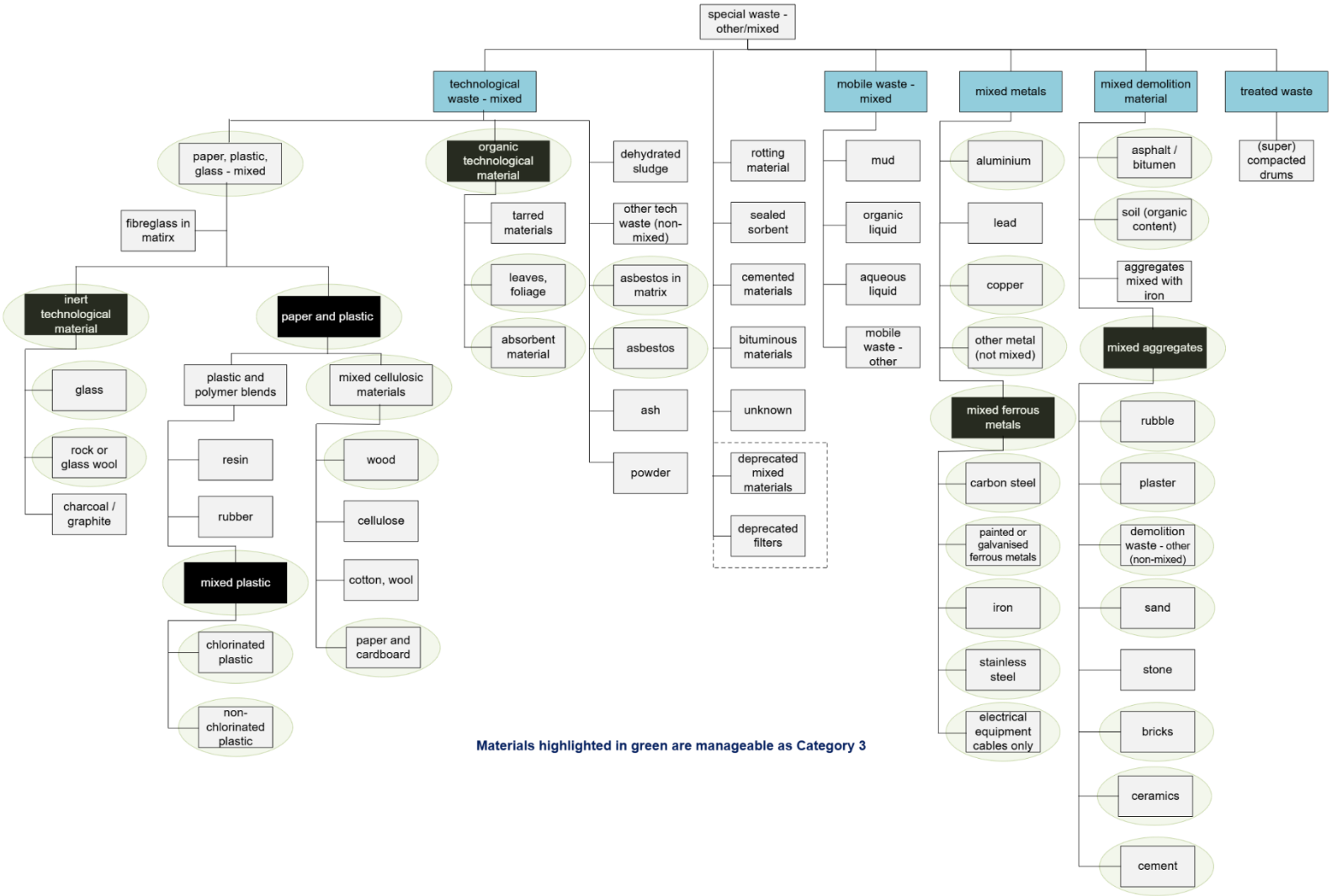


Providing routine waste management services for category 3 materials

CASE STUDY

KP-JRC-018

09/04/2026

This page has been intentionally left blank

Foreword

In 2021, the European Commission (EC) adopted a new proposal for a Council Regulation[1] establishing a dedicated financial programme for decommissioning nuclear facilities and managing radioactive waste. This instrument covers the co-funding of the decommissioning programmes of Bulgaria, Slovakia and the decommissioning of the Joint Research Centre (JRC). A separate Council Regulation[2] was adopted for the decommissioning programme of Lithuania.

The EC JRC is mandated to foster the spread of decommissioning knowledge across all the European Union Member States and facilitate knowledge sharing arising from implementing the above-mentioned decommissioning programmes, funded by the Nuclear Decommissioning Assistance Programme (NDAP).

The decommissioning operators from the NDAP (NDAP Operators) implemented and tested a knowledge management methodology in 2021 through Project ENER/D2/2020-273. Using this methodology, the NDAP Operators can develop knowledge products that are currently available to share with other European stakeholders. In addition, this methodology is being implemented by the JRC Nuclear Decommissioning and Waste Management Directorate (NDWMD), which has become a knowledge generator extracting the knowledge from the ongoing decommissioning activities across the JRC´s four different sites (Geel, Ispra, Karlsruhe and Petten).

The JRC´s NDWMD aims to become a Centre of Excellence in nuclear decommissioning knowledge management and to develop a decommissioning knowledge platform which allows exchanging information building on EU best practices through executing the multi-annual financial framework (2021 – 2027) strategy. The operational phase of the project started in 2024 with the objectives to: develop ties and exchanges among EU stakeholders, document explicit knowledge and make it available through multi-lateral knowledge transfers on decommissioning and waste management governance issues, managerial best practices, technological challenges, and decommissioning processes at both operational and organisational level, as well as to develop potential EU synergies.

This is a knowledge product prepared by the JRC for the Nuclear Decommissioning and Waste Management Directorate (NDWMD) – Directorate J of the Joint Research Centre.

Document code	KP-JRC-018		
Performed by	NDKM Team		
Revised by	Jonathan James Oliver / Francisco Javier Chaparro / Marc Altés i Soler		
Version	V0	23/02/2026	Initial version
	V1	08/04/2026	Final version
Sent to	Mikolaj Maksymilian Semba		
Approved by	Andrea Piagentini		

[1] Council Regulation (Euratom) 2021/100 of 25 January 2021 establishing a dedicated financial program for the decommissioning of nuclear facilities and the management of radioactive waste, and repealing Regulation (Euratom) No 1368/2013

[2] Council Regulation (EU) 2021/101 of 25 January 2021 establishing the nuclear decommissioning assistance programme of the Ignalina NPP in Lithuania and repealing Regulation (EU) No 1369/2013

PRODUCT DESCRIPTION

This knowledge product (KP) sets out: the operational procedures and instructions for the management of the JRC-Ispra site's Category 3 materials under the current removal procedure, including the radiometric measures necessary to confirm the minimum detectable level of radioactivity, as well as the operational procedures and instructions for conducting the process in the Advanced Records System (ARES) until the batch / lot is assigned to the JRC-Ispra waste service of Unit R.I.3 or to any dedicated contractor (e.g. for FAV materials) prior to physical release from the site. Physical release is usually preferred for the purpose of recycling and / or reuse.

ABSTRACT

This KP provides a comprehensive overview of the operational procedures for managing Category 3 materials at the JRC-Ispra site. It details the lifecycle from identification and segregation to radiometric verification and disposal as conventional waste. Main highlights include the challenges encountered during the implementation of the Category 3 management process, such as ensuring compliance with radiometric criteria and managing large volumes of heterogeneous materials, as well as the interfaces between said radiometric criteria and distinctions made for clearable material. Solutions include streamlined workflows in ARES, robust documentation practices and campaigns like the "Blank Campaign for air treatment unit (ATU) filters". Lessons learnt emphasise the importance of early planning, stakeholder coordination and continuous improvement of radiometric protocols. Recommendations focus on enhancing automation in ARES, expanding blank sample libraries and fostering cross-site knowledge exchange.

OBJECTIVE

To record, convey and explain the knowledge gained during the application of the waste management services for Category 3 materials at the JRC's Ispra site.

APPROACH

This KP was developed through referring to the following knowledge inputs: NE.83.2625.A.991.rev3_EN / IT ¨Provide routine waste management services¨ as a contribution to the JRC's Nuclear Decommissioning Knowledge Management (NDKM) Initiative. It provides a readable and engaging high-level overview of the routine services utilised to manage Category 3 materials. This begins with an introduction to the JRC site, work carried out concerning the management of Category 3 materials (i.e. the waste management plan), challenges tackled during implementation and a summary of findings, followed by a comprehensive case study that conveys the following main points:

- guidelines and criteria,
- general procedures for Category 3 materials in ARES,
- batch and continuous production of standard material,
- radiometric measurements, removal and clearance authorisation,
- blank campaign series,
- key takeaways and recommendations.

RESULTS, FINDINGS AND INSIGHTS

The implementation of Category 3 material management at the JRC-Ispra site demonstrates significant efficiency gains through the use of ARES workflows. Key findings include: improved traceability of waste streams, reduced radiometric clearance delays and successful execution of blank sample campaigns for continuous production materials like ATU filters. KPIs such as compliance rate (>98%) and processing time reduction (20%) underscore the effectiveness of the approach.

TARGET USERS

This KP is a valuable contribution to entities involved in routine waste management services for Category 3 materials, or those materials defined similarly with respect to the JRC-Ispra General Removal Procedure, especially for entities of a similar organisational setup which are also carrying out research activities, as well as positioned to inform policy decision making.

APPLICATION, VALUE AND USE

The information contained herein offers insights which detail the approach employed at the JRC-Ispra site to manage Category 3 materials and elaborates how this coincides with the application of the JRC's electronic document management system (ARES) prior to being assigned to the JRC-Ispra waste service. This covers the main activities (material identification, segregation, production, packaging, radiometric measurements etc.) involved in the generation of Category 3 materials in volumes above 5 m^3 because they require a waste management plan. The plan must be prepared before the start of, updated during and, when necessary, adjusted after the end of any works.

This KP is directly applicable to any other JRC sites with an interest in adopting such material management procedures with respect to the release and clearance of material, as well as the same regarding an electronic document management system such as ARES. Furthermore, the general concepts detailed herein are transferable to other nuclear decommissioning operators and key stakeholders who would like to improve, benchmark or otherwise gain a greater understanding of how traceability, compliance and accessibility can be ensured for all stakeholders involved across all aspects of Category 3 material management, from initial through to eventual release and clearance.

KEYWORDS

Decommissioning, management of materials, clearance, exemption, blank sample campaigns, radiometric measurements

TABLE OF CONTENTS

ACRONYMS

ABT	Temporary Buffer Storage Areas
ADR	European Agreement concerning the International Carriage of Dangerous Goods by Road
ARES	Advanced Records System
ATU	Air Treatment Unit
CC	Clearance Coordinator
CER	Catalogue / European Waste Code
CP	Continuous Production
CS	Contamination Survey
DA	Destructive Analysis
EC	European Commission
ECAS	European Commission Authentication System
EMAS	Eco-Management and Audit Scheme
ER	Radiation Protection Expert
FARO	Fuel Melting Experimental Facility
FMB	Functional Mailbox
GSMS	Gamma Spectrometry Monitoring System
HPGe	High Purity Germanium Detector
ISF	Interim Storage Facility
ISO	International Organization for Standardization
ISOCS	In-Situ Object Counting System
KM	Knowledge Management
KP	Knowledge Product
KPI	Key Performance Indicator
LCSR	Laboratory for Hot Studies and Research
MCNP	Monte Carlo N-Particle (code / model)
MDC	Minimum Detectable Concentration
MRL	Radioactive Measures Laboratory
NDA	Non-Destructive Analysis
NDKM	Nuclear Decommissioning Knowledge Management
NDAP	Nuclear Decommissioning Assistance Programme
NDWM	Nuclear Decommissioning and Waste Management
NDWMD	Nuclear Decommissioning and Waste Management Directorate
PMRER	Radiometric Requirements and Measurement
RAA	Request for Alignment Authorisation
RCHL	Radio-Chemical Hot Laboratory

RDA	Request For Analysis
RP	Radiation Protection
RTI / ITD	Director or Installation's Technical Director
SdC	Clearance Sheet
SDS / MSDS	Safety Data Sheet / Material Safety Data Sheet
SdL	Worksheet
SdP	Weight File
SRP & L	Radiation Protection Laboratory
STEL	Liquid Effluent Treatment Station
STRRL	Liquid Radioactive Waste Treatment Station
TABs	Temporary Accumulation Bases
WITS	Waste Inventory and Tracking System
WMP	Waste Management Plan

LIST OF FIGURES

LIST OF TABLES

This page has been intentionally left blank

1. INTRODUCTION

1.1. Background and context

The **Nuclear Decommissioning and Waste Management Directorate** (**NDWMD**) of the **JRC** is running the Nuclear Decommissioning and Waste Management (NDWM) Programme for the nuclear sites of the European Commission (EC), with the majority of the activities currently focused on dormant facilities situated on the Ispra site (located in northern Italy).

In 2020 the Council of the EU issued **Council Regulations 100** and **101** in which they provided **co-funding to the decommissioning programmes in three EU Member States** (Slovakia, Bulgaria and Lithuania), and full funding to the EC's internal **NDWM Programme**, **run by the JRC**. This initiative is commonly known as the **Nuclear Decommissioning Assistance Programme** (**NDAP**).

The same regulations mandated the JRC to initiate a knowledge management project on NDWM, based on the experience and lessons learnt during the implementation of the JRC's and NDAP Operators' decommissioning programmes. The primary products of the KM project, referred to as KPs, will be disseminated to European stakeholders to support new operators entering NDWM activities, enabling them to benefit from knowledge gained through previous experience and programmes.

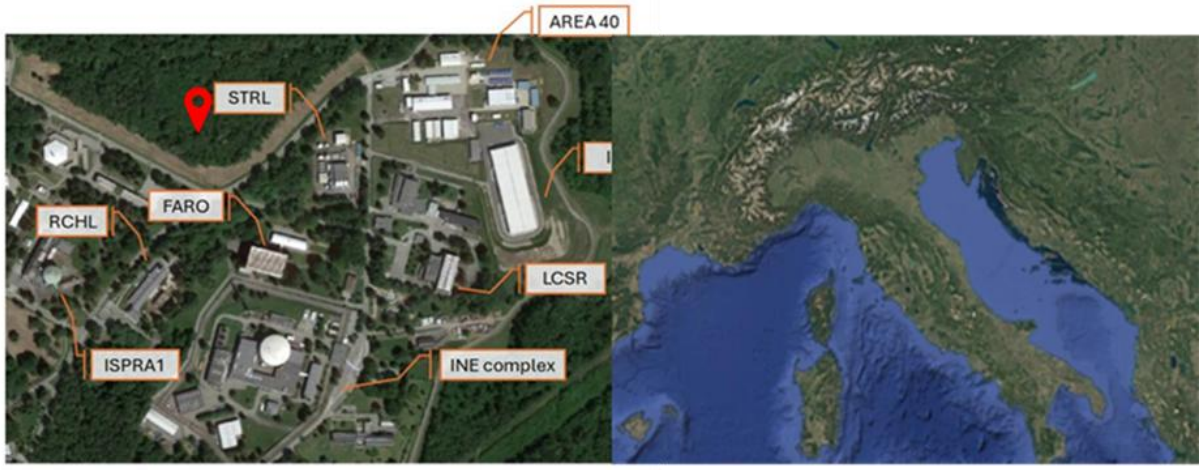


Figure 1. Aerial photo of the JRC-Ispra nuclear installations

This KP builds on the progress made by the NDWM Programme in the past years, specifically as an extension to what has already been provided for **radioactive waste**, **material management** and **clearance programmes**. Because actioning this KP will help to disseminate a unique contribution to the topic of routine management of Category 3 materials stemming from research facilities which, due to not typically being associated with harmful radioactive waste, is seldomly documented in detail.

1.2. Overview of the case study

Numerous nuclear installations on the JRC's Ispra site are currently in the process of or soon to start the process of decommissioning. **The main installations of note are listed below**:

- Radio-Chemical Hot Laboratory (**RCHL**), already **fully decommissioned and released**,
- Fuel Melting Experimental Facility (**FARO**),
- Laboratory for Hot Studies and Research (**LCSR**),
- Liquid Radioactive Waste Treatment Station (**STRRL**), currently no longer in use because it was **replaced by the Liquid Effluent Treatment Station** (**STEL**),
- **Cyclotron**,
- **Waste management area and facilities** (including the Interim Storage Facility (**ISF**), Radioactive Waste Management Station (**SGRR**) and **STEL**),
- **ISPRA 1** (note: as of the 26th of September 2019, it has been **managed by SO.G.I.N. S.p.A.**),
- **INE Complex** (**ESSOR reactor** and associated buildings / laboratories).

This KP elucidates the operational procedures and instructions for the management of Category 3 materials based on the JRC's experience on their Ispra site. This document also sets out the operational procedure and instructions for conducting the process in ARES (prior to the assignation of the waste service on site). It involves all stages of the Category 3 materials management process, from the identification of Category 3 material, its segregation to the definition of the criteria for verifying the absence of artificial radioactivity and, finally, its delivery for disposal outside the JRC-Ispra site.

A high-level schematic of the Category 3 material management process can be seen in Figure 2.

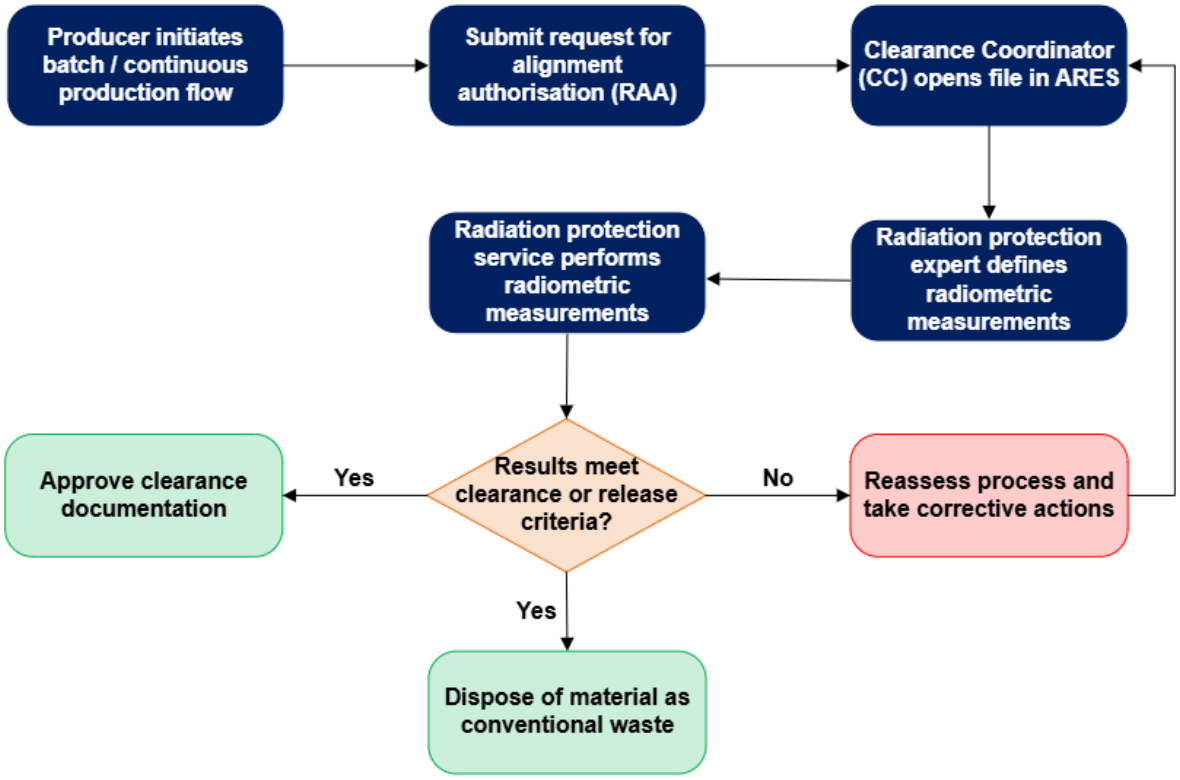


Figure 2. High-level schematic of the Category 3 materials management process

An **example of JRC stewardship** with respect to the routine management of Category 3 materials is the initial **blank sample campaign**, launched in 2021 to manage ATU pre-filters under reference procedure "General procedure for the management of Category 3 materials" [1]. Pre-filters, the first barrier for external air entering ATUs, are replaced periodically, generating significant waste volumes.

Innovation in practice: the initial blank sample campaign

The campaign successfully established a continuous Category 3 materials management flow for these components, supported by:

- ER assessments and ARES documentation,
- comparative analysis of ^{137}**Cs concentrations** for clearance validation,
- annual blank sample collection from conventional areas to expand the blank inventory.

This initiative demonstrates how structured campaigns can transform ad-hoc processes into sustainable workflows, paving the way for similar flows for ATU filters after evaluation by the **Clearance Coordinator** (**CC**) and the **Radiation Protection Expert** (**ER**). The initial campaign was followed by eight other campaigns between 2022 to 2025 (summarised at the end of this document). Said campaigns covered: asphalt, debris (cement / brick), insulation (glass wool / rick wool), soil / sand, ferrous metals, mixed plastics and wood. Although each class of material was different, clear repeated patterns emerged across all datasets for non-classified and classified areas.

2. CASE STUDY

2.1. What are Category 3 materials?

Category 3 materials represent a distinct category within the JRC-Ispra material management framework. They encompass all materials that are not produced by nuclear activities or radiological practices yet can originate from a classified area. These materials typically remain in such areas for a limited period of time and in well-defined positions considered reasonably free from artificial radioactivity.

The above definition ensures that Category 3 materials are low risk but still require systematic verification before disposal. As an extension to the above definition, Category 3 material can be considered all solid materials derived from offices (cabinets, desks, PCs, etc.), waste from ordinary green activities, ordinary activities or extraordinary work carried out, as well as liquid waste (generally varnishes and oils) or waste resulting from the periodic replacement of batteries, lamps, etc.

A key distinction which should be considered for Category 3 materials is that there is a fundamental difference between Category 3 materials and clearable materials. Category 3 materials **are not subject to the Waste Inventory and Tracking System** (**WITS**) **inventory**, whereas clearable materials are subject to the aforementioned inventory.

Key characteristics

Non-nuclear origin: Category 3 materials are not generated by processes involving radioactive substances.

Limited residence time: A **maximum of 10 years** in a classified area is a parameter for classification. This, combined with historical radiological memory, serves as a decisive factor for inclusion in the Category 3 management process.

Defined positioning: Materials must have been stored or used in areas with minimal likelihood of contamination.

Examples of Category 3 materials

Office-derived items: Cabinets, desks, computers and other furniture.

Ordinary maintenance waste: Batteries, lamps, varnishes, oils and similar consumables.

Green activity waste: Materials from landscaping or routine facility upkeep.

Extraordinary work residues: Waste generated during periodic interventions or replacements within facilities.

Why classification matters

Category 3 designation ensures:

Regulatory compliance: Materials undergo radiometric checks before leaving controlled zones.

Operational procedures: Segregation and documentation prevent inadvertent contamination.

Efficiency: Large volumes of heterogeneous materials can be processed without unnecessary restrictions.

Due to the definition of Category 3 materials it can be easy to overlook that they can also be generated in classified areas. Moreover, it is important to note that because Category 3 materials can also be generated within classified areas, it can also lead to misconceptions about their risk profile. Despite their origin, they are generally considered safe for release, provided they meet radiometric criteria. In summary, **Category 3 materials bridge the gap** between **conventional waste** and **radiologically controlled substances**, requiring a structured approach to identification, verification and disposal.

2.1.1. How are Category 3 materials managed?

Managing Category 3 materials is a **strategic process that combines compliance**, **innovation**, and **operational discipline**. While these materials are expected to be free from artificial radioactivity, i.e., satisfy minimum detectable concentration (MDC) levels; this assumption must be **validated through rigorous procedures**. The JRC-Ispra approach reflects a commitment to **precision**, **accountability** and **continuous improvement**, ensuring that operations remain robust and adaptable.

Special management considerations

Category 3 materials are managed under a **comprehensive procedural framework**, which distinguishes between:

Batch production: Materials generated during discrete interventions (e.g., refurbishment projects).

Continuous production: Materials produced at regular intervals, such as ventilation filters and pre-filters.

This distinction is decision factor because it **shapes the management strategy**, influencing planning, documentation and radiometric verification. The management network in force at the JRC-Ispra with respect to Category 3 materials has been detailed in the following subsections (2.1.1.1 to 2.1.1.2).

External expertise

Management activities are supported by an **external firm**, reinforcing the principle that **specialised competence is essential** for radiometric verification and compliance with regulatory standards.

2.1.1.1. Radiological verification

The cornerstone of Category 3 materials management is the **confirmation of zero artificial radioactivity** (**MDC**), achieved through:

- **radiological mapping and site surveys** for preliminary assessment,
- **radiometric measurements**, defined by the ER and documented in the **radiometric requirements and measurement** (**PMRER) module**,
- **blank samples**, which serve as reference points and are periodically updated to maintain reliability.

Unlike other clearance categories, Category 3 materials are not evaluated against radionuclide specific activity limits; they **must not exhibit any detectable activity**.

2.1.1.2. Accountability Framework

Success depends on **clear roles and responsibilities,** as shown below in Table 1.

Table 1. Roles and responsibilities within the Category 3 materials accountability framework

Role	Responsibilities
Producer (**JRC**)	Identifies, segregates and classifies materials; initiates analysis requests.
CC	Ensures compliance, updates procedures and verifies correct application.
ER	Defines radiometric criteria, prescribes measurements and issues approvals.
SRP & L Service	Performs measurements and archives results in ARES.
License Holder	Authorises final delivery as conventional waste.
NEMO	Oversees compliance with environmental policy under EMAS certification.

This **management network ensures traceability and legal compliance**, from initial identification to final disposal.

2.2. Guidelines and criteria

The release of Category 3 materials from the JRC-Ispra site occurs **only after successful completion of the management process** outlined in this document. This process culminates in **radiometric measurements confirming the absence of artificial radioactivity (i.e. confirms MDC)**.

2.2.1. General guidelines on Category 3 materials

The guidelines and criteria adhered to ensure that the materials can be managed as **conventional waste** in compliance with:

- **environmental legislation, i.e. Legislative Decree No. 152/06**, as amended [2],
- **site-specific procedures** governing waste streams.

This section establishes the foundational principles for managing Category 3 materials, emphasising compliance, documentation and segregation to maintain integrity throughout management.

2.2.1.1. Nature of Category 3 materials

Most materials resulting from the **safe preservation and maintenance of JRC-Ispra installations** are conventional in nature. These include:

- **technological waste**: packaging, consumables and materials used during operational activities,
- **metallic components**: piping, pumps, valves, appliances, motors and electrical switches.

Statistically, **only about 3% of all material and waste generated at nuclear installations constitutes radioactive waste**, underscoring the importance of efficient clearance and release procedures for the remaining majority.

2.2.1.2. Criteria for conventional waste classification

Solid or liquid materials (e.g., oils, paints) originating from classified areas can be considered conventional waste if:

- **historical zero**: operational history confirms no contact with active or contaminated substances or fluids,
- **logical zero**: materials were never exposed to direct or nearby neutron flows,
- **instrumental zero**: radiological data and measurements confirm absence of artificial radioactivity.

The criteria listed above form the basis for managing such materials under the **Category 3 process**.

2.2.1.3. Documentation and traceability

Reconstructing the operational history of an object is essential. Best practices include:

- collecting supporting documentation in the **Waste Management Plan** (**WMP**) [3] and / or checklist (annex 1 in [4]),
- including maps, purchase or installation records, and worksheet (**SdL**) references to justify the Category 3 classification,
- ensuring correct identification of materials during activity preparation.

2.2.1.4. Inventory considerations

Category 3 materials **are not subject to the WITS inventory**. However, if a material fails to meet Category 3 requirements (i.e., does not comply with PMRER), it must:

- be inventoried in **WITS**,
- stored in the appropriate temporary buffer areas (**ABT)**, with proper packaging to prevent mixing with other streams or sources.

2.2.2. Containers

The **container choice** for temporarily packaging Category 3 materials is a step in ensuring safe handling, accurate radiometric measurements and compliance with management protocols. This responsibility lies with the **producer** (**JRC**), who should request the necessary containers via the **functional mailbox** (**FMB**) addressed to the relevant manager.

2.2.2.1. Standard containers

The following containers are typically used for Category 3 materials:

CPM 530L crates

Suitable for plates, glass, permissible jewellery, rubber items (weight permitting) and metals arranged as homogeneously as possible.

Bin bags

Recommended for plastics, technological waste, electrical cables and rubber items (subject to weight assessment).

Wooden or metal pallets

For supporting non-standard containers or oversized items.

CPM 530L boxes, generally intended for clearance or removal processes, may be used for Category 3 materials provided they are **returned after delivery to the waste area**. Small objects, broken down by origin and type can also be placed inside them.

2.2.2.2. Non-standard containers

Non-standard containers may be used, when necessary, provided they do not significantly exceed standard measurement geometries (e.g., jackets and big bags). These must:

- be placed on **metal or wooden pallets** (if size allows),
- be packed to create a **homogeneous and compact** "**neck**", minimising free volume spaces.

Large metal pieces may be submitted in their original form, subject to **agreement with the radioactive measures laboratory** (**MRL**) to define optimal geometries and measurement times. In such cases, details of size and thickness must be documented and attached to the **WMP or checklist** and uploaded to **ARES**.

2.2.2.3. Segregation and homogeneity

Electrical equipment must be segregated: cables with or without sheathing treated separately from other waste. For metal batches, materials should be placed horizontally where possible to avoid large voids. And always select the most detailed category defined in the **material tree and choice of** (**catalogue / European waste**) **CER codes** (annex A1). Only if unavailable, choose the next less detailed level.

2.2.2.4. Hazardous materials

Materials identified as hazardous (marked with * in the JRC's **European Waste Code** (**EWC**) or listed in annex A1) require approved containment, such as:

- big bags bearing the **yellow "R" letter on a black background**, with certification of containment type and maximum permissible weight,
- approved containers for batteries, lamps or neon tubes (typically yellow).

In cases of uncertainty, the producer should contact their respective **waste service** via **a designated e-mail contact** or, such as at the JRC-Ispra site, request special containers from a **central warehouse**.

2.2.2.5. Sampling for analysis

During Category 3 management, samples may be required for **destructive analysis** (**DA**), following ER and MRL guidance:

- **1L Marinelli beakers** for fine particle matrices (cement, wood, technological waste),
- **150 ml filter samples**, filled to at least 50%,
- metal samples submitted as **chips or sheets**, with thickness ≤ 2 mm to avoid self-absorption.

The CC will provide additional instructions after consulting the ER and the laboratory to ensure representative sampling.

2.2.3. Identification of TABs

Before commencing any activity that generates Category 3 materials, the **producer** (**JRC**) must identify suitable **temporary accumulation bases** (**TABs**). These areas serve as secure points where the executing firm will place materials in the containers previously requested. Proper TAB identification and management are essential for maintaining **traceability**, **segregation** and **compliance** throughout the management process.

This section reinforces the principle that **TAB identification and management are not logistical details**, **they are safeguards for compliance and safety**. Proper segregation, labelling and documentation ensure that Category 3 materials can be processed efficiently and without risk.

2.2.3.1. TAB location options

TABs may take different forms depending on operational needs:

- **Outdoor areas near work yards**: These must be clearly delimited and marked to prevent unauthorized access.
- **Indoor premises within buildings**: Such TABs require formal identification and authorization by the installation's Director or Technical Director (**RTI / ITD**).
- **Discarded containers or ISO containers**: These may be repurposed as TABs when appropriately secured and documented.

2.2.3.2. Producer responsibilities

The producer (JRC) **is accountable for**:

- **informing the executing company and operators** about TAB arrangements,
- **defining segregation rules** to ensure homogeneous batches within TABs,
- **monitoring material production and storage** throughout the activity to prevent cross-contamination.

2.2.3.3. Labelling and traceability

At the end of the activity:

- all homogeneous batches stored at the TAB must be **labelled with the appropriate EWC**,
- each batch must carry a **unique file number** (**save number**) generated in **ARES** once the **CC** approves and opens the activity file,
- non-hazardous removable material will be transferred to a **buffer storage area**.

2.2.3.4. Special waste handling

For hazardous special waste (e.g., oils, varnishes, neon lamps, batteries):

- **INE Area**: the ABT is located at **Ed. 87B**,
- **SGRR Area**: the ABT corresponds to **Garage 40a tettoia**,
- such materials, if removable, will be transferred to **DT2** (**Ed. 16B**) or handled by a dedicated contractor.

Special waste other than chemical and biological waste (e.g., paints, varnishes, waste oils, waxes) must comply with **ADR regulations** for the transport of dangerous goods. Given the inherent risks, all necessary measures must be taken to ensure **maximum safety during transport**, including proper containment, documentation and adherence to legal requirements.

2.2.4. Labelling

Proper labelling is essential for **traceability**, **compliance** and **safe handling** of Category 3 materials throughout the management process. Each batch or lot produced must be identified by a unique ARES save number (see subsection 2.3), which is generated once the CC approves and opens the activity file in ARES.

This section emphasises that **accurate labelling is not optional**; **it is a regulatory requirement** that ensures safe handling, proper disposal and full traceability of Category 3 materials.

2.2.4.1. Batch and homogenous lot structure

A **batch** may consist of **up to five homogeneous lots** in both batch and continuous production workflows. If more than five homogeneous lots are required, the producer (JRC) must request the CC to **open an additional ARES file**, accompanied by the relevant **request for alignment authorisation** (**RAA)** (see subsection 2.5.2).

A **homogeneous lot** refers to a group of materials with similar characteristics, intended for delivery as **conventional waste** under **Legislative Decree No. 152/06** (e.g., stored at the buffer storage areas**)**.

Each homogeneous lot must:

- contain **uniform material**,
- be assigned a **single EWC** (see annex A1 for applicable categories).

2.2.4.2. Segregation and EWC codes

The **producer** (JRC) is **responsible for**:

- correct segregation of waste into homogeneous lots,
- assigning the appropriate **EWC** to each lot.

Materials from similar processes may share the same EWC but still require segregation into separate homogeneous lots. For example:

- A batch of **electrical and electronic equipment** may carry EWC 16.02.14, but cables must be separated from mixed electrical components.
- A batch of **mixed technology material** (e.g., ventilation filter replacements) may use EWC 15.02.02/15.02.03*, but must distinguish between **pre-filters and filters** by origin and type.

The **JRC-Ispra Waste Service** validates EWC for waste streams and may assign additional codes following environmental contaminant analysis.

EWC code structure

The EWC code consists of six digits in the format **XX.YY.ZZ**:

- **XX**: Industrial sector (chapter).
- **YY**: Sub-class (production process).
- **ZZ**: Category (specific waste type).

If the EWC is accompanied by an asterisk (*); the waste is classified as hazardous. In such cases:

- The **HP hazardous code** (e.g., explosive, oxidizing, flammable, irritant) must be indicated.
- The producer (JRC) must consult **security fact sheet / material safety data sheet** (**SDS / MSDS**) to identify the most relevant hazard information ("H" statements) for generating the HP code.

2.3. General procedures for Category 3 materials in ARES

ARES is the EC's official electronic document management system designed to record, manage and archive all official documentation in a single secure repository. It ensures traceability, compliance and accessibility across all stakeholders involved in the management process.

The general procedures for Category 3 materials in ARES have been elaborated in this section with respect to access and authentication, role in Category 3 material management, documentation requirements, system features, compliance and operational significance.

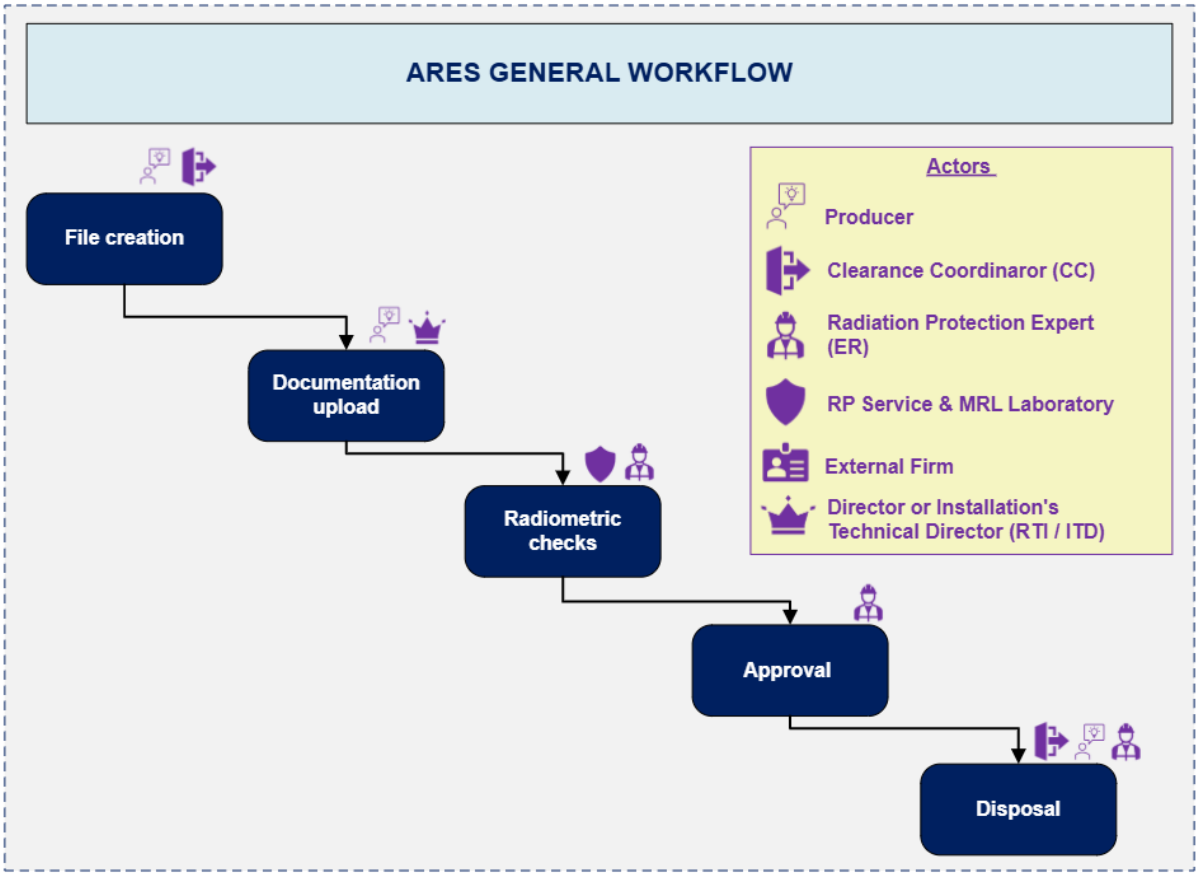


Figure 3. ARES General Workflow

Access and authentication

- ARES can be accessed via a menu in an internal application or designated web link (in force at the JRC).
- Access requires ECAS authentication, guaranteeing secure user identification.

Role in Category 3 material management

- The NDWMD uses ARES to manage and record all documentation related to the:
  - **material clearance process** (subject of KP-JRC-017),
  - **Category 3 material management process** (subject of this document).

All technical, administrative and authorisation documents are stored electronically in ARES, ensuring compliance with ISO 9001:2000 Quality Management System procedures.

Documentation requirements

Each file must include:

- material details (description, origin, quantities),
- radiometric measurements and analysis results.

Documents are created, issued and archived according to the NDWMD's operating procedures and quality standards.

Systems features and compliance

ARES provides:

- continuous interface between all actors in the process,
- full traceability of documents and correspondence with removed materials,
- download and print options for all documents, including electronically signed authorisations.

Electronic signatures comply with **Article 4.2** (**Validity of Electronic Documents**), Commission Decision of 7 July 2004, No. 563.

Operational significance

ARES is the backbone of the Category 3 material management workflow, ensuring transparency, security and regulatory compliance throughout the management lifecycle.

2.3.1. Premisses

When initiating a Category 3 material generating activity, the producer (JRC) must explicitly indicate this in the **"Notes" field** of the SdL. This ensures early identification and proper management of Category 3 materials within **ARES**.

2.3.1.1. Prerequisites for process initiation

The **producer** (**JRC**) must provide verified and approved documentation, such as the **checklist** or **WMP** and the **SdL** (see subsections 2.4.1 and 2.5.1). If required, the ER will specify preliminary radiometric checks in the SdL, to be carried out by the radiation protection (RP) service. Once these conditions are met, the **producer** (**JRC**) requests the CC to open a dedicated file in **ARES**.

2.3.1.2. File creation and identification

Upon dossier creation, **ARES** generates a **unique sequential code** called the **save number**, which serves as the batch identification code for removal. This code is used by the **producer** (**JRC**) to complete all related documentation for the management process. A workflow is automatically associated with the document via **e-signatory**, which defines the sequence of tasks, validation steps and electronic signatures.

2.3.1.3. Workflow and notifications

The e-signatory workflow is sequential, ensuring that each step is completed before the next begins. When a task is completed, the next actor in the process receives an email notification, enabling direct task activation from **ARES**.

2.3.1.4. Roles in e-signatory

The roles in e-signatory include:

- **RED** (**Redactor**): Initiates and creates the process.
- **CONTRIB** (**Contributor**): Provides input based on instructions.
- **Sign**: Approves or authorises documents.
- **Visa**: Confirms acceptance of an instruction for approval purposes.
- **EXP** (**Expedition**): Finalises and archives the workflow.

2.3.1.5. Document management

All documentation must be uploaded to the **ARES dossier** as a main document or annex for future consultation. When a file is closed, ARES assigns a **registration number**, which, along with the save number, ensures full traceability.

2.3.1.6. Reporting and oversight

Annually, the **CC** reviews the entire management process, compiles a statistical report on quantities and types of Category 3 materials, as well as distributes it to key stakeholders and designated hierarchical figures.

2.3.1.7. Operational significance

The ARES environment provides a structured, traceable and compliant framework for managing Category 3 materials, supporting both batch production (see subsection 2.4) and continuous production (see subsection 2.5).

2.3.2. General material management process for Category 3 in ARES

The management of Category 3 materials within ARES follows a structured workflow that ensures traceability, compliance and coordination among all stakeholders. This process involves multiple steps, from file creation to final authorisation or corrective actions.

2.3.2.1. File creation and initial setup

The **CC** accesses ARES via an internal application or the designated webpage.

To create a new file:

- Click **create document**, select “To” or “Cc” fields in the list, and choose the reference procedure for Category 3 management.
- Enter the producer’s (JRC’s) name and the CC virtual entity in the **from field**.
- Title the document as:
  - “**RAA Category 3 – SdL XXXX-XXX – short description**”.
- Set confidentiality to **sensitive non-classified**, security marking to **SENSITIVE** and save the document.
- Assign the correct archiving folder by selecting **filing** > **file document**, choosing the appropriate year folder and confirming.
- ARES generates a **save number**, which is a unique sequential code used throughout the process for traceability.

2.3.2.2. Workflow configuration (e-signatory)

The **CC** creates the **e-signatory** workflow by selecting **create e-signatory** > **List**, which displays the correct reference procedure. Then add the **producer’s** (**JRC’s**) name and attach the **RAA excel file** as the **main document**. Launch the workflow by clicking **save and launch** (not just save), which triggers notifications to the next actors. Notifications include task type (Visa, Sign, or Contrib) and a direct link to the document.

2.3.2.3. Producer’s responsibiltiies

Upon notification, the **producer** (**JRC**):

- Completes the **RAA form** in **ARES**.
- Uploads all required documentation as **annexes** in PDF format, including:
  - checklist (with save number indicated), or WMP,
  - SdL, weight file (SdP), RP CSs,
  - photos of each homogeneous lot (open and clearly visible contents),
  - if necessary, delegates tasks via **preferences** > **task delegation** in ARES.
- After completing uploads, the producer (JRC) closes the task **(CONTRIB** – Finish).

2.3.2.4. Radiometric requirements and laboratory involvement

The **ER** uploads the **PMRER form** (annex A3) and defines radionuclides and measurement criteria for each batch. The **ER** signs digitally (**VISA**), triggering a **CC** review.

Depending on the PMRER form's **content**:

- **If RP service involvement is required**, **ARES** notifies the **RP service** to perform checks and uploads the contamination survey (CS) reports.
- **If RP service is not required**, **ARES** notifies the **MRL** to prepare the request for data acquisition (**RDA)** and **SdC**, which are uploaded for signature.

External service providers receive tasks to complete entries and coordinate logistics.

2.3.2.5. Measurement and clearance

The **MRL** confirms readiness (**VISA**) and performs measurements (mostly NDA). If sampling is required, the **producer** (**JRC**) sends items to the **MRL**, coordinating via a designated **CC** e-mail. After measurements, the MRL uploads **Radiometric Reports** (**RdPs**) as annexes. The **CC** then verifies data and closes their task (**VISA**). The **ER reviews** the **results** and **issues one of three outcomes**:

Favourable outcome

- The **ER** approves (VISA), ARES notifies the **CC** and the **license holder authorises** (SIGN).
- The **CC** closes the file (EXP) and Unit R.I.3 coordinates material transfer and disposal as conventional waste.

Unfavourable outcome (no further investigation)

- The **ER** declines and assigns a new task to the **CC** (**CONTRIB**).
- The **CC** closes the file, updates e-signatory and informs the **producer** (**JRC**) to reorganise storage or initiate the clearance procedures (WITS code assignment).

Further investigation required

- The **ER** declines and instructs the **CC** to amend the e-signatory with new tasks for the **producer** (**JRC**), **RP service** and **MRL**.
- After additional checks, the **ER** either approves (process continues) or confirms non-compliance (batch recovery and clearance procedure initiated).

2.3.2.6. Traceability, reporting and operational significance

All actions are logged in **ARES**, ensuring full traceability via **save number** and **Registration Number**. Annual reviews by the **CC** include statistical reporting on quantities and categories of Category 3 materials managed.

This workflow guarantees structured management, regulatory compliance and transparency across all stages of Category 3 material management, from initial documentation to final disposal.

2.4. Batch production of standard material

Batch production, also commonly referred to as discontinuous production, means the type of activities that generate a discrete quantity of material (i.e., a batch). The materials involved in batch production are typically spoiled materials, scrap from demolition (cement, cabinets, ceilings; covers), cables, pipes, electrical switches, office floors, metals, plates, asbestos removal and FVF, etc.

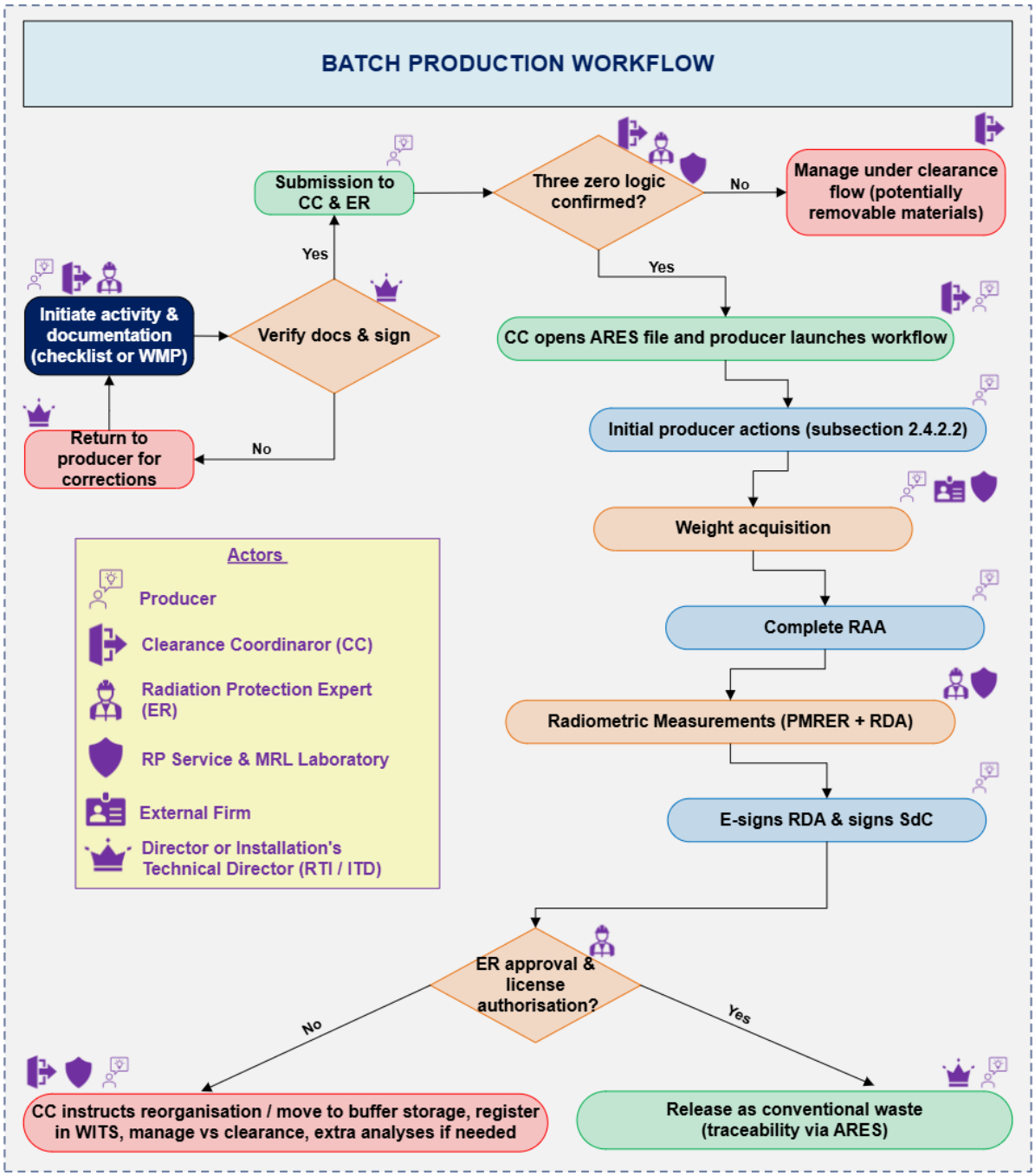


Figure 4. Schematic of the batch production workflow

2.4.1. The producer

This section highlights the **producer's** (**JRC's**) **accountability** in initiating the workflow, emphasising **early planning**, **accurate documentation** and **proactive coordination** to prevent delays and ensure compliance.

In the context of **batch production**, the producer (JRC) plays a pivotal role in initiating and managing the Category 3 material management process. Batch production typically involves **discrete quantities of material** generated during activities such as demolition, refurbishment or extraordinary maintenance. Common examples include:

- spoiled materials and demolition scrap (cement, insulation, ceilings, covers),
- cables, pipes, electrical switches,
- office flooring, metallic components, plates,
- asbestos removal and FVF (fibrous vitreous fragments).

2.4.1.1. Documentation requirements

The producer (JRC) is responsible for compiling either:

- the **checklist** (annex A4) or
- the **WMP**, depending on the volume of waste.

Key rule: if the waste volume exceeds **5 m³**, a **WMP must be prepared**; in this case, annex A1 is **not required**.

Pre-activity coordination

Before commencing the activity, the producer (JRC) is advised to:

- organise an **on-site inspection** with the **CC** and the **ER** in the plant area where processing will occur,
- ensure that all necessary documentation and segregation plans are in place.

2.4.1.2. Approval and submission

Once the checklist has been **signed by the RTI / ITD or a delegate**, the producer (JRC) must:

- submit the **completed WMP or checklist** for verification by the CC and ER,
- send the documents via email to the respective **FMB**.

This step ensures that all stakeholders are aligned and that the process can proceed under controlled and documented conditions.

2.4.2. Preconditions and approvals

The management of Category 3 materials under **batch production** requires **strict adherence to preconditions**, **documentation** and **approval workflows** to ensure compliance and traceability. This section outlines the steps from initial verification to final authorisation

2.4.2.1. Preconditions: the three zeros logic

Before initiating the Category 3 management process, the **three zeros logic** must be confirmed:

- **historical zero**: no contact with active or contaminated substances,
- **logical zero**: no exposure to neutron flows,
- **instrumental zero**: radiometric checks provide an estimate (indication) based on preliminary surveys that that there is a minimum detectable level of activity.

If **these conditions are not met**, then the Category 3 process stops, and the material is managed under the **clearance flow for potentially clearable materials**. If confirmed, the CC creates a dedicated **ARES file**, enabling the producer (JRC) to launch the workflow.

It should be noted that the three zeros logic follows ISO 11929-1:2025; this series is a comprehensive set of standards that provides procedures for the determination of characteristic limits (decision threshold, detection limit and limits of the coverage interval) for measurements of ionising radiation.

2.4.2.2. Initial actions by the producer

Once authorised:

- Indicate Category 3 waste generation in the **SdL**.
- Identify and organise **ABTs** for temporary storage.
- Request containers via **FMB** from Unit 92.
- Ensure preliminary measures requested by the **RP service** are included in the SdL.
- Begin processing and packaging batches (**max 5 homogeneous lots per batch**).
- Apply **labels** in advance to containers, showing:
  - **ARES save number** (format: jrc.j.1(202-)).
  - **EWC**.
  - Indices for homogeneous lot (X = 1 – 5) and sequential container number (Y).

Upload all documentation to ARES, including:

- checklist or WMP – SdL and SdP,
- photos of each item (file name: save number – consignment – item number),
- supporting documents.

2.4.2.3. Weight acquisition

The producer (JRC) must:

- Request the external firm to weigh skips, big bags, pallets and large individual items.
- Record weights in the **weight sheet for Category 3 materials** (annex A2).
- Upload the weight sheet to ARES.
- The **radiation protection laboratory** (**SRP & L**) service uses weight data for activity / mass analysis to confirm absence of radioactivity.

2.4.2.4. ARES workflow and RAA form

The **RAA** form is mandatory for each batch. The workflow is described in the following bullet points:

- Complete the form in ARES (editable via “Checkout” and “Check-in” functions).
- Indicate **batch production flow**. Enter:
  - Producer name & save number.
  - SdL number, origin area, material class & ABT.
  - Weight, volume, number of parts, EWC code and container type.
- Provide functional description in “Functions performed” field.
- Ensure correct formatting for Excel fields (decimal separator settings).
- Each batch requires a separate RAA; if >5 homogeneous lots, request CC to open additional ARES files.

It is important to complete the workflow accurately for the laboratory to automatically generate the **RDA**.

2.4.2.5. Roles and responsibilities – batch production

The roles and responsibilities, for the case of batch production of Category 3 materials, can be seen below in Table 2.

Table 2. Roles and responsibilities for batch production

Role	Responsibilities
Producer	Submits documentation (checklist or WMP), ensures the three zeros logic.
	Requests containers and prepares packages, completing RAA and SdL fields.
	Launches ARES workflow, uploads docs, signs SdC after radiometric checks.
CC	Opens ARES file after verifying documentation, ensures records completeness.
	Coordinates corrective actions if radiometric results fail.
ER	Reviews SdL, defines radiometric criteria in PMRER Form (annex A3).
	Specifies radionuclides, MDC, measurement geometry, sampling points.
	Issues approval for delivery as conventional waste.
External firm	Handles movement, transfer and weighing of skips, pallets and large items etc.
	Supports transport to measurement stations, ensures safe, compliant handling.
RP service	Performs surface CSs and records in radiological maps.
	Executes tool checks for exit from controlled areas.
MRL	Conducts NDA gamma spectrometry or sampling-based measurements.
	Prepares RDA and uploads results (RdPs) to ARES.
	Coordinates with external firm for material transfer to measurement station.
RTI / ITD	Reviews and signs the checklist, ensuring preconditions compliance.
	Oversees and resolves operational issues during batch production activities.

2.4.2.6. Authorisation and outcomes

Upon ER approval and license holder authorisation, material is released as conventional waste. **If results fail**:

- The CC instructs the producer (JRC) to reorganise material and transfer it to an ABT.
- Material is inventoried in WITS and managed under clearance process (see KP-JRC-017).
- Additional analyses or surveys may be required; results uploaded to WITS.

2.4.2.7. Key compliance principles

The following are considered key compliance principles:

- **Traceability**: every step documented in ARES.
- **Segregation**: homogeneous lots clearly identified and labelled.
- **Coordination**: continuous interaction between the producer (JRC), CC, ER, RP service and the MRL.

2.5. Continuous production of standard material

Continuous production refers to **Category 3 materials generated regularly as part of routine activities**, typically at known intervals such as six-monthly or annual replacements. Unlike batch production, which deals with discrete quantities from extraordinary interventions, continuous production creates **predictable flows of material**, enabling streamlined management and planning.

Continuous production flows allow the JRC-Ispra site to **standardise and optimise management operations for recurring waste streams**, reducing administrative burden while maintaining full compliance and traceability. A schematic displaying the continuous production workflow, described in the ensuing subsections, can be seen below in Figure 5.

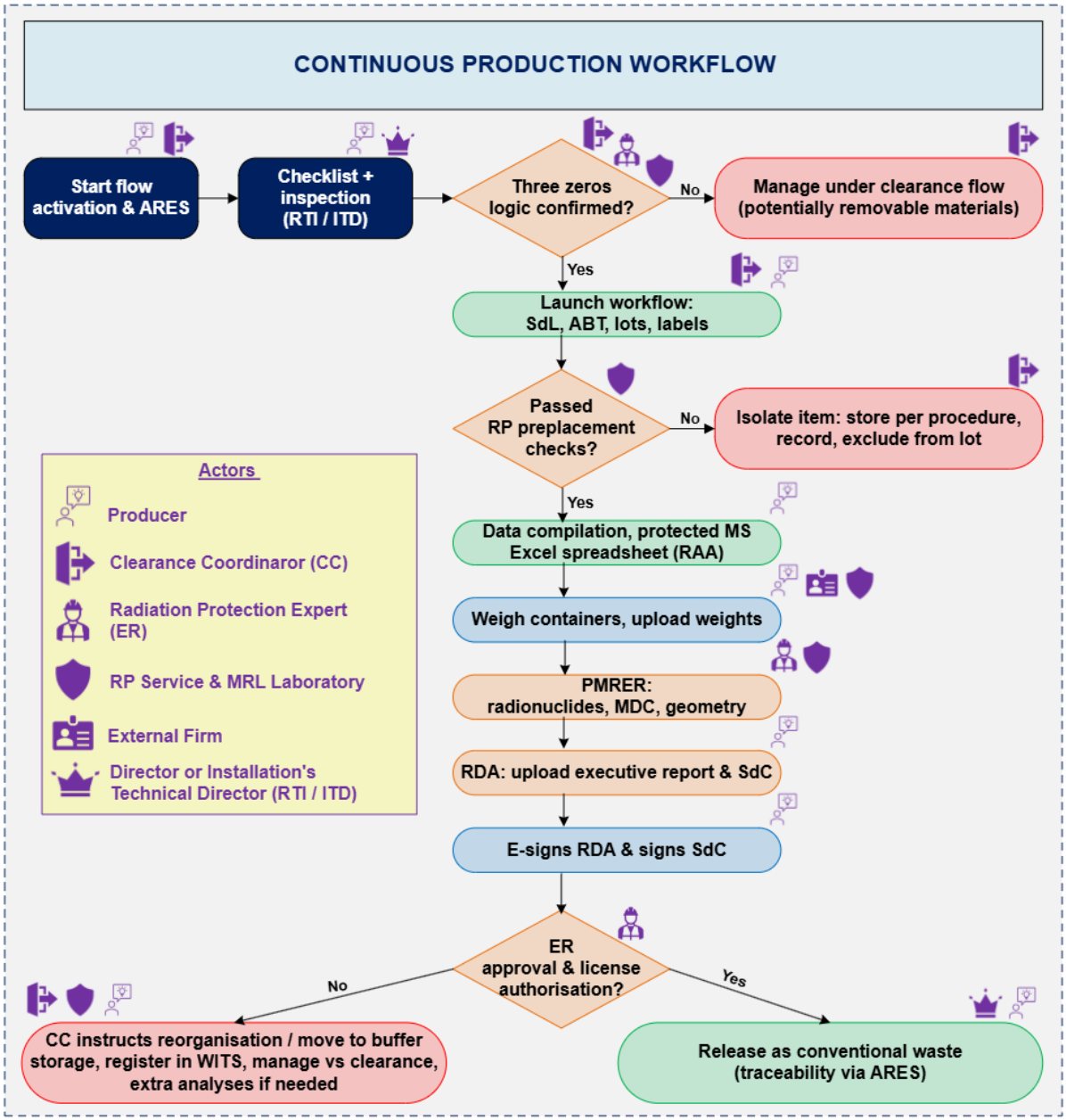


Figure 5. Schematic of the continuous production workflow

Characteristics of continuous production

Regular intervals: Materials arise from scheduled activities (e.g., lamp replacements, ventilation filter changes).

Defined flows: Each flow corresponds to a specific ARES dossier, validated by the **CC**, the **ER** and **RTI / ITD**.

Regulated by SdL: Activities are governed by a dedicated SdL that specifies operational and radiometric requirements.

Lot structure and limits

- Each lot may include up to 5 homogeneous batches.
- Maximum permitted volume per lot: **5 m³**.
- Validity: **one year of harvesting** or until the volume limit is reached.

Examples of Category 3 materials generated through continuous production include:

Ventilation filters

A continuous flow for replacing delivery filters and pre-filters will generate two homogeneous batches:

- **filters** (technological waste),
- **pre-filters** (technological waste),
- different homogeneous batches will be created for each battery type (e.g., Pb, Ni), each with its own EWC.

The following **workflow** is followed for continuous production flows of Category 3 materials.

1. Flow activation

At the start of the year or when required, the producer requests the activation of a continuous flow and the creation of an ARES dossier.

2. Data compilation

Once the maximum volume or one-year limit is reached, the producer (JRC):

- informs the CC to launch the e-signatory process in ARES,
- completes a single Microsoft Excel file for the lot, detailing:
  - place of origin / function performed in the plant,
  - identification code / container type.

3. Radiometric data

The RP service adds surface contamination values and dose rate measurements for each item.

2.5.1. The producer

In the context of **continuous production flows**, the producer (JRC) plays a central role in initiating, coordinating and documenting all activities related to the management of Category 3 materials. These responsibilities ensure compliance, traceability and safe handling throughout the management process.

2.5.1.1. Initial preparations

Compile the checklist (annex A4) and organise an **inspection with the CC and ER** in the plant area where processing will occur. Then obtain approval via **RTI / ITD signature** on the checklist and submit it to the FMBs. If the **three zeros logic** cannot be confirmed then, as alluded to previously in the

document, the Category 3 process stops and the material is managed under the **clearance flow for potentially clearable materials**.

2.5.1.2. Launching the workflow

The producer (JRC) launches the workflow in the following manner:

- Indicate **Category 3 waste generation** in the SdL, specifying that it is a **continuous flow**.
- Identify and organise the **ABT** and request containers via **FMB** from the Head of Ed.92.
- Request the CC to **open an ARES dossier** and receive the **save number**.
- Segregate materials into **homogeneous lots** (max 5 per lot) and prepare **labels** showing:
  - save number,
  - EWC,
  - indices for lot (X = 1–5) and container sequence (Y).
- Ensure ABTs are secured and containers properly closed to prevent contamination from other waste streams.

2.5.1.3. Operational activities

The following operational activities must be undertaken by the producer:

- Coordinate with the RP service for **surface contamination and dose rate checks** before placing material in containers.
- Record:
  - object identification,
  - origin (building and location),
  - function performed,
  - container details.
- Use the protected **excel file** (annex A5) provided by the CC to log all required data.
- If an item fails RP checks, store it in a dedicated area per procedure.

2.5.1.4. Documentation and labelling

The producer (JRC) abides by the following requirements for documentation and labelling:

- Verify:
  - SdL,
  - labels with EWC code and save number,
  - excel file with RP measures,
  - photos of container contents (file name: save number – consignment – item number).
- Request RP documentation signed by the RTI / ITD.
- Complete the RAA form in ARES for each lot.

2.5.1.5. Weight acquisition

The producer undertakes the following steps relating to weight acquisition:

- Request assistance from the external firm for weighing containers via **FMB**.
- Record weights in the **weight sheet for Category 3 material** and upload to ARES.
- SRP & L service uses weight data for activity / mass analysis.

2.5.1.6. Final steps

The final steps pertaining to the producer's (JRC's) activities include:

- Forward the signed **RDA** to the MRL via e-signatory (pre-filled in ARES).
- Sign the **CP** form (in the same way as the RAA form).
- RP service enters contamination and dose rate values in the clearance sheet (**SdC)** within ARES.
- External firm organises material transfer to the measurement station and updates ARES tasks.
- Monitor the ARES workflow until completion of radiometric checks.

2.5.1.7. Authorisation and outcomes

In relation to authorisation and outcomes:

- If the **ER** approves and the license holder authorises, material is released as conventional waste.
- If results fail:
    - the **CC** instructs the producer to reorganise material and transfer it to an **ABT**,
    - material is inventoried in **WITS** and managed under the clearance process,
    - additional analyses or surveys may be required; results uploaded to **WITS**.

2.5.1.8. Key compliance principles

The following key compliance principles are observed by the producer (JRC):

- **Traceability**: all documentation uploaded to ARES.
- **Segregation**: homogeneous lots clearly identified and labelled.
- **Coordination**: continuous interaction with CC, ER, RP service and external firm.

2.5.2. Form request for alignment authorisation - RAA

The **RAA** is the official document required to initiate the continuous production flow for Category 3 materials. It ensures compliance with clearance requirements and provides traceability within ARES.

2.5.2.1. Scope and applicability

The form is exclusively for **Category 3 materials** (**solid or liquid**) **that meet the specifications outlined in previous sections**. A **separate form must be completed for each batch scheduled** for removal. Each batch may include up to five homogeneous lots; exceeding this limit requires additional forms and files in ARES.

2.5.2.2. Responsibilites and workflow

The responsibilities and workflow with respect to RAA are detailed below:

Producer role

- Indicate the intention to start continuous production using the drop-down menu under the header.
- Complete all mandatory fields accurately. The blank form is provided by the CC in ARES upon file creation.
- Edit the Microsoft Excel form by checking out the document in ARES, making changes and checking it back in. Version history is accessible via the "Manage Versions" function.

Key fields to complete

- **Producer**: Full name of the JRC staff member initiating the process.
- **Save number** (**Iotto**): Sequential code generated by ARES.
- **SdL Nor**: Reference number of the SdL generating Category 3 material; tick “bis” if related to reorganisation.
- **Origin and classification**: Select area of origin, material class, material type and ABT from drop-down menus.
- **Storage location**: Enter the temporary storage area for verification.
- **Physical data**: Weight, volume, number of parts and EWC.
- **Additional details**: Notes, previous function of the material and packaging type (e.g., big bag, CPM metal box, pallet).

Technical considerations

- Drop-down menus must be used where available.
- If numeric fields fail to validate, adjust the Microsoft Excel file’s settings: File > Options > Advanced, disable “Use system separators,” and apply “,” as decimal and “.” for thousands.
- Correct completion is essential for automated import into the RDA. Missing data triggers an error message: “Warning, not all fields have been filled in.”

Integration with radiometric workflow

The RAA form provides the foundation for subsequent steps, including preparation of the RDA and PMRER forms. Consistency across these documents is a must for laboratory processing and release / clearance authorisation.

2.5.3. The Clearance Coordinator

The CC plays a central role in managing documentation and ensuring compliance throughout the management process.

2.5.3.1. CC – key responsibilities

The CC’s key responsibilities include:

File creation in ARES

- Using an approved checklist, the CC opens a dedicated file in ARES for each request.
- The ARES workflow will only commence once the documentation package is complete.

Documentation control

The CC ensures that all required documents, as specified by the procedure, are uploaded and maintained within the relevant ARES file.

Process oversight and corrective actions

If radiometric measurement results fail to meet clearance criteria, the CC coordinates with the ER, SRP & L service and the producer to reassess the process and implement corrective measures.

Operational significance

The CC acts as the procedural gatekeeper, guaranteeing that documentation integrity and compliance are maintained before clearance authorisation can proceed.

2.5.4. Radiation Protection Expert

The **ER** is actively involved in managing Category 3 materials from the **earliest stages** of the process, beginning with the drafting of the **SdL**.

2.5.4.1. Role in planning and coordination

Prior to initiating continuous production, the producer (JRC) consults with the ER and the CC to identify materials eligible for Category 3 classification arising from routine activities. The ER specifies, within the prescriptions, the need to trace planned radiometric checks for activities generating Category 3 waste in classified areas. The results of these checks must be recorded in the shared directory.

2.5.4.2. Radiometric criteria and measurements

The following radiometric criteria and measurements must be satisfied:

- Once the workflow is initiated in ARES, the ER defines the radiometric criteria and measurement requirements, documenting them in the PMRER module (see next section).
- After measurements are performed, the ER evaluates the results and issues approval in ARES.

2.5.4.3. Corrective actions

The following bullet points summarise the approach which should be taken to corrective actions:

- If measurements fail to meet criteria, and a more detailed survey is required, the ER determines additional actions and specifies the type of analysis to be conducted.
- The ER communicates these requirements to the producer and SRP & L service, while keeping the CC informed.

2.5.4.4. Operational significance

The ER ensures radiological safety and compliance by establishing robust measurement protocols and validating results before release authorisation.

2.5.5. Form Radiometric Requirements and Measurement (PMRER)

The **PMRER form**, provided in annex A3, is completed by the ER and serves as the official request for radiometric measurements required to confirm the absence of artificial radioactivity (i.e. the MDC has not been exceeded). These measurements are essential for authorising the material as conventional waste.

The limits established by the PMRER are based on Italian legislation wherein, specifically, an upper threshold of ten times below the legal limit is established for "minimal detectable dose" The specific legal limit relating to clearance levels for solid materials can be seen in Table I-1b of the legislative decree published on the 31st of July 2020, n.101.

In the case of some materials, particularly those prone to a lot of self-shielding (mainly metals, such as structural ferrous metals or lead), it is very challenging to guarantee an MDC that is below the threshold of 1/10th the legal limit. Nonetheless, the activity that can be measured is still well below the aforementioned legal limit. Such borderline cases usually include metallic or ferrous materials, often structural materials.

2.5.5.1. Purpose and scope

The PMRER form communicates the ER's prescribed measurement requirements to the SRP & L service team, ensuring compliance with clearance criteria.

2.5.5.2. Key information included in the form

Key information included in the PMRER form includes:

Radionuclides and MDC

The of key radionuclides and their associated **MDC** for each batch within the lot.

Measurement units and geometry

Specification of units (Bq/g) and measurement geometry, which may follow the producer's (JRC's) indications in the RAA form or be adapted by the ER for optimal detection.

Measurement surfaces

Indication of sides to be measured. For NDA gamma spectrometry, two surfaces are typically required; for sample-based analysis, a single measurement using low-background instruments in the MRL is sufficient.

Sampling

Definition of sampling points and number of samples. If multiple points are needed for representativeness, samples must be homogenised in a single weigher before submission for MRL analysis.

2.5.5.3. Additional responsibilites of the ER and operational significance

Based on data provided by the producer (JRC) in ARES, the ER may request supplementary surface contamination checks from the RP service. The PMRER form ensures that radiometric measurements are precise, traceable and aligned with release and clearance protocols, forming a strong link between planning and laboratory verification.

2.5.6. The Radiation Protection and MRL Service

The **RP service** and **the MRL** play roles in verifying compliance and supporting the management process for Category 3 materials.

2.5.6.1. Radiation protection service responsibilities

The radiation protection service responsibilities include:

Initial checks

Based on the requirements outlined in the SdL, the RP service performs radiometric checks on each object included in the lot.

Data recording

All measurement results must be documented in the designated form stored in the shared directory.

Formalisation

At the end of the activity, results are consolidated in a CS report, signed by the RP Area Manager and archived.

Communication

The RP Area Manager sends the signed CS report to the producer, who uploads it to ARES as part of the required documentation for process initiation.

2.5.6.2. MRL responsibilities

The MRL's responsibilities include:

Entry point

The MRL becomes involved after the PMRER form is completed by the ER.

Preparation of RDA

Using PMRER data, the laboratory prepares the RDA file on behalf of the producer.

Integration in ARES

Once ready, the operational execution report and SdC are uploaded to ARES for review, signature and validation by all stakeholders.

2.5.6.3. Measurement activities

The measurement activities include:

Non-destructive analysis (NDA)

Most measurements are non-destructive.

Sampling-based analysis

If the ER prescribes sampling, the producer sends items (e.g., Marinelli beakers, filter samples) to the laboratory, coordinating via: XYZ account.

2.5.6.4. Post-measurement actions

The laboratory uploads **radiometric reports** (**RdPs**) to the ARES dossier. If results require further investigation, the ER and the CC liaise directly with the laboratory to define additional analyses.

2.5.6.5. Operational significance

The RP service ensures initial compliance through surface contamination checks, while the MRL provides advanced radiometric verification and documentation, forming the backbone of the release and clearance authorisation process.

2.6. Radiometric measurements, removal and clearance authorisation

The verification of the absence of artificial radioactivity, i.e., MDC, is a step in the management process for Category 3 materials. This is achieved through radiometric measurements on key radionuclides representative of the installations from which the material originates.

2.6.1. Measurement principles

The **ER** determines:

- **type of measurement,**
- **quantity of material to be measured,**
- **frequency of checks**, particularly for continuous production flows.

Key radionuclides typically include **Am-241**, **Co-60**, **Cs-137** and **U-238** (specific to FARO installations). Additional radionuclides may be included based on the ER's assessment and indicated in the **PMRER module**.

2.6.2. Measurement techniques

Measurement techniques depend on geometry and method, as defined by the ER and documented in the PMRER. Examples include big bags, boxes, Marinelli geometry for samples, soil or cement cores.

The preferred technique is **NDA** using gamma spectrometry, performed:

- in the field with ISOCS,
- in the MRL.

ISOCS protocol includes:

- short measurement (~20 s) to check homogeneity,
- long measurement (~60 s) for MDC comparison.

In recent years, an enhancement was incorporated through the introduction of the **Gamma Spectrometry Monitoring System** (**GSMS**) to strengthen NDA capabilities. Simulations were carried out relating both to the specific measurement configuration of the GSMS system and to a more generic configuration, considered of greater practical interest through leveraging the **Monte Carlo N-Particle** (**MCNP**) model to simulate the transport of neutrons, photons and electrons in various materials.

DA is applied when required for higher sensitivity. DA requires representative, homogenised samples and may involve Marinelli beakers or weighing bottle geometries. While less practical, DA provides more targeted results.

The objective of the simulations was to verify that the field of display of the detector entirely included the metric unit of reference which, in the case of a configuration with a single detector, coincided with the portion of the caisson directly in front of the detector and corresponding to one eighth of the total volume. The GSMS simulation enables the demonstration of material clearance requirements being met and can also be used for Category 3 material.

As can be seen in Figure 6, two simulations were undertaken: one for the configuration of the GSMS and the other for generic configuration. As far as the GSMS is concerned, the geometry including the entire caisson and a single HPGe detector equipped with a rectangular collimator has been modelled. The simulations relating to the more generic configuration, on the other hand, involved the modelling of the same caisson but with the detector placed in the centre.

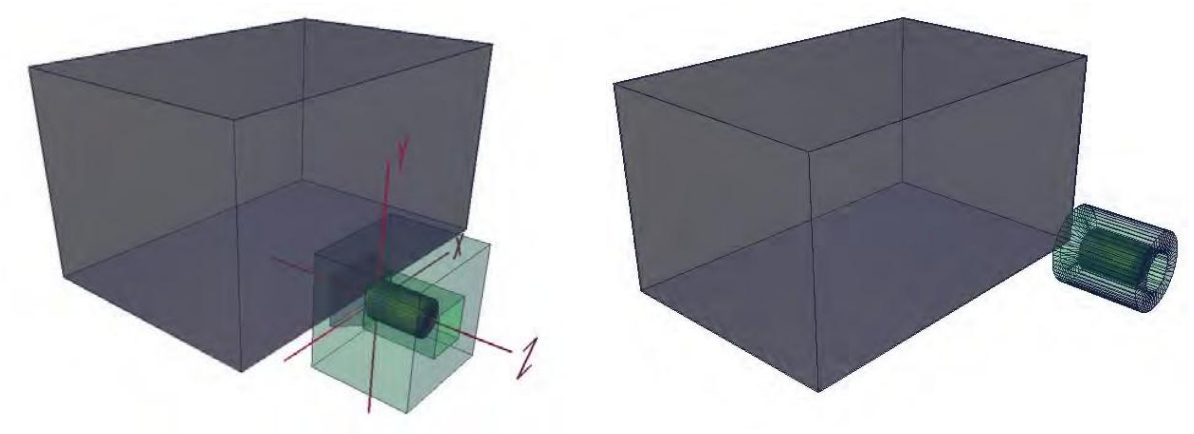


Figure 6. MCNP simulation models. Left to right: (a) configuration of the GSMS system with detector for the four measurement positions and (b) generic configuration with the detector located in one of the central positions

The simulations relating to the specific measurement configuration of the GSMS confirmed its ability to analyse the entire metric reference unit, corresponding to the **CMP-530 L type container** with the maximum quantities established for each type of material. Figure 7 below has been provided for demonstrative purposes as an example of the analysis undertaken to assess the GSMS' probability of detection with respect to spatial distribution.

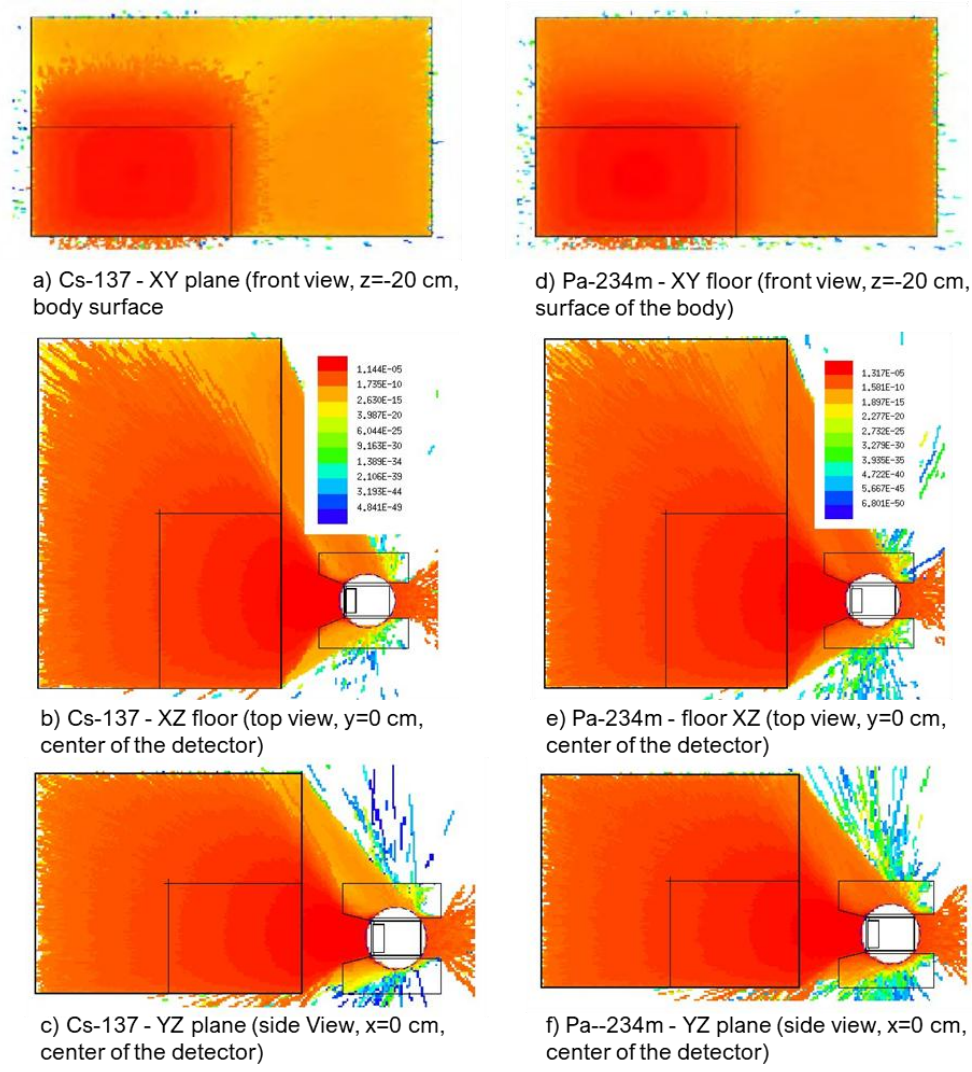


Figure 7. Spatial distribution of the probability of detection of the GSMS

Full details of the technicalities, analysis and discussion of results can be found through referring to the report which was published following the presentation at the **National Airp Cogress Padova** between the 29th to 31st of October 2025. The most **pertinent conclusions** can be seen below:

- the **GSMS' measurement configuration** was **validated**,
- **detection volume** is **primarily governed by photon energy**, followed by material density and then detector distance,
- **low energy gamma emitters are problematic** due to rapid attenuation; this is **important for waste acceptance criteria**,
- the **simulations proved useful** in optimising gamma spectrometry layouts, collimator design and detector positioning in nuclear waste assay systems.

2.6.3. Sampling, control and blank sample comparison

Sampling must be representative of the lot and taken from the most radiologically significant points. RP CS and radiological cartography guide sampling and handling during transfer to the measuring station. In some cases, verification includes comparison with blank samples to account for natural, cosmogenic and fallout radionuclides.

Blank samples must:

- match the physicochemical characteristics of the material,
- originate from areas free of artificial radioactivity.

In the past blank sample data was considered incomplete. Therefore, a dedicated campaign was carried out to expand the blank sample library for NDA and DA comparisons (see subsection 2.7.1). The ER compares RdPs of Category 3 materials with blanks if:

- radionuclide concentration is lower than blank averages → material is releasable,
- higher → statistical tests assess homogeneity; single outliers are checked against 2σ limits.

2.6.4. Clearance criteria

Absence of artificial radioactivity is confirmed when:

- measured values are below instrument MDC,
- MDC is at least one order of magnitude lower than limits in Table I-1b of Annex I [1].

For key radionuclides (**Am-241**, **Co-60**, **Cs-137**):

- total mass concentration per package < MDC,
- MDC threshold for clearance: < **0.01 Bq/g.**

In exceptional cases (e.g., Am-241 above PMRER limits but below annex A4 thresholds), the ER may request further analysis before issuing a positive opinion.

2.6.5. Laboratory procedures and operational significance

The laboratory operates under **MRL analysis requests** procedures (NDWMD intranet). Acceptability criteria include dose rate and surface contamination; Category 3 samples must show no activity. Standard geometries include:

- **Marinelli 1 L** for solids, crates, big bags.
- **Weighing bottle** (**150 ml**) for small volumes.
- **Bottles** (**125–500 ml**) for specific cases.

Ad hoc geometries may be defined by the ER or laboratory based on material characteristics.

Radiometric verification ensures compliance with clearance criteria and underpins the safe disposal of Category 3 materials as conventional waste. The process combines NDA for efficiency and DA for precision, supported by robust protocols and continuous improvement initiatives.

2.7. Blank campaign series

Core **high-level findings from** the extensive radiometric characterisation detailed in **the nine campaigns** referred to in subsection 1.2 are summarised below:

1) **The entire JRC-Ispra site non-classified zone appears radiologically stable and uncontaminated**. Furthermore, the blank datasets recorded across the nine campaigns form a strong and internally consistent multiyear radiological fingerprint for all unclassified material flows.

   I.e., ten years of data recorded show only natural background levels, with rare and explainable anomalies, thus it can be inferred that there is no evidence of contamination from nuclear practices in any non-classified zones.

2) **Cs-137 remains the key anthropogenic tracer** and it is **consistently near zero**.
3) **Natural decay chains** (specifically U-238 and Th-232) fully dominate material signatures.
4) **Cross-material consistency strengthens confidence in clearance decisions**. It can be noted that, irrespective of material (e.g. solid, organic, mineral and polymeric) the pattern is the same.
5) **The GSMS was validated by simulation studies,** specifically Monte Carlo simulation, a form of quantified verification of the system's trustworthiness as it was employed in all campaigns.

Table 3 below shows trends with respect to material, dominant nuclides and observations. The radiological signature of all materials is controlled almost entirely by naturally occurring radioactive material (NORM).

Table 3. Trends with respect to type of material, dominant nuclides and observations

Material	Dominant Nuclides	Observations
Soil / sand	K-40, Ac-228, Pa-234m	Geological minerals, organic content
Debris (cement / brick)	Ac-228, Pa-234m	Mineral aggregate composition
Insulation (rock / glass wool)	K-40, Ac-228	Basalt / silicate origins
Metals	K-40, Pb-210	Surface dust deposition
Plastics	K-40, Pb-210	Environmental dust, weathering
Wood	K-40, Pb-210	Uptake from soil, atmospheric deposition
Asphalt	Ac-228, Pa-234m	Aggregates and mineral binders

No measurements above MDC were detected in any campaign, with respect to all material classes, for the elements of: Co-60, Am-241, Na-22 and Ra-226.

The main point is that the datasets constitute a coherent and reliable radiological baseline. Materials exhibiting radionuclide activity within the established reference intervals can be confidently classified as Category 3 or considered suitable for clearance under applicable regulatory frameworks.

2.7.1. Blank campaign example: pre-filtration management & ATU filters

In 2021, the first blank sample campaign was launched to manage Category 3 materials from ATU pre-filters. These pre-filters act as the initial barrier for external air entering the ATU, positioned upstream of the main filter.

2.7.1.1. Campaign scope and sampling

The objective, sampling details and approach to sampling preparation during the blank campaign can be seen below:

Objective

To establish a validated process for managing a product category generated continuously and periodically within classified site areas.

Sampling details

Nine pre-filters were collected during routine replacements in conventional (non-classified) areas of JRC-Ispra. Data recorded included:

- machine airflow rates,
- filter type and category,
- installation/replacement dates,
- filter dimensions, sampling area, aspirated volume,
- installation height and proximity to green areas or construction zones.

Sample preparation

Delivered to the MRL in Marinelli geometry, pre-filters were processed by:

- removing metal frames and mesh,
- cutting filters to fill a 1L Marinelli beaker.

Measurements were performed by the MRL and results (RdPs) were evaluated by the ER.

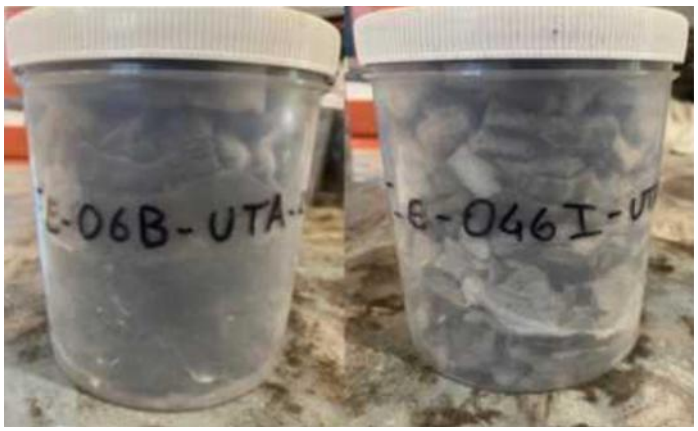


Figure 8. Filtration samples

2.7.1.2. Analytical approach

The campaign aimed to compare pre-filter measurements with **blank samples** to account for radionuclides difficult to quantify via gamma spectrometry using **non-destructive ISOCS methods** (typically applied to big-bag packaged filters).

Focused radionuclides included naturally occurring isotopes and fallout-related species, notably **Cs-137**.

New data supplemented gaps from the previous 2016 campaign, enabling normalisation of classified-area pre-filter data by processed air volume and comparison with blank campaign results.

2.7.1.3. Outcomes, future actions and operational significance

The campaign successfully validated Category 3 material management for pre-filters and established a basis for similar initiatives targeting ATU filters, subject to **evaluation by** the **CC** and the **ER**.

Annual campaigns have since collected new blank samples from conventional areas to expand the **blank inventory**, supporting ongoing comparisons and release / clearance decisions.

The blank campaign enhanced confidence in release / clearance protocols for ventilation system components, ensuring robust radiometric verification and supporting continuous improvement in Category 3 material management.

2.7.2. Category 3 management flows (continuous production) for ATU filters and pre-filters

The operational management of ATU filters and pre-filters under Category 3 classification requires strict coordination and adherence to established workflows in ARES.

2.7.2.1. Pre-replacement coordination

Producers must inform the CC, the RP service and the external support firm (via FMB) well in advance of any replacement activity.

Before starting it is important to:

- Agree with the RP service to check each filter or pre-filter upon removal.
- Separate filters and pre-filters into distinct bags; mixing is not permitted.
- Ensure traceability by labeling bags with:
    - type of material,
    - quantity (number of filters / pre-filters),
    - building and room of origin,
    - date of replacement.
- Packaging in bags is allowed only after communication from the Radiation Protection Technician.
- At the end of the activity, the RP service coordinates recovery and transfer of classified bags to designated TABs, informing the CC and the external firm.

2.7.2.2. Continuous production workflow and operational significance

After RP documentation is complete:

- The external firm selects representative samples from each bag, prepares them and sends them to the **MRL** for analysis.
- Waste is packaged in big bags for storage and release / clearance processing.

Once sufficient quantities have accumulated or at year-end, the CC:

- initiates the continuous production file in ARES, activating the workflow defined in annex A6,
- includes a note summarising standardised MRL analysis results, normalised for air volume processed and compares them with blank samples.

If specified by the ER in the **PMRER module**, additional **ISOCS measurements** are performed on packaged lots.

This structured approach ensures traceability, compliance and efficient release / clearance of ventilation system components, supporting periodic replacements and large-scale waste management under Category 3 protocols.

3. KEY TAKEAWAYS & RECOMMENDATIONS

3.1. Key Takeaways

The key takeaways from the JRC's experience of providing routine waste management for Category 3 materials have been recorded below. They include the need for standardised sampling protocols, proactive communication between producers and RP services, as well as maintaining an updated library of blank samples for accurate radiometric comparisons.

Early planning is essential

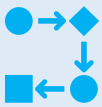
Initiating radiometric considerations during the SdL drafting phase ensures smooth integration of release and clearance requirements into operational workflows.

Stakeholder coordination

Continuous communication between producers, CC, ER, RP service, MRL and external contractors is vital for timely execution and compliance.

Documentation integrity

Accurate and complete documentation in ARES is the cornerstone of traceability and regulatory adherence. Missing or inconsistent data can delay release / clearance, requiring corrective actions.



Workflow efficiency

The structured e-signatory process in ARES minimises errors and provides transparency but requires strict adherence to sequential task completion.

Radiometric protocols

NDA techniques offer advantages for large volumes, while DA remains for precision in complex cases. Blank sample comparisons strengthen confidence in release and clearance decisions.

Campaign-based improvements

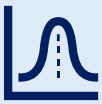
Initiatives like the blank campaign demonstrated the value of systematic data collection and normalisation for continuous production flows.

3.2. Recommendations

Six global recommendations (Rs) have been provided based on the experience of performing routine Category 3 materials management, with a view of informing future similar works. The recommendations include implementing automated alerts in ARES for workflow bottlenecks, expanding training for external contractors and integrating predictive analytics for waste volume forecasting.

#R-1 Expand automation in ARES

Implement advanced features for task delegation, document validation and automated notifications to reduce manual intervention.



#R-2 Develop a comprehensive blank sample library

Launch dedicated campaigns to collect and catalogue blanks for diverse material categories, improving statistical robustness in release and clearance assessments.

#R-3 Strengthen analytical capacity

Accelerate deployment of new systems like the GSMS to improve NDA sensitivity and reduce reliance on DA for routine cases.

#R-4 Standardise sampling protocols

Formalise guidelines for representative sampling and homogenisation to ensure consistency across all material categories.

#R-5 Foster cross-site knowledge exchange

Share best practices and lessons learnt with other JRC sites to harmonise procedures and leverage collective expertise.

#R-6 Continuous improvement

Regularly review radiometric criteria, operational workflows and documentation standards to align with evolving regulatory and technological requirements.

REFERENCES

[1] E. Milione, S. Cagno , S. Gatti, C. Requejo Coronado, M. Voinich, G. Magrotti , G. Bilancia, L. Chamenti, F. Gueli and P. Peerani, “NE.83.2625.A.001.rev 3 General procedure for the management of Type E materials,” EC JRC Directorate J - Nuclear Decommissioning and Waste Management, Ispra, 2022.

[2] “Environmental Legislation, Legislative Decree No. 152/06,” [Online]. Available: https://www.isprambiente.gov.it/files/sostanze-pericolose/d.-lgs-152-2006.pdf.

[3] “NE.80.2625.A.005 Guidance for the Production of a Project Waste Management”.

[4] “NE.87.1010.A.708 Planning for the management of Type E materials generated in”.

A1 MATERIAL TREE AND CHOICE OF CER CODES

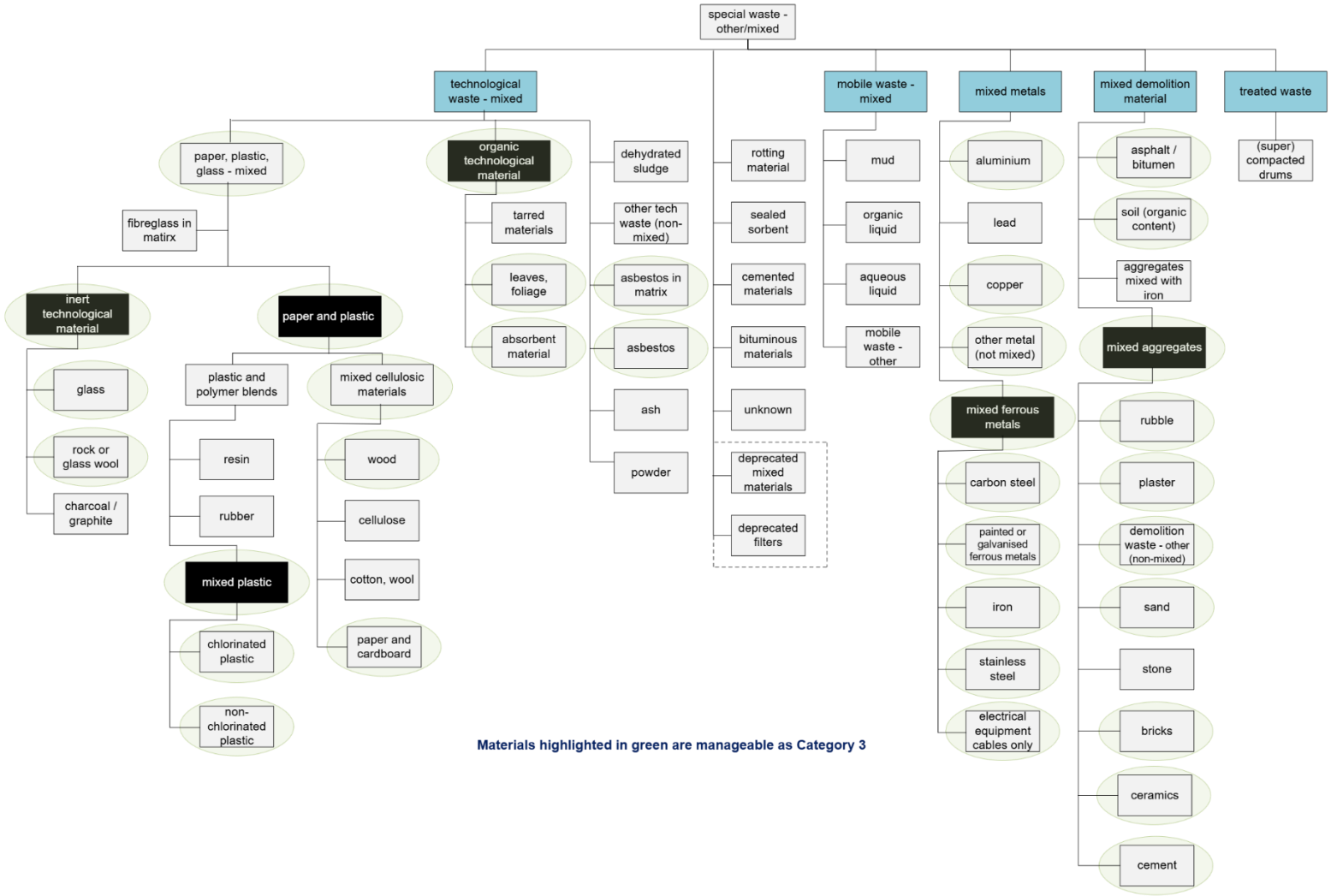


Figure 9. Material tree

This page has been intentionally left blank

Choice of CER Codes

Below are the CER codes of the most commonly managed materials as Category 3, and their requirements for delivery to the Temporanei Depositi (DT) of the site. N.B.: the list is not exhaustive.

Table 4. Choice of CER Codes

CER	CATEGORY	TYPES ALLOWED	DT	REQUIREMENTS
06 – WASTES FROM INORGANIC CHEMICAL PROCESSES				
061302 *	SPENT ACTIVATED CARBON (EXCEPT 060702 OR ACTIVATED BY CHLORINE PRODUCTION)	Spent ATTIVE coal (see also 190904 – waste from drinking water)	DT2	BB approved on pallets
08 – WASTES FROM THE PRODUCTION, FORMULATION, SUPPLY AND USE OF COATINGS (PAINTS, VARNISHES, ENAMELS), ADHESIVES, SEALANTS AND PRINTING INKS				
080111 *	WASTE PAINT AND VARNISH CONTAINING ORGANIC SOLVENTS OR OTHER HAZARDOUS SUBSTANCES	PAINTS, MILK, TOLLE	DT2	Approved big bag
080112	WASTE PAINT AND VARNISH OTHER THAN THOSE MENTIONED IN 080111	Paints IN THE ACQUA/OTHER PITTURE WITH SDS or ANALISES ACTING NOT HEALTH	DT2	Approved big bag
11 – WASTES FROM CHEMICAL SURFACE TREATMENT AND COATING OF METALS AND OTHER MATERIALS,				
110105 *	PICKLING ACIDS	ACID PICKLING	DT2	Original or type-approved casks
110107 *	PICKLING BASES	BASE PICKLING	DT2	Original or type-approved casks
13 – SPENT OILS AND RESIDUES OF LIQUID FUELS (EXCEPT EDIBLE OILS AND OILS OF CHAPTERS 05, 12 AND 19)				
130205 *	WASTE ENGINE OIL, GEAR OIL AND LUBRICATING OILS	MINERAL-BASED NON-CHLORINATED ENGINE, GEAR AND LUBRICATING OILS	DT2	Approved casks/shafts
130206 *	SYNTHETIC, ENGINE, GEAR AND LUBRICATION OILS	SPENT ENGINE OIL, COMPRESSOR OIL	DT2	Approved casks/shafts
130208 *	OTHER MOTOR OILS, COOLANT	EMULSIONS	DT2	Approved casks/shafts
15 – PACKAGING WASTE, ABSORBENTS, RAGS, FILTER MATEIRAL AND PROTECTIVE CLOTHING				
150102	PLASTIC PACKAGING	PLASTIC, POLYSTYRENE, OFFICE PLASTIC	DT1	Big bag
150107	GLASS PACKAGING	GLASS	DT1	Pallets, for bulk packagings only. Use 200307 for other types of glass
150202 *	ABSORBENTS, FILTER MATERIALS (INCLUDING OIL FILTERS), RAGS AND CLOTHING CONTAMINATED WITH HAZARDOUS	Filters, absorbent MATERIAL, ARIA FILTRI if not accompanied by analysis, PPE used	DT2	Bigbag on pallets
150203	ABSORBENTS, FILTER MATERIALS (INCLUDING OIL FILTERS), NON-HAZARDOUS RAGS AND CLOTHING	Filters and other absorbent materials with SDS or non-hazard analysis	DT2	Bigbag on pallets
16 – WASTES NOT OTHERWISE SPECIFIED IN THE LIST				
160211 *	WASTE FROM EQUIPMENT ELECTRICAL AND ELECTRONIC	REFRIGERATORS/EQUIPMENT WITH CFCS, HCFCS, HFCS	DT2	
160213 *	WASTE FROM EQUIPMENT ELECTRICAL AND ELECTRONIC	END-OF-LIFE EQUIPMENT CONTAINING HAZARDOUS COMPONENTS (E.G. SMOKE DETECTORS/OLD MONITORS)	DT2	
160214	END-OF-LIFE EQUIPMENT (METAL WASTE IRON AND STEEL/METAL WASTE FROM MACHINERY AND PARTS THEREOF)	BOILER, BUTTONS, KEYBOARDS, CARDS, KEYS, SMALL ELECTRICAL SWITCHES, ELECTRICS, ELECTRONICS	DT2	
160601 *	BATTERIES AND ACCUMULATORS	LEAD BATTERIES	DT2	Dedicated container
160602 *	BATTERIES AND ACCUMULATORS	NICKEL-CADMIUM BATTERIES	DT2	Dedicated container
17 – CONSTRUCTION AND DEMOLITION WASTES (INCLUDING LAND FROM CONTAMINATED SITES)				
170401	METAL WASTE	COPPER, BRONZE, BRASS	DT1	
170402	METAL WASTE	ALUMINIUM ONLY	DT1	
170403	METAL WASTE	LEAD ONLY	DT1	
170405	METAL WASTE IRON AND STEEL HEAVY AND LIGHT	IRON/STEEL/STAINLESS STEEL, WHETHER OR NOT FOR FURNITURE	DT1	
170411	METAL WASTE – CABLES	COPPER CABLES, CABLES OTHER THAN OIL-IMPREGNATED CABLES, TAR OR SLABS. PERIC)	DT1	
170601 *	INSULATION MATERIALS AND MATERIALS FROM CONSTRUCTION CONTAINING ASBESTOS		Resp. R.I.4	CER NOT MANAGED BY R.I.3
170603 *	OTHER ISLAND MATERIALS CONTAINING OR CONSISTING OF DANGEROUS SUBSTANCES	E.G. STONE WOOL	DT2	Approved big bag
170604	INSULATING MATERIALS OTHER THAN HEADINGS 170601 TO 170603	DEMOLITION WASTE SUCH AS BITUMINOUS SHEATHS, PLASTERBOARD PLATES, INSULATION PIPES H2O	DT2	Mandatory analysis + bb approved
170904	NON-HAZARDOUS MIXED DEMOLITION MATERIAL	GLASS, TECHNOLOGY, INERT, MIXED PLASTIC, DEMOLITION CERAMICS	DT1	
19 – WASTE FROM WASTE TREATMENT PLANTS, OFF-SITE WASTE WATER TREATMENT PLANTS, POTAPPING AND ITS PREPARATION FOR INDUSTRIAL USE				
190904	SPENT ACTIVATED CARBON	CARBON ASSETS, ACTIVATED CARBON DEPLETED FROM H2O DETACHMENT PROCESSES	DT2	BB approved on pallets
20 – MUNICIPAL WASTE				
200101	PAPER AND CARDBOARD	MIXED TECHNOLOGY OF PACKAGING PAPER – CARDBOARD	DT1	
200138	WOOD	WOODEN FURNITURE, E.G. FROM FURNITURE, CRATES, PALLETS	DT1	
200307	OTHER MUNICIPAL WASTE – BULKY	MIXED TECHNOLOGY, HARD PLASTIC, GLASS	DT1	Glass: maximum 3 x time
200121 *	NEON TUBES	NEON TUBES	DT2	Dedicated container

This page has been intentionally left blank

A2 WEIGHT SHEET FOR CATEGORY 3 MATERIALS

Save Number ARES: Company *:

Measuring instrument:

Notes

ID NUMBER	Weight (kg)	Date of the measure	ID NUMBER	Weight (kg)	Date of the measure

Operators	Date	Signature

Verifier	Date	Signature

With upload to the ARES file and completion of the task, this file is approved by the JRC.

* The company declares that it operates with its own procedures for measuring the weight as a whole.

Figure 10. Example of a weight sheet for Category 3 materials

This page has been intentionally left blank

A3 REQUIREMENTS FOR CATEGORY 3 MATERIALS RADIOMETRIC CLEARANCE MEASURES

Table 5. Example of the form for recording the Category 3 materials radiometric clearance measures requirements

PLEASE NOTE THAT NOT ALL FIELDS HAVE BEEN FILLED IN

SAVE NUMBER (LOT)

KEY RADIONUCLIDES AND MDC	V.A.T.									
	1		2		3		4		5	
^{60}Co	□		□		□		□		□	
^{137}Cs	□		□		□		□		□	
241 am	□		□		□		□		□	
^{238}U	□		□		□		□		□	
Others (select below)	□		□		□		□		□	
Others (select below)	□		□		□		□		□	

ACTIVITY REFERENCE DATE	01/01/2021				
MEASUREMENT UNIT REQUESTED	V.A.T.				
	1	2	3	4	5
Insert measurement unit					

QUANTITY TO BE MEASURED	V.A.T.				
	1	2	3	4	5
No of sides to be measured					
Number samples					

MEASUREMENT GEOMETRY	V.A.T.				
	1	2	3	4	5
Type of measure					
Type of container (Specify)					

Other REQUIREMENTS (Surface contamination)	V.A.T.				
	1	2	3	4	5
Instrumentation (e.g.: contaminator)					
MDC					

This page has been intentionally left blank

A4 STANDARD CHECKLIST FOR CONTINOUS PRODUCTION FLOW

1 ACTIVE APPLICANT

Producer (JRC Manager)

External company in charge

Planned activity (short description)

Expected volume (**N.B. SUPERIORE 5 m³ REDIGERE WMP)** m³.....

See Ref. NE.80.2625.A.005

SDL .....

Planned date for start of activity .....

(tick the appropriate box)

"ORDINARY" ° OCCASIONAL/SPECIFIC INTERVENTION

'Continuous production' – the activity generates consumables at a specific frequency.

Specific, extraordinary activity due to safety, asbestos removal – FAV remediation, electrical, mechanical and civil activities.

2 AREA INVOLVED

Building concerned

Local (s) involved

(if more than one building is involved, please specify)

3 Description MATERIAL GENERAL FROM ACTIVITIES (tick all relevant boxes)

- Type of waste generated:

° Metal cementitious ° Other materials (specif.).....

- Related ERC Codes.....
.....
.....@@

(Ref. Annex 7 to this procedure)

N.B. If dangerous indicate nature (HP code), EWC code and intended packaging

- Estimation of residence time in classified area .....

- Physical state:

° Solid HERETO:liquid

- Expected weight:

kg.....

- Type of container intended for collection:

There is a metal cat 600 l quantit

° Big bag 500 l quantit

v

4 RECONSTRUCTION OF THE ALLEGED RADIOLOGICAL STATE

Identify if the material referred to in point 3 has ever been subjected to radiological practice:

1 is the activity planned on a specific installation system?	YES	NO
2 is the activity planned on a specific facility?	YES	NO
3 is the activity planned on an installation component?	YES	NO
4 has the material ever been subject to neutron flux?	YES	NO

5 have you ever been subject to contamination events (even completely accidental)?

YES NO

6 has decontamination treatment ever been necessary (simple with liquid or gel decontaminants, mechanical systems, abrasives such as sanding or paving, ultrasonic washes)?

	YES	NO
7 is the activity planned in BZ?	YES	NO
8 is the activity planned in LFA?	YES	NO

N.B.: provide for the management of any secondary waste generated by the activity in question.

Please attach supporting documents (maps, documents, purchase invoices)

Please note that the attached documentation will be useful in particular to reconstruct history and residence time in classified areas.

IF THE ANSWERS TO QUESTIONS 1-2 – 3-4 – 5-6 PROVIDE FOR AN ANSWER NEGATIVE THE PRODUCER CAN ADVANCE THE RAA AS A TYPE MATERIAL AND

5 Continuous flows (tick the relevant box)

To be filled in only if expected continuous production flow

The planned activity generates:

° Batterias

° Grave mowing

° Gear pruning

ŮOli (engine oil, hydraulic oil, compressor oil, etc.)

° Lampade, neon

° Gasolium/gasoline

° Filters supplied with ventilation

° Pre-Filters supplied with ventilation

° Other (please specify and justify the need for continuous production):

DATE OF COMPLETION OF THE FORM JRC RESPONSIBLE SIGNATURE

FOR APPROVAL TO SIGN RTI/ITD (OR ITS DELEGATE) _____

A5 PRE-CHARACTERISATION FOR CONTINUOUS PRODUCTION FLOW

Table 6. Example of Microsoft Excel file used by the CC to log historic pre-characterisation data

CONTINUOUS PRODUCTION FLOW – TYPE E – (NB: data entered as an example)												
RIF SAVE NUMBER: jrc.j.1 (2021) xxxxxxxxxx							Results MISURE RP (by radiation protection)					
SDL	CONTAINER	ITEM	MATERIAL	AREA OF ORIGIN – LOCAL	ABT	WITS	DATE OF CONTROL	RPO	RPO IDENTIFIER	SC βă – Bq/cm²	SC α – Bq/cm²	DR
2021-XXX	CONT. X NEON	1	neon	warm wing	40a							
	CONT. X NEON	2	neon	41b	40a							
	CONT. X NEON	3	neon	41j	40a							
		4	neon	warm wing	40a							
		5	neon	LOC. 043	40a							

* attach photos
* * N.B. WITS field to be filled ONLY if the waste does not comply with the limits for exit from BZs

This page has been intentionally left blank

A6 ARES CONTINUOUS PRODUCTION WORKFLOW

Table 7. ARES continuous production workflow

CODE	ASSIGNED TO	INSTRUCTIONS
RED	CC	Create the file, upload the AAR form and notify the producer of the save reference number. Once the lot has reached the maximum permissible quantity or has elapsed, the CC, notified by the producer, starts the ARES flow.
CONTRIB	PRODUCER	Person responsible for the procedure. Fill in the RAA, attach Check-list, SdL, CS, pre-characterisation Excel file §7.2, pictures of packages with visible content, SdP and additional maps (if any).
VISA	CC	Check that the attached documentation is correct and complete
CONTRIB	ER	Upload the PMRER tab
VISA	CC	Verification of RP involvement, if not foreseen, removes the RP task
CONTRIB	RESPONSIBLE FOR RP AREA	CS charge per total surface contamination measure
CONTRIB	MRL	Prepare, attach and send RDA, which has already been completed, for signature to the Produrer. Upload and attach SdC. The SdC is filled in directly in ARES.
CONTRIB	veă jrc.clearance coord ext	Check or complete (if not included) the weight in the SOC
CONTRIB	RESPONSIBLE FOR RP AREA	With regard to checks on RP (previously carried out), fill in the CP in the section for which it is
SIGN	PRODUCER	Sign the RDA and the SdC
VISA	MRL	Acceptance of RDA and SdC
VISA	veă jrc.clearance coord ext	Take charge of the delivery and transfer the equipment to the measuring station
CONTRIB	MRL	Upload RdP
VISA	CC	Verification of the correctness and completeness of the attached
VISA	ER	For verification and approval – positive or negative opinion on removal
In case of a positive opinion, ER shall record the approval for removal.		
CONTRIB	CC	In view of the ER's positive opinion, the CC sends the dossier to the
SIGN	OPERATOR	Authorises removal
EXP	CC	After consulting the NEMO, it authorises delivery of type E material as conventional waste
In the event of a negative opinion, the ER rejects the dossier.		
VISA	ER	Assign a CONTRIB to CC under the heading 'decline'
CONTRIB	CC	Does not send the dossier to the Esercenter
EXP	CC	Closes files, informs the different actors that the process has not been successful. Inform the producer for the management and recovery of the lot.