wastewater treatment		
Presence of a railway access nearby (loading dock):		
Presence of a waterway nearby (loading dock):		
Area of bare land (ha) : (=)		
Bare land fertility aspects (=)		
Sealed area (ha) : (=)		

Social aspects	
Current use	
Current status (legal use) of the site:	
Current use of the site, regardless of its official use:	
Which activities?	
Territorial strategy aspects:	
Intended future site use:	
General risk evaluation	
Severe risk for human health:	
Olfactory pollution:	
Distance from the nearest housing (m):	
Surrounding	
1. Artificial surfaces	
1.1. Urban	
1.2. Industrial, commercial	
1.3. Mine, dump and construction sites	
1.4. Artificial, non-agricultural vegetated areas	
2. Agricultural areas	
3. Forest and semi natural areas	
4. Wetlands	
5. Water bodies	
Social support	
Wishes of local residents or associations to see the site	
Description of the social support	

Description of industrial processes (historical information)

N°	Operator Name	Begining year date	End year date	Public/ Private	Processing details and description	Type of industry	Technologies and processes related to infrastructures and activities	List of inputs	List of outputs (products, coproducts and waste)	Degree of output hazard	Were the outputs valorised in the past?	Waste management	Estimated volume of waste deposit	Presumed pollutants/ Estimation of soil pollution	If there is a risk of suspected pollutants, which ones?
1															
2															
3															
4															
5															
6															
7															
8															
9															
10															



Soil pollution investigations and remedial actions

Soil pollutions investigations done in the past (e.g. studies investigating and delimiting the presence of pollution, risk studies, ...)

N°	Name/ Reference of the soil pollution investigation	Date (year)	Summary	Did the investigation uncover any (potential) metallic soil contamination?	Which one (please list among Zn, Cu, Fe, Co, Cd, Pb, Hg, As, Ni, Al, Sb, Se, Cr, Mn, Mo, Rare earth, other) ?	Contamination area (m²)
1						
2						
3						
4						
5						

Remedial actions done in the past

N°	Main type of remediation	Date (year)	Remediation strategy: summary of decisions taken	Residual main metallic soil contamination?	Which one (please list among Zn, Cu, Fe, Co, Cd, Pb, Hg, As, Ni, Al, Sb, Se, Cr, Mn, Mo, Rare earth, other) ?	Contamination area (m²)
1						
2						
3						
4						
5						

Remedial actions planned

N°	Main type of remediation	Date (year)	Remediation strategy: summary of decisions taken
1			
2			
3			
4			
5			

Figure 6 : Structure of the site and surroundings sheet.

2.1.1.4 Deposit x

Depending on the number of deposits recorded in the "Surrounding and Site" sheet (cell E7), corresponding individual deposit sheets labeled as Deposit x will be available, where x represents the deposit number. These sheets allow for detailed description of each deposit, recognizing that the suitability for material recovery may vary from one deposit to another. The deposit-specific sheets cover the following topics:

- Main description
  - General information
  - Exploitation/production period
  - Waste deposit location
- Technical information:
  - Specific deposit characteristics
  - Rehabilitation status
  - Leachates and drainage
  - Monitoring, gas, other technical information
- Environmental context
  - Risk evaluation
  - Surface water and groundwater vulnerability
  - Geological information
  - Soil and topsoil information
  - Biodiversity

DEPOSIT (Homogeneous volume) 1

Legend
①SMART PHOENIX questions
②SMARTIX questions

Name of deposit 1
Description of deposit 1
Current occupation of deposit 1 compared to all volume of deposit (%)

Main description

General information

Type of residues from metallurgical origin	Presence in deposit 1 ①	Confidence ①	Main Physical state	% (weight)	Total estimated weight (T) ②	Estimated volume (m³)	Bulk Density (T/m³) ②	Waste hazardness (Heavy metals, PAHs, Hydrocarbons) ②
Slag		↑ *please only indicate confidence just above for all types of residues*						
Metal scraps								
Ashes								
Dust								
Sludges								
Refractories								
None from the list								
Total				0%	0	0		

	Answer	Confidence level
Estimated total volume of the residues from metallurgical origin (m³) in deposit 1 ①		
Estimated surface occupied by deposit 1 (m²) ①		
Are the residues clearly separated from each other, or mixed? ①		
Current use of this surface, regardless of the official use of deposit 1 ①		

Exploitation/production period

Beginning date
End date

Waste deposit location:*

Point 1	x coord		y coord	
Point 2	x coord		y coord	
Point 3	x coord		y coord	
Point 4	x coord		y coord	

*Estimated GPS coordinates (WGS) of deposit zone (4 points)

Deposit 1 technical information

Specific deposit characteristics

Origin of the metallurgical waste
Estimated average thickness (m) ②
Estimated average height (above ground) (m)
Estimated average depth (below ground) (m)
Main water content of the excavated materials (above water table) (%)
Estimated proportion of large and hard exogenous material in the deposit ②

Estimated homogeneity ②

Maximum slope ②

Water table ②

Osha classification before excavation (linked with stability, type of material and water table) ②

Rehabilitation status

Rehabilitation status of the surface occupied by deposit 1
Sampling results
Visually observable contamination
Odour perception
Presence of physical barriers to prevent pollutant dispersal

Top layer
Presence of a cover layer at the top

Watertightness layer
Rainwater drainage
Gas drainage

Bottom layer
Presence of a bottom layer
Watertightness layer
Leachate drainage layer

Describe any changes in cover over time

Leachates and drainage

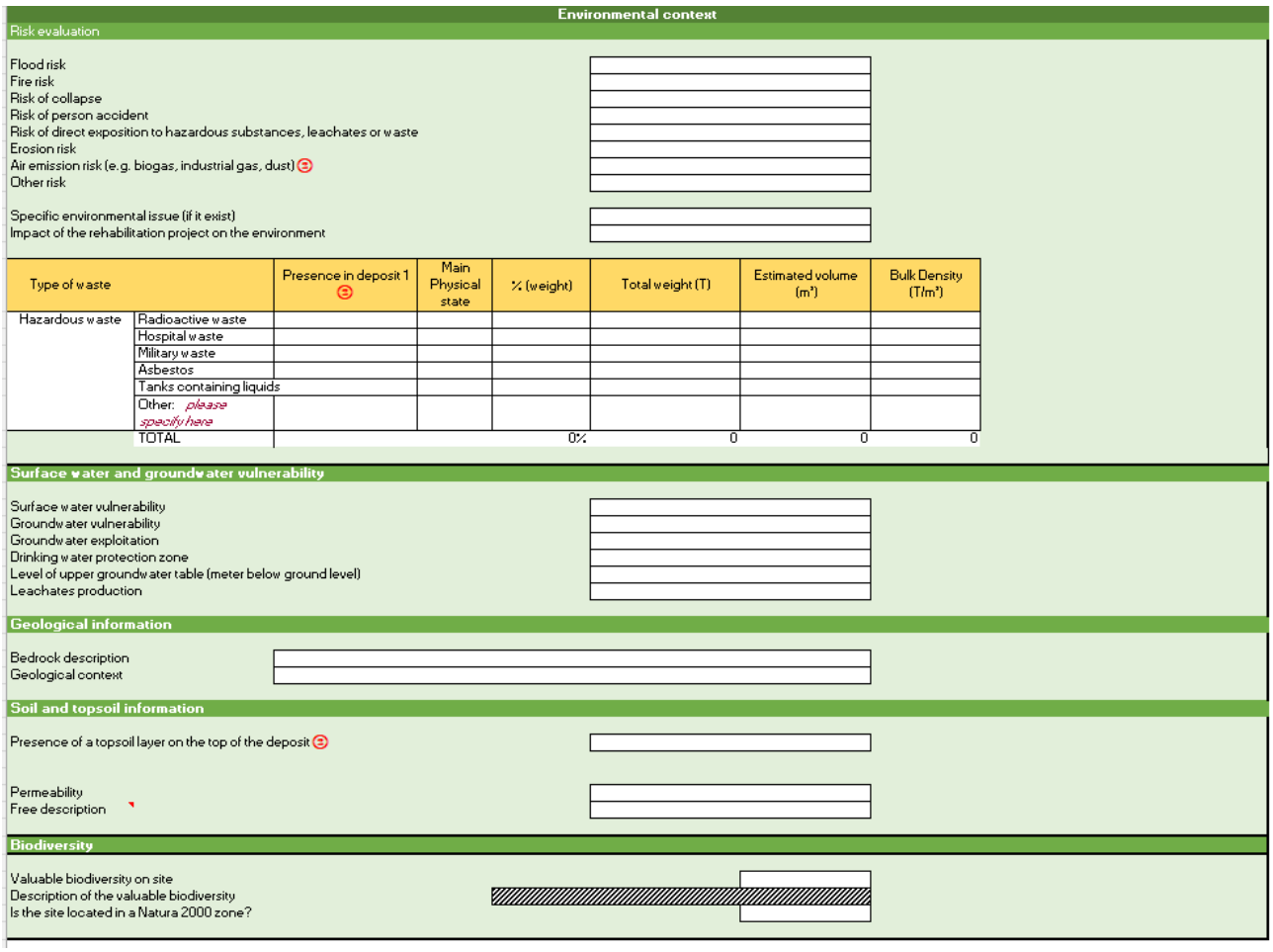
Presence of water/leachates table that can freely flow during works
Water table depth (m)
Presence of a drainage system
Presence of a leachates treatment plant on site
Presence of a leachates treatment plant nearby

Monitoring, gas and other technical information

Presence of a monitoring system still in use?

Presence of biogas ②
Presence of venting system
Presence of monitoring wells

Presence of pipes
Presence of tanks
Presence of cables
Presence of aerial electric lines
Presence of large structure, foundations or underground building (infrastructure)
Presence of sewers
Presence of canals
Presence of available access roads (for trucks)
Nature and condition of the pavement:



Environmental context

Risk evaluation

Flood risk
Fire risk
Risk of collapse
Risk of person accident
Risk of direct exposition to hazardous substances, leachates or waste
Erosion risk
Air emission risk (e.g. biogas, industrial gas, dust)
Other risk

Specific environmental issue (if it exist)
Impact of the rehabilitation project on the environment

Type of waste		Presence in deposit 1	Main Physical state	% (weight)	Total weight (T)	Estimated volume (m³)	Bulk Density (T/m³)
Hazardous waste	Radioactive waste						
	Hospital waste						
	Military waste						
	Asbestos						
	Tanks containing liquids						
	Other: please specify here						
	TOTAL			0%	0	0	0

Surface water and groundwater vulnerability

Surface water vulnerability
Groundwater vulnerability
Groundwater exploitation
Drinking water protection zone
Level of upper groundwater table (meter below ground level)
Leachates production

Geological information

Bedrock description
Geological context

Soil and topsoil information

Presence of a topsoil layer on the top of the deposit

Permeability
Free description

Biodiversity

Valuable biodiversity on site
Description of the valuable biodiversity
Is the site located in a Natura 2000 zone?

2.1.1.5 Data sources

This page serves as a compilation of information on encoding processes and provides a comprehensive list of documents and other sources of information utilized during the completion of the MESIS tool. The purpose of this section is to document and reference the various sources that have been consulted to gather the necessary data for accurately filling the MESIS tool. By documenting the data sources, users can ensure transparency and traceability in the information provided, enhancing the reliability and validity of the MESIS assessment.

2.1.2 Data accuracy

In certain fields within the MESIS tool, users have the option to input the confidence level of their answers. This additional information is crucial for the SMART PHOENIX tool, as it uses both the answers and confidence levels to evaluate the resource recovery potential of the site. By indicating the confidence level, users can provide an indication of the reliability and accuracy of the data provided, allowing for a more robust assessment of the site's potential. This consideration enhances the overall accuracy and effectiveness of the SMART PHOENIX.

2.1.3 Fields definition

To assist users in completing the MESIS tool, detailed definitions of the fields can be found in Appendix 1. This resource provides clear explanations and descriptions of each field within the MESIS tool, ensuring a common understanding of the information required for accurate and comprehensive data input. By referring to the field definitions in Appendix 1, users can

effectively navigate and complete the MESIS tool, promoting consistency and clarity in the data collection process.

Appendix 1: field definitions:

Sheet - General PMSD ID-card	
General PMSD Information	
Questions	**Description**
Is your site a PMSD*? ①	This field indicates whether the site qualifies as a Past Metallurgical Site and Deposit (PMSD). PMSDs are categorized as sites where metallurgical activities occurred in the past or sites that contain deposits of metallurgical origin.
Name:	This field captures the name of the site.
Other name 1:	These fields allow for the inclusion of any alternative names or aliases associated with the site, if applicable.
Other name 2:	
Other name 3:	
Ref:	This field pertains to a reference or identifier associated with the site, which could be a specific code or reference number.
Country:	This field specifies the country in which the site is located.
City:	This field provides the name of the city or town where the site is situated.
Postal Code:	This field indicates the postal code or ZIP code associated with the site's location.
Street:	This field captures the street name or address where the site is situated.
Code NUTS:	The Nomenclature of Territorial Units for Statistics (NUTS) code is a standard classification system used for regional delineation within the European Union. This field represents the NUTS code associated with the site's location.
X / Longitude (WGS 84):	This field specifies the longitude coordinate of the site's location using the World Geodetic System (WGS 84) reference framework.
Y / Latitude (WGS 84):	This field represents the latitude coordinate of the site's location using the World Geodetic System (WGS 84) reference framework.
Site area (m^2):	This field indicates the total area of the site in square meters.
Administration in charge:	This field captures the name or entity responsible for the administration and oversight of the site.
Administration adress:	This field provides the address or contact information of the administration in charge of the site.
Current/ past ownership and operation	

Name	This field captures the name of the owner or operator associated with the site.
Owner or operator	This field specifies whether the entity listed is the owner or operator of the site.
Public/private	This field indicates whether the ownership or operation of the site is public or private.
Start date (year)	This field indicates the year when the ownership or operation of the site began.
End date (year)	If applicable, this field captures the year when the ownership or operation of the site ended. If the site is currently active, this field may be left blank or marked as ongoing.
NACE code	The NACE (Nomenclature of Economic Activities) code is a standard classification system used to classify economic activities. This field represents the NACE code associated with the owner or operator's activities related to the site.
Permits and authorisations list	
Reference	This field captures a unique reference or identification number assigned to each permit or authorization.
Date (year) of autorisation	This field indicates the year when the permit or authorization was granted or issued.
Expiration date (year)	If applicable, this field specifies the year when the permit or authorization is set to expire. If the permit has no expiration date, this field may be left blank or marked as ongoing.
Nature of permit	This field describes the type or nature of the permit or authorization granted. It provides an overview of the regulatory purpose or requirements associated with the permit.
Permit description	This field provides a detailed description or summary of the permit, including specific conditions or restrictions that may be applicable.
Permit/ Authorisation Holder	This field specifies the entity or individual who holds the permit or authorization. It represents the party responsible for complying with the conditions and requirements outlined in the permit.

Sheet - Surrounding and site	
General site and surrounding information	
Before investigations	
Questions	**Description**
Does the site contain a landfill, deposit or backfill with possible metallic residues (mainly Pb, Cu, Zn and Fe)? ①	This question aims to assess whether the site includes any specific areas designated for the disposal of metallic residues, such as landfills, deposits, or backfills. These areas may contain residues primarily composed of metals such as lead (Pb), copper (Cu), zinc (Zn), and iron (Fe). It is important to identify these locations as they may require special attention during the inventory and material recovery process.
Must the site / an area of the site be rehabilitated? ①	This question aims to determine whether the entire site or a specific area within it requires rehabilitation. Rehabilitation typically involves restoring the site to a safe and environmentally sound condition, addressing any contamination or degradation caused by previous metallurgical activities. Identifying the need for rehabilitation is crucial for planning and implementing appropriate strategies for material recovery and overall site improvement.
Is there a known interest for the reconversion of the site (public or private projects/interests) ? ①	This question explores whether there is any documented interest, either from public or private entities, in repurposing or redeveloping the site for different projects or activities. Identifying such interests can help determine potential opportunities for the valorization of materials and the overall economic viability of the site's recovery efforts.
Is the site registered in a database? ①	This question seeks to establish whether the site is registered in any existing databases related to metallurgical sites, environmental remediation, or land management. Being registered in a database can provide valuable information and facilitate access to historical data, regulatory requirements, and potential funding sources for the site's recovery and rehabilitation efforts.
Is there historical data available? ①	This question aims to assess the availability of historical data related to the site's metallurgical activities, previous environmental assessments, or any other relevant information. Historical data can provide valuable insights into the site's past operations, potential contamination sources, and the composition of materials present. Access to such data is crucial for making informed decisions during the inventory and material recovery process.
Surface occupied by low vegetation: ①	This question focuses on determining the extent of the site covered by low vegetation, including grasses, shrubs, or other similar vegetation types. Knowing the surface area occupied by low vegetation is essential for assessing the overall condition of the site and planning appropriate measures for vegetation management during the rehabilitation and material recovery process.
Surface occupied by constructions: ①	This question aims to quantify the surface area of the site that is currently occupied by any existing structures, buildings, or infrastructure. Identifying the surface area occupied by constructions is important for understanding the available space for material recovery operations and

	potential limitations or considerations for site redevelopment. It can also leads to additional costs if destruction is needed.
Surface occupied by trees: ①	This question seeks to determine the surface area covered by trees within the site. It' is important to evaluated th rehabilitation costs.
Is the site easy to access for trucks and heavy equipment? ①	This question evaluates the ease of access for trucks and heavy equipment to the site. Assessing the site's accessibility is vital for logistics planning and ensuring efficient material recovery operations. Factors such as road conditions, nearby transportation routes, and any potential restrictions need to be considered to optimize the transportation of materials and equipment.
Complementary information on the site	
Is the site considered as hazardous? ①	This question addresses whether the site is classified as hazardous according to relevant regulatory frameworks or environmental assessments. Determining the hazardous nature of the site helps identify potential risks, safety measures, and any specific requirements for handling and recovering materials. It also assists in establishing the necessary protocols for worker safety and environmental protection. It has an impact on the cost of the project.
Total site area (m^2) occupied by residues from metallurgical origin (before investigation):	This question aims to determine the total area of the site, in square meters (m^2), that is occupied by residues originating from metallurgical activities. It provides an initial assessment of the extent of metallurgical waste on the site, which is essential for planning material recovery and rehabilitation strategies.
Total estimated volume (m^3) of all the deposits (before investigation):	This question seeks to estimate the total volume, in cubic meters (m^3), of all the deposits present on the site before any investigation has been conducted. Estimating the volume of deposits provides crucial data for assessing the economic feasibility of the metal recovery project and determining the capacity requirements for storage, processing, and transportation.
Soil and groundwater restriction (related to the presence of hazard):	This question addresses whether there are any restrictions on the use of soil and groundwater due to the presence of hazardous substances on the site. Understanding the restrictions is crucial for evaluating potential liabilities, estimating the costs associated with remediation, and assessing the overall financial feasibility of the metal recovery project.
Have any soil pollution investigations happened on the site?	This question focuses on whether any soil pollution investigations have been conducted on the site. Soil pollution investigations provide critical information for assessing the extent and nature of contamination, estimating the costs and techniques required for remediation, and evaluating the financial viability of the metal recovery project.
Have any remediation actions happened on the site?	This question aims to determine whether any remediation actions have been implemented on the site to address soil or groundwater contamination. The information regarding previous remediation actions helps in evaluating the

	effectiveness of the measures taken, estimating the remaining remediation requirements, and assessing the associated costs for the metal recovery project.
Does the site still need to be remediated?	This question seeks to determine whether the site still requires remediation efforts to address any existing contamination or environmental risks. Evaluating the need for remediation is essential for estimating the costs involved, understanding the potential impact on the metal recovery project's profitability, and assessing the feasibility of the overall business case.
Urgency of need for remedial actions:	This question assesses the urgency or priority level for undertaking remedial actions on the site. Understanding the urgency helps in prioritizing the timing of remediation activities, estimating the associated costs, and evaluating the impact on the overall project timeline and financial projections.
Did the site receive metallurgical waste from other industries?	This question aims to identify whether the site has received metallurgical waste from other industries. The information regarding the origin of waste materials helps in evaluating their potential value for recovery and assessing potential partnerships or collaborations with other industries for material sourcing, which can impact the cost and benefit analysis of the metal recovery project.
Does the site have any infrastructure of historical, architectural or aesthetic (or potential) heritage interest?	This question explores whether the site possesses any infrastructure or structures that hold historical, architectural, or aesthetic significance or potential heritage value. Identifying such features is essential for evaluating their potential for adaptive reuse, repurposing, or preservation, which can impact the overall attractiveness and marketability of the metal recovery project, potentially leading to additional benefits and economic value.
Presence of a wastewater treatment plant:	This question focuses on whether there is a wastewater treatment plant located on the site. The presence of a wastewater treatment plant indicates the availability of existing infrastructure, which can reduce the cost of establishing on-site wastewater treatment facilities for the metal recovery project. It positively impacts the cost-benefit analysis by potentially lowering operational costs and environmental compliance expenses.
Presence of a railway access nearby (loading dock):	This question aims to determine if there is a railway access point or loading dock in close proximity to the site. The presence of nearby railway access can significantly impact the logistics and transportation costs associated with the metal recovery project. It provides opportunities for efficient and cost-effective transportation of recovered metals, enhancing the project's economic feasibility and potential profitability.
Presence of a waterway nearby (loading dock):	This question aims to determine if there is a waterway access point or loading dock in close proximity to the site. The presence of nearby waterway access can significantly impact the logistics and transportation costs associated with the metal recovery project. It provides opportunities for efficient

	and cost-effective transportation of recovered metals, enhancing the project's economic feasibility and potential profitability.
Area of bare land (ha) : ②	"bare land" here means an area readily available for vegetation, i.e. an area that has not been sealed off (by concrete, buildings, etc.)
Bare land fertility aspects ②	An estimation of the vegetation density allows to estimate the fertility of the identified bare land.
Sealed area (ha) : ②	Sealed area refers to a waterproof area, that can be for example covered by roads, buildings, or other impervious facilities.

Social aspects	
Current use	
Current status (legal use) of the site:	This question aims to determine the current legal use status of the site. Understanding the legal status helps assess any restrictions or permissions related to the site's current activities and provides insights into the social and regulatory context within which the metal recovery project must operate.
Current use of the site, regardless of its official use:	This question focuses on the current activities taking place on the site, irrespective of its official designated use. It provides an understanding of the site's present social and economic function, which can have implications for community engagement, stakeholder involvement, and the potential social benefits that can be derived from the mineral or metal recovery project.
Which activities?	This question seeks to identify and specify the activities currently taking place on the site. It helps in understanding the diverse range of ongoing operations and potential social interactions, including any community engagement, job creation, or economic benefits associated with these activities.
Territorial strategy aspects:	This question explores the territorial strategy aspects related to the site, such as urban planning considerations, land-use policies, and regional development goals. Understanding the territorial strategy provides insights into the broader social and economic context in which the site operates and helps align the rehabilitation project with the overall development objectives of the region.
Intended future site use:	This question aims to determine the intended future use of the site. Identifying the planned future use helps in understanding the long-term vision for the site and assessing its compatibility with the rehabilitation project. It also provides insights into potential synergies with community development plans, social value creation, and opportunities for sustainable land use post-recovery.
General risk evaluation	

Severe risk for human health:	This question addresses the presence of severe risks to human health associated with the site. It aims to identify potential hazards, contaminants, or other factors that may pose significant health risks to individuals in the vicinity. Understanding the severity of health risks helps in assessing the need for remediation measures, implementing appropriate safety protocols, and evaluating the overall feasibility and social acceptability of the metal recovery project.
Olfactory pollution:	This question explores the presence of olfactory pollution, which refers to unpleasant or noxious odors emitted from the site. Olfactory pollution can impact the quality of life for nearby residents and communities. Assessing the extent and severity of olfactory pollution helps in addressing potential nuisance concerns, implementing mitigation measures, and ensuring a socially acceptable rehabilitation project.
Distance from the nearest housing (m):	This question focuses on determining the distance, in meters (m), between the site and the nearest housing or residential areas. Evaluating the proximity to residential areas helps in understanding potential exposure risks, noise impacts, and community concerns. It is crucial for assessing the social implications of the project, implementing mitigation measures, and maintaining positive relationships with the neighboring communities.
Surrounding	
1. Artificial surfaces	This question examines the presence of artificial surfaces in the surrounding areas, categorized into different types. It includes urban areas, industrial and commercial zones, mine sites, dumpsites, construction sites, and artificial vegetated areas that are non-agricultural. Understanding the distribution and characteristics of these surrounding artificial surfaces helps in assessing the potential impact of the rehabilitation or material recovery project, identifying potential synergies or conflicts, and evaluating the project's compatibility with the surrounding environment.
1.1. Urban	
1.2. Industrial, commercial	
1.3. Mine, dump and construction sites	
1.4. Artificial, non-agricultural vegetated areas	
2. Agricultural areas	This question focuses on the presence of agricultural areas in the vicinity of the project site. Evaluating the nearby agricultural land helps in understanding potential interactions, such as land use conflicts, environmental considerations, and potential opportunities for collaboration or shared resources. It is essential for assessing the social and environmental implications of the rehabilitation or material recovery project and its relationship with the agricultural sector.
3. Forest and semi natural areas	This question addresses the presence of forested and semi-natural areas surrounding the project site. Evaluating the extent and characteristics of nearby forests and semi-natural landscapes helps in understanding potential ecological considerations, biodiversity impacts, and conservation opportunities. It assists in assessing the compatibility of the rehabilitation or material recovery project with the surrounding natural environment and identifying potential environmental benefits or challenges.

4. Wetlands	This question explores the presence of wetlands in the surrounding areas. Wetlands are ecologically sensitive areas that provide important ecosystem services. Assessing the proximity and extent of nearby wetlands helps in understanding potential ecological impacts, water resource considerations, and regulatory requirements. It is crucial for evaluating the compatibility of the rehabilitation or material recovery project, identifying potential mitigation measures, and preserving the integrity of wetland ecosystems.
5. Water bodies	This question focuses on the presence of water bodies, such as rivers, lakes, or streams, in the vicinity of the project site. Evaluating the proximity and characteristics of nearby water bodies helps in understanding potential water resource interactions, impacts on aquatic ecosystems, and regulatory considerations. It is essential for assessing the environmental implications of the rehabilitation or material recovery project, implementing appropriate water management practices, and safeguarding water quality and biodiversity.
Social support	
Wishes of local residents or associations to see the site rehabilitated	This question explores the desires and preferences of local residents or community associations regarding the rehabilitation of the site. It aims to assess the level of support and interest from the local community in seeing the site restored or revitalized. Understanding the wishes of local residents or associations provides valuable insights into the social acceptance, potential collaborations, and community engagement opportunities for the rehabilitation project. It helps in aligning the project with the aspirations and needs of the surrounding community.
Description of the social support	This question seeks a general description of the social support available for the project. It involves understanding the level of backing, cooperation, or endorsement from various stakeholders, including local residents, community organizations, government agencies, or other relevant social entities. Describing the social support helps in evaluating the project's social sustainability, identifying potential partnerships, and ensuring effective stakeholder engagement throughout the rehabilitation process.

Description of industrial processes (historical information)	
Operator Name	-
Begining year date	-
End year date	-
Public/ Private	-
Processing details and description	This field captures the processing details and provides a comprehensive description of the historical industrial processes that took place on the site. It includes information about the specific technologies, methods, and procedures employed in the industrial activities. Understanding the processing details is crucial for assessing the types of materials used, identifying potential sources of recoverable materials, and informing the estimation of the materials that

	could be recovered during the rehabilitation or material recovery project.
Type of industry	This field focuses on identifying and categorizing the type of industry that operated on the site. It includes the specific sector or field in which the industrial activities were carried out, such as metallurgy, manufacturing, chemical production, etc. Understanding the type of industry provides insights into the nature of the processes, the types of materials typically involved, and helps in estimating the potential recoverable materials that may be present on the site.
Technologies and processes related to infrastructures and activities	This field captures the technologies and processes that were utilized in the infrastructure and activities on the site. It includes details about specific machinery, equipment, or systems that were integral to the industrial operations. Understanding the technologies and processes helps in assessing the potential for material recovery, identifying the types of equipment or infrastructure that may contain recoverable materials, and informing the estimation of recoverable materials during the rehabilitation or material recovery project.
List of inputs	This field involves listing the inputs, such as raw materials, chemicals, or energy sources, that were used in the historical industrial processes on the site. It provides an inventory of the resources consumed during operations and aids in identifying potential sources of recoverable materials. Understanding the list of inputs helps in estimating the types and quantities of materials that could potentially be recovered during the rehabilitation or material recovery project.
List of outputs (products, coproducts and waste)	This field captures the list of outputs generated as a result of the historical industrial activities. It includes products, co-products, and waste materials. Understanding the outputs is crucial for estimating the potential recoverable materials. It helps in identifying valuable products or co-products that could be recovered and utilized, as well as waste materials that may contain recoverable resources. This information informs the estimation of recoverable materials during the rehabilitation or material recovery project.
Degree of output hazard	This field assesses the degree of hazard associated with the outputs generated from the historical industrial activities. It helps in categorizing the level of potential environmental impact or risks associated with the materials produced or released on the site. Understanding the degree of output hazard is important for evaluating the feasibility and safety considerations of recovering and handling materials during the rehabilitation or material recovery project, particularly for hazardous or potentially harmful substances.

Were the outputs valorised in the past?	This field explores whether the outputs generated from the historical industrial activities were valorized or utilized in the past. It helps in understanding if any materials were recovered, recycled, or reused, indicating potential opportunities for material recovery in the present. This information assists in estimating the feasibility and viability of recovering and valorizing materials during the rehabilitation or material recovery project.
Waste management	This field focuses on documenting the waste management practices that were implemented during the historical industrial operations on the site. It includes information about how waste materials were handled, stored, treated, or disposed of. Understanding the waste management practices helps in identifying potential areas where recoverable materials may have been discarded, providing insights for estimating the recoverable materials during the rehabilitation or material recovery project.
Estimated volume of waste deposit	This field captures the estimated volume of waste deposits resulting from the historical industrial activities on the site. It provides an approximation of the quantity of waste materials that have accumulated over time. Understanding the estimated volume of waste deposit assists in estimating the potential quantity of recoverable materials present within the waste deposits. This information informs the planning and estimation of the material recovery potential during the rehabilitation or material recovery project.
Presumed pollutants/ Estimation of soil pollution	This field focuses on identifying the presumed pollutants or providing an estimation of soil pollution resulting from the historical industrial activities on the site. It involves assessing the types of contaminants that are likely to be present in the soil based on the known industrial processes, inputs, and outputs. Understanding the presumed pollutants or estimating the extent of soil pollution helps in identifying the specific materials of interest for recovery and determining the necessary remediation or treatment measures during the rehabilitation or material recovery project.
If there is a risk of suspected pollutants, which ones?	This field explores the presence of suspected pollutants that pose a potential risk based on the historical industrial activities on the site. It involves identifying specific contaminants that are of concern due to their potential environmental impact or human health hazards. Understanding the risk of suspected pollutants helps in prioritizing the assessment, remediation, and material recovery efforts. It provides insights into the potential challenges and considerations associated with the recovery and handling of materials during the rehabilitation or material recovery project.

Soil pollution investigations and remedial actions
This section focuses on soil pollution investigations and remedial actions conducted in the past, as well as planned actions for the rehabilitation or material recovery project. It provides information about the studies and investigations carried out to assess and delineate the presence of pollution in the soil, risk

assessments, and other relevant studies. The section also includes details about remedial actions undertaken previously to address soil contamination and any planned remediation strategie
Soil pollutions investigations done in the past (e.g. studies investigating and delimiting the presence of pollution, risk studies, …)
The soil pollution investigations subsection lists the name/reference of each investigation, along with the corresponding date (year) and a summary of the findings. It identifies whether the investigations uncovered any (potential) metallic soil contamination and specifies the contaminants involved, such as Zn, Cu, Fe, Co, Cd, Pb, Hg, As, Ni, Al, Sb, Se, Cr, Mn, Mo, Rare earth, or others. Additionally, the contamination area in square meters is provided to indicate the extent of the identified pollution.
Remedial actions done in the past
This subsection outlines the remedial actions undertaken previously to address soil contamination. It includes the main type of remediation, the date (year) when the actions were carried out, and a summary of the decisions taken regarding the remediation strategy. It indicates whether residual main metallic soil contamination remains after the remedial actions and lists the specific contaminants involved. The contamination area in square meters is also provided to indicate the coverage of the remediated area.
Remedial actions planned
The subsection on remedial actions planned outlines the main types of remediation intended for the site. It includes the date (year) when the actions are planned to be executed and provides a summary of the decisions taken regarding the remediation strategy. This information reflects the future plans for addressing any remaining soil contamination or implementing additional remediation measures.

Sheet -Deposit	
Main description	
General information	
The table provides an overview of the different types of residues originating from metallurgical processes and their presence in deposit. It includes information about the confidence level of their presence.	
Type of residues from metallurgical origin	This column lists various types of residues that can be associated with metallurgical processes, such as slag, metal scraps, ashes, dust, sludges, and refractories. Additionally, there is an option to indicate "None from the list" if there are no residues from the specified categories present.
Presence in deposit 1 ①	This column indicates the presence or absence of each type of residue in deposit 1. It signifies whether the specific residue is found within the deposit.
Confidence ①	The confidence level column indicates the degree of certainty regarding the presence of each type of residue in deposit. The confidence level can vary based on available data, historical records, or site investigations.
Main Physical state	This column describes the primary physical state of the residues, such as solid, liquid, or particulate form.
% (weight)	This column represents the percentage (by weight) of each residue type within deposit. It quantifies the proportion of each residue relative to the total weight of the deposit.
Total estimated weight (T) ②	This column provides the total estimated weight of all residues present in deposit 1, measured in metric tons (T).
Estimated volume (m^3)	This column presents the estimated volume occupied by the residues in deposit 1, measured in cubic meters (m^3). The volume estimation takes into account the physical characteristics of the residues and their arrangement within the deposit.
Bulk Density (T/m^3) ②	This column indicates the bulk density of the residues in deposit 1, measured in metric tons per cubic meter (T/m^3). The bulk density reflects the mass of the residues per unit volume.
Waste hazardness (Heavy metals, PAHs, Hydrocarbons) ②	This column provides information about the hazardous nature of the residues in terms of heavy metals, polycyclic aromatic hydrocarbons (PAHs), and hydrocarbons. It indicates whether the residues present a potential risk due to the presence of these hazardous substances.
Estimated total volume of the residues from metallurgical origin (m^3) in deposit 1 ①	This question seeks to determine the estimated total volume of residues originating from metallurgical processes present in deposit. It is measured in cubic meters (m^3). The estimation takes into account the combined volume of all types of residues within the deposit.

Estimated surface occupied by deposit 1 (m^2) ①	This question aims to assess the surface area occupied by deposit. It provides an estimation of the extent of the physical footprint of the deposit, measured in square meters (m^2). The surface area indicates the spatial coverage of the deposit within the site.
Are the residues clearly separated from each other, or mixed? ①	This question investigates the physical arrangement and composition of the residues within deposit. It determines whether the different types of residues are clearly separated from each other or if they are mixed together. Understanding the separation status helps in evaluating the feasibility and efficiency of material recovery processes.
Current use of this surface, regardless of the official use of deposit 1 ①	This question focuses on the present utilization of the surface occupied by deposit 1. It seeks information about the activities taking place on the surface, irrespective of its official designated use. This information provides insights into the existing conditions and potential restrictions or considerations for the material recovery or rehabilitation project.

Deposit 1 technical information	
Specific deposit characteristics	
Origin of the metallurgical waste	This characteristic identifies the source or origin of the metallurgical waste found within the deposit. It provides insights into the specific industries or processes from which the waste materials originated.
Estimated average thickness (m) ②	This characteristic refers to the average vertical thickness of the deposit, measured in meters (m). It provides an estimation of the depth of the waste materials present within the deposit.
Estimated average height (above ground) (m)	This characteristic describes the average height of the deposit above the ground level. It helps determine the vertical extent of the deposit from the surrounding terrain or reference point.
Estimated average depth (below ground) (m)	This characteristic indicates the average depth of the deposit below the ground level. It provides information about the vertical extent of the deposit beneath the surface.
Main water content of the excavated materials (above water table) (%)	This characteristic pertains to the water content of the excavated materials within the deposit, specifically above the water table. It represents the percentage of water present in the excavated materials.
Estimated proportion of large and hard exogenous material in the deposit	This characteristic assesses the proportion of large and hard exogenous materials present within the deposit. It helps in understanding the composition and distribution of different materials within the deposit.

Estimated homogeneity ②	This characteristic refers to the degree of homogeneity or uniformity of the deposit. It provides an estimation of how consistent the composition and properties are throughout the deposit.
Proportion of hard material (IS>3MPa) in the heterogeneous mass	This characteristic indicates the proportion of hard materials with an intact strength (IS) value greater than 3 Megapascals (MPa) within the heterogeneous mass of the deposit. It helps in assessing the presence of solid and stable materials within the deposit.
Maximum slope ②	This characteristic specifies the maximum slope or incline present within the deposit. It provides information about the steepness or gradient of the deposit's surface.
Water table ②	This characteristic describes the level of the water table in relation to the deposit. It indicates the depth at which groundwater is encountered within or around the deposit.
Osha classification before excavation (linked with stability, type of material and water table) ②	This characteristic refers to the classification of the deposit based on Osha regulations before any excavation or remediation activities. It takes into account factors such as stability, type of material, and water table to determine the appropriate Osha classification. For more information, please consult: https://www.osha.gov/vtools/construction/soil-testing-fnl-eng-web-transcript
Rehabilitation status	
Rehabilitation status of the surface occupied by deposit 1	This question assesses the current status of rehabilitation efforts for the surface area occupied by deposit 1. It aims to determine whether any rehabilitation measures have been undertaken to restore or improve the condition of the surface.
Sampling results	This question refers to the results of sampling activities conducted on the surface occupied by deposit 1. It indicates whether samples have been collected and analyzed to assess the presence and extent of contamination.
Visually observable contamination	This question evaluates whether there are visible signs of contamination on the surface. It involves visual inspection to identify any apparent indications of pollution or undesired substances.
Odour perception	This question relates to the presence of odours that can be detected on the surface. It investigates whether there are any noticeable smells or odours associated with the deposit or potential contaminants.
Presence of physical barriers to prevent pollutant dispersal	This question focuses on the existence of physical barriers implemented to prevent the dispersal of pollutants from the deposit. It aims to determine whether any structures or

	measures are in place to restrict the movement of contaminants.
Top layer	
Presence of a cover layer at the top	This question focuses on the presence of a cover layer specifically at the top of the deposit. It aims to determine if there is a designated layer designed to separate the deposit from the surrounding environment.
Watertightness layer	This question assesses the presence of a watertight layer within the cover system. It determines whether there is a barrier to prevent the infiltration or movement of water through the deposit.
Rainwater drainage	This question focuses on the drainage system in place to manage rainwater on the surface occupied by deposit. It investigates whether there are provisions for collecting and directing rainwater to prevent its accumulation or potential effects on the deposit.
Gas drainage	This question pertains to the presence of a gas drainage system on the surface. It aims to determine if there are measures in place to control or mitigate the release of gases that may be associated with the deposit or potential contaminants.
Bottom layer	
Presence of a bottom layer	This question explores the presence of a bottom layer beneath the deposit. It investigates whether there is a designated layer or barrier at the bottom to prevent the downward movement or leaching of contaminants.
Watertightness layer	If there is a bottom layer, this question assesses the presence of a watertight layer within the bottom system. It determines whether there is a barrier to prevent the migration of water or leachate from the deposit.
Leachate drainage layer	This question focuses on the presence of a drainage layer specifically designed to manage leachate within the bottom system. It investigates whether there are provisions for collecting and directing leachate to prevent its accumulation or potential effects.
Describe any changes in cover over time	This question seeks a description of any observed changes or modifications made to the cover layer over time. It aims to capture the evolution or updates in the cover system, including any adjustments, repairs, or replacements that may have occurred.
Leachates and drainage	
Presence of water/ leachates table that can freely flow during works	This question investigates whether there is a water or leachate table present on the site that can freely flow during construction or remediation activities. It aims to assess the

	potential for water accumulation or movement during such works. It has an impact on the soil stability and the cost of the remediation project.,
Water table depth (m)	This question aims to determine the depth of the water table at the site. It provides information on the distance from the ground surface to the level of saturated groundwater and helps evaluate the potential impact on site activities and environmental considerations.
Presence of a drainage system	This question assesses whether there is a drainage system in place at the site. It explores whether there are measures implemented to collect and manage water or leachate runoff, preventing its accumulation or potential impacts.
Presence of a leachates treatment plant on site	This question focuses on the existence of a leachate treatment plant located directly on the site. It aims to determine whether there are facilities available for treating leachate generated from the site's activities or waste deposits.
Presence of a leachates treatment plant nearby	This question explores the proximity of a leachate treatment plant to the site. It investigates whether there are treatment facilities situated in the vicinity that can potentially handle leachate from the site, even if they are not located directly on-site.
Monitoring, gas and other technical information	
Presence of a monitoring system still in use?	This question aims to determine whether a monitoring system is currently operational at the site. It assesses the ongoing monitoring efforts and indicates the presence of an active monitoring program.
Specify what is monitored (e.g. air, groundwater, surface water, biodiversity)	Specify what is monitored (e.g., air, groundwater, surface water, biodiversity): This question seeks to identify the specific parameters or environmental components that are being monitored at the site. It can include air quality, groundwater quality, surface water quality, biodiversity, or any other relevant factors.
Presence of (bio)gas ②	This question investigates the presence of (bio)gas at the site. Biogas is generated by organic decomposition and may be present in landfills, waste deposits, or other areas. Its detection is important for safety and environmental considerations.
Presence of venting system	This question assesses whether there is a venting system in place at the site. Venting systems are designed to control and release gases, such as biogas, to minimize potential risks or environmental impacts.
Presence of monitoring wells	This question focuses on the presence of monitoring wells at the site. Monitoring wells are

	typically used to assess groundwater quality and levels, providing valuable information for environmental monitoring and management.
Presence of pipes	These questions explore the presence of various infrastructure components at the site, such as pipes, tanks, cables, and aerial electric lines. They help assess the existing infrastructure and potential considerations for material recovery projects.
Presence of tanks	
Presence of cables	
Presence of aerial electric lines	
Presence of large structure, foundations or underground building (infrastructure)	This question investigates the presence of large structures, foundations, or underground buildings within the site. It provides insights into the site's infrastructure and potential challenges or opportunities for rehabilitation and material recovery projects. It may induce demolition cost.
Presence of sewers	This question aims to determine the presence of sewers at the site. They assess the existing water drainage and management systems, which are crucial for environmental considerations and site rehabilitation. It may induce demolition cost.
Presence of canals	This question investigates the presence of canals at the site. Canals are artificial waterways constructed for navigation, irrigation, or drainage purposes. Assessing their existence helps determine the availability of water transportation infrastructure.
Presence of available access roads (for trucks)	This question focuses on the availability of access roads for trucks at the site. It assesses the existing transportation infrastructure and logistics considerations for material recovery projects or other activities.
Nature and condition of the pavement:	This question seeks information on the nature and condition of the pavement at the site. It provides insights into the accessibility, safety, and suitability of the site's infrastructure for various activities, including material recovery projects.
Environmental context	
Risk evaluation	
Flood risk	This question examines the risk of flooding at the site. It considers the likelihood and potential consequences of flooding, which can impact the project's operations, infrastructure, and overall environmental management.
Fire risk	This question assesses the risk of fire at the site. It considers factors such as the presence of flammable materials, ignition sources, and fire prevention measures to ensure the safety of personnel, infrastructure, and surrounding areas.
Risk of collapse	This question investigates the risk of structural collapse at the site. It considers the stability of existing structures, excavations, or underground

	facilities to ensure the safety of workers and mitigate potential hazards.
Risk of person accident	This question focuses on the risk of personal accidents at the site. It considers factors such as the presence of hazardous materials, safety protocols, and training to minimize the potential for accidents and ensure the well-being of workers.
Risk of direct exposition to hazardous substances, leachates or waste	This question examines the risk of direct exposure to hazardous substances, leachates, or waste materials at the site. It considers the potential health and environmental impacts of exposure and the measures in place to mitigate such risks.
Erosion risk	This question assesses the risk of erosion at the site. It considers factors such as soil stability, surface water runoff, and erosion control measures to prevent soil erosion and minimize sedimentation in surrounding areas.
Air emission risk (e.g. biogas, industrial gas, dust) ②	This question focuses on the risk of air emissions at the site. It considers the potential release of gases, particulate matter, or dust that may have environmental or health implications. It includes specific mention of biogas, industrial gases, and dust emissions.
Other risk	This question allows for the identification and assessment of any additional risks not covered by the previous questions. It provides an opportunity to address specific concerns or unique environmental issues associated with the site.
Which type of risk?	
Specific environmental issue (if it exist)	This question investigates any specific environmental issues or concerns associated with the site. It provides an opportunity to highlight and evaluate any known environmental challenges or sensitive areas that may require special attention during the project.
Impact of the rehabilitation project on the environment	This question examines the potential environmental impact of the rehabilitation project itself. It considers the overall effect of the project on the surrounding environment, including positive changes, mitigation measures, and any potential negative consequences that need to be addressed.

Table about waste	The table provides a summary of the types of waste present in deposit 1. It categorizes the waste into different types and assesses their presence, physical state, weight percentage, total weight, estimated volume, and bulk density. Here is a description of the table: Type of waste: This column specifies the different types of waste that are being evaluated. It includes categories such as hazardous waste, radioactive waste, hospital waste, military waste, asbestos, tanks containing liquids, and an "Other" category for any additional waste types that may be specified. Presence in deposit 1: This column indicates whether each waste type is present in deposit 1. It provides information on whether the particular waste category is found within the specified deposit. Main physical state: This column describes the predominant physical state of each waste type. It may indicate whether the waste is in solid, liquid, or gaseous form. % (weight): This column represents the weight percentage of each waste type within deposit 1. It provides an estimation of the proportion of each waste category relative to the total weight of materials in the deposit. Total weight (T): This column shows the total weight of each waste type in metric tons (T). It reflects the cumulative weight of the specific waste category present in deposit. Estimated volume (m^3): This column provides an estimation of the volume occupied by each waste type in cubic meters (m^3). It indicates the overall spatial extent of the waste within the deposit. Bulk Density (T/m^3): This column specifies the bulk density of each waste type, expressed in metric tons per cubic meter (T/m^3). It represents the mass of the waste material per unit volume, indicating its compactness or density.
Surface water and groundwater vulnerability	

Surface water vulnerability	This field assesses the vulnerability of surface water in the vicinity of the site. It refers to the susceptibility of surface water bodies, such as rivers, lakes, or streams, to potential contamination from the site.
Groundwater vulnerability	This field indicates the vulnerability of groundwater in the area surrounding the site. It pertains to the likelihood of groundwater resources being adversely affected or contaminated by activities on the site.
Groundwater exploitation	This field describes the current status of groundwater exploitation in the vicinity of the site. It identifies whether groundwater is actively being used as a source of water supply for various purposes
Drinking water protection zone	This field specifies the presence or absence of a designated drinking water protection zone in the area surrounding the site. It indicates whether specific measures are in place to safeguard the quality and integrity of drinking water sources.
Level of upper groundwater table (meter below ground level)	This field provides information on the depth of the upper groundwater table below ground level. It indicates how deep the groundwater is in relation to the surface, which is important for understanding potential interactions between the site and the groundwater.
Leachates production	This field assesses the production of leachate from the site. Leachate refers to the liquid that drains or leaches from waste materials and can potentially contain pollutants. It provides an indication of the presence and quantity of leachate generated at the site.
Geological information	
Bedrock description	This field provides a description of the bedrock present at the site. It includes information about the type of rock, its composition, structure, and any other relevant geological features. The bedrock refers to the solid rock layer beneath the surface soil and sediments.
Geological context	This field describes the broader geological context of the site. It encompasses the geological formations, processes, and features that are relevant to the site's location. This may include information about the geological history, regional geological structures, and geological hazards associated with the area.
Soil and topsoil information	
Presence of a topsoil layer on the top of the deposit ②	This field indicates whether there is a distinct layer of topsoil present on the top of the deposit. Topsoil refers to the uppermost layer of soil, which is typically rich in organic matter and nutrients and supports plant growth

Permeability	This field describes the permeability of the soil at the site. Permeability refers to the ability of the soil to allow the passage of water and other liquids through it. It provides an indication of how easily water can infiltrate or drain through the soil.
Free description	This field allows for a free-form description of the soil characteristics at the site. It can include additional details about the soil composition, texture, color, consistency, or any other relevant observations.
Biodiversity	
Valuable biodiversity on site	This field indicates the presence of valuable biodiversity on the site. It refers to the existence of diverse and significant plant and animal species, habitats, or ecosystems that contribute to the ecological richness and importance of the site.
Description of the valuable biodiversity	This field allows for a description of the valuable biodiversity present on the site. It may include information about specific species, habitats, ecological communities, or any other notable features that contribute to the biodiversity value of the site.
Is the site located in a Natura 2000 zone?	This field determines whether the site is situated within a Natura 2000 zone. Natura 2000 is a network of protected areas established under the European Union's Birds Directive and Habitats Directive. These areas are designated for the conservation of rare, threatened, or vulnerable species and habitats of European significance.