

OECD/NEA RepMet (Radioactive Waste Repository Metadata Management) Initiative

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RepMet Introduction

- **RepMet** (Radioactive Waste **Re**pository **Me**tadata Management);
- RepMet is an initiative that IGSC¹ launched to investigate the role of metadata in the knowledge and information management within the national programmes of radioactive waste repositories;
- 1st RepMet meeting in January'14;
- RepMet initiative will finish at the end of 2017;
- **Participation** - 12 organizations (WMOs and research labs) from 12 countries:
ANDRA (France), ENRESA (Spain), JAEA (Japan), NAGRA (Switzerland), NDA/RWM (UK), NWMO (Canada), ONDRAF/NIRAS (Belgium), POSIVA (Finland), PURAM (Hungary), DoE - Sandia National Laboratories (USA), SKB (Sweden), SURAO (Czech Republic).

1 IGSC (Integration Group for the Safety Case) is a body under the OECD/NEA RWMC (Radioactive Waste Management Committee). Its mission is to assist member countries to develop effective safety cases supported by robust scientific technical basis.

Why metadata? Why RepMet?

- National programmes for radioactive waste repositories require the **long-term** management of **large amounts of data**. As matter of fact, they:
 - ❖ Require **large amounts of data** across **multiple disciplines** (e.g. engineering, geoscience, waste management) and for multiple purposes (e.g. site characterization and selection, numerical modelling, licensing, repository design, construction and operation, waste packaging, safety case, environmental impact assessment etc.).
 - ❖ Operate for a **significant time**, as the programme moves through successive stages of the repository life cycle: pre-siting, siting, characterization, construction, operation and finally closure.

- Metadata, “data about data”, are a **key tool of modern data management**: they play a fundamental role in the long-term management of data...

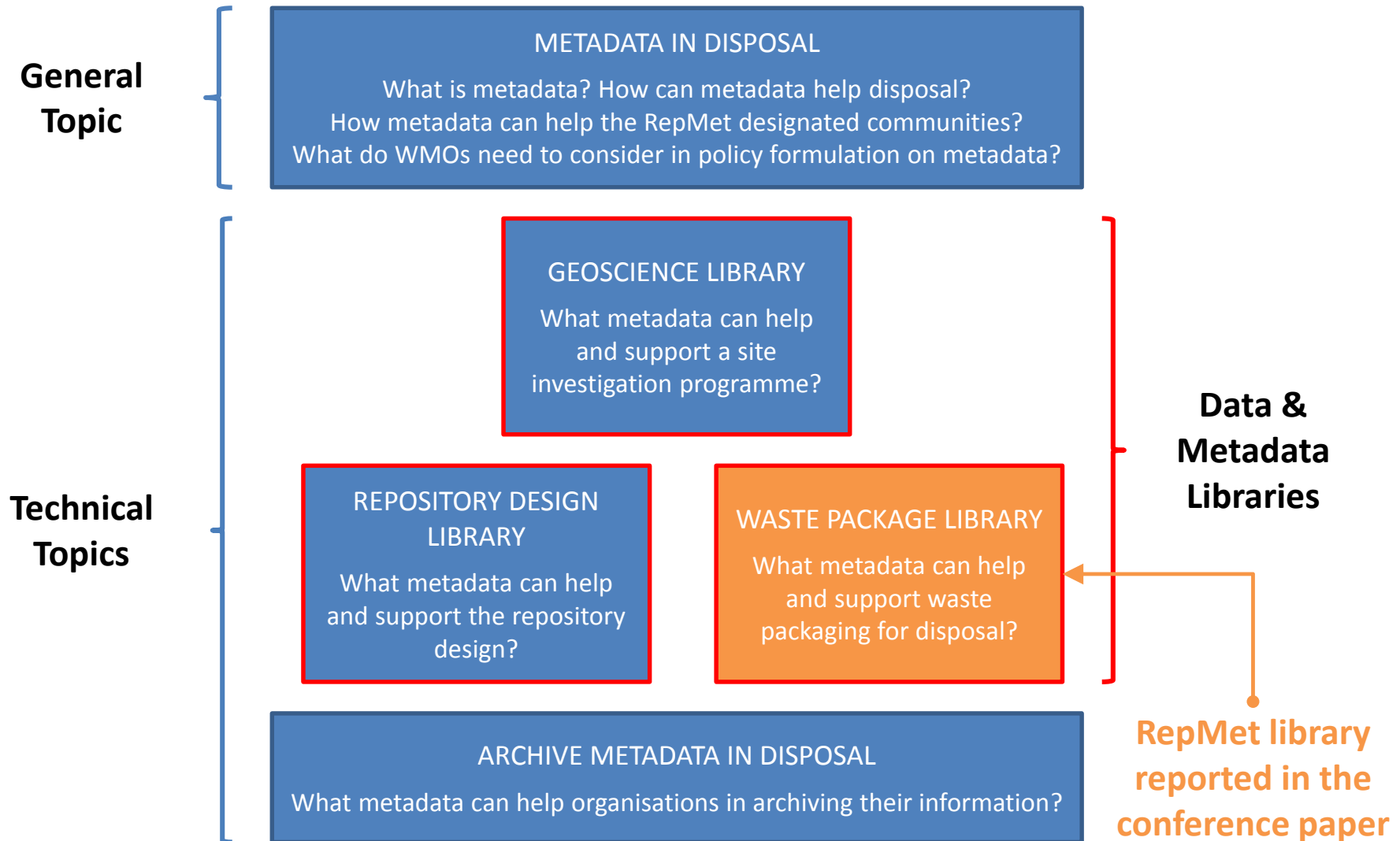
Metadata Types		Potential applications
Discovery metadata	Helps a user to find the data objects that they are looking for.	<i>Subject area of a dataset, dates of creation or update, geographical coverage.</i>
Preservation metadata	Representation information and preservation description information needed to ensure long-term understandability and confidence in the data objects.	-
	<i>Contextual metadata</i> Put the data objects into a wider context, allowing objects to be related and compared, and to provide understanding of their provenance.	<i>Details of organisation that produced or modify a dataset, original format of dataset.</i>
	<i>Detailed metadata</i> Detailed metadata represent additional information about the data or object in a structured and detailed way.	<i>Source, ID, how waste inventory is derived from the radionuclide inventories.</i>

Why metadata? Why RepMet? (2)

- RepMet is investigating metadata in order to bring about a **better understanding** of their application within the radioactive waste repository field in support of national programmes. Within this framework, the main goals are:
 1. *The creation of **metadata libraries** that can be used by national programmes to manage their repository data, information and records in a way that is harmonised internationally and suitable for long-term management and utilisation.*
 2. *The formulation of a consistent and sufficient **set of guiding principles** for capturing and generating metadata.*

- RepMet is of use to existing programmes looking to review their current systems and to new programmes looking to develop their own systems. Some of the potential benefits for the national programmes thanks to this NEA initiative:
 - ❖ *Interoperability between repository data systems and harmonization of the information collected within.*
 - ❖ *Creation of a network between repository data systems.*
 - ❖ *To facilitate the data access to the repository designated communities (e.g. local communities, public, policy-makers, international bodies, NGOs, etc.)*
 - ❖ *And more...*

RepMet Topics



Waste Package Library Application

What does a country need to know about this waste package to ensure it is suitable for disposal? What to manage that information on long-term?

Courtesy of UK NDA/RWM



Waste Package Library Application

What does a country need to know about this waste package to ensure it is suitable for disposal? What to manage that information on long-term?

1. A common framework to describe the waste package and its components: a **conceptual data model** (that it is reported in the conference paper) & a controlled glossary.

Courtesy of UK NDA/RWM



Entity			Description
WP Module	Waste Package	Waste	<i>Metals etc. for disposal</i>
		Stabiliser (1)	<i>Cement</i>
		Stabiliser (2)	<i>Capping grout</i>
	WF Container		<i>500l metal drum and In drum mixer</i>
	Overpack		<i>None</i>
	WP Container		<i>Holding frame</i>
	Filler		<i>None</i>

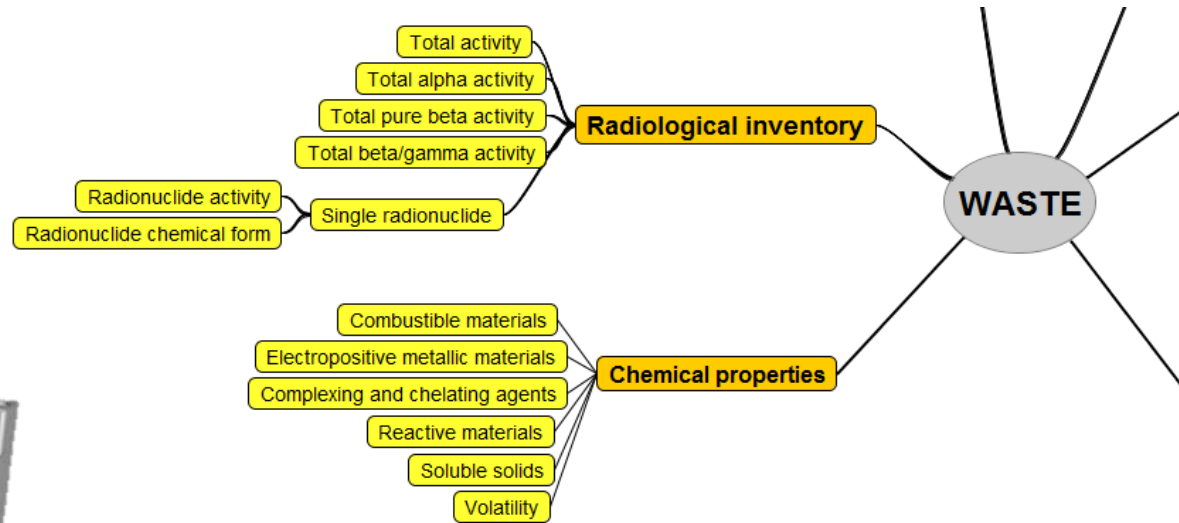
RepMet framework applied to a UK waste package

Waste Package Library Application

What does a country need to know about this waste package to ensure it is suitable for disposal? What to manage that information on long-term?

2. A set of suitable, well-organised and sufficient **data and metadata** to support national programmes (e.g. safety case development)

Courtesy of UK NDA/RWM



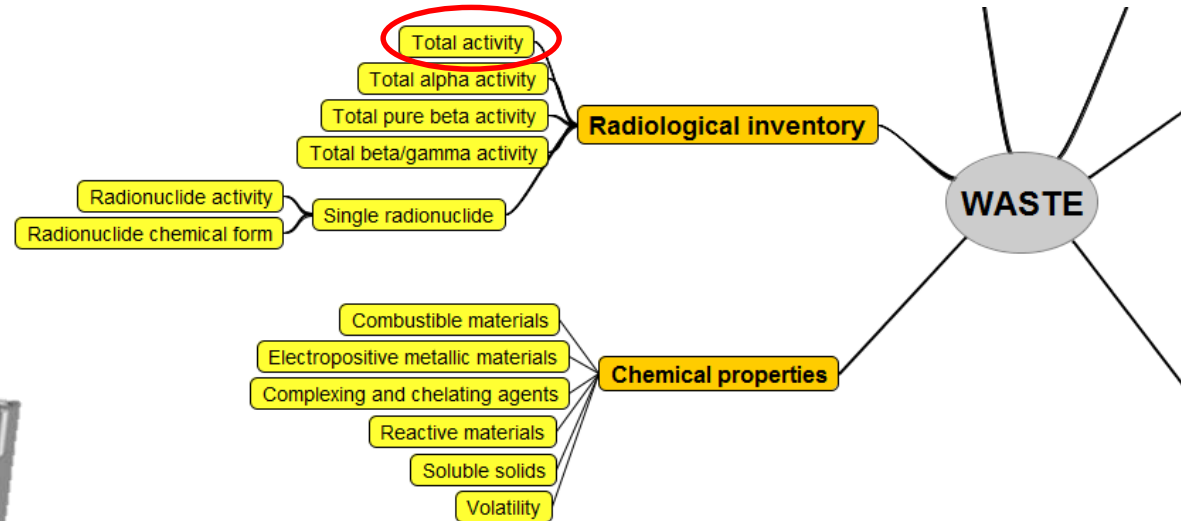
Multiple information sources: 2 exploratory questionnaires, waste package specifications of involved WMOs.

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Metadata are connected to data, according to the data-type. They can add information, store the data context, support the data archiving, help users in managing, etc.

Name	Total activity		
HG	Radiological inventory		
Definition	Activity due to all radionuclides within the waste.		
Source	-		
Purpose	For waste characterization and inventory purposes. To meet radiation protection requirements as per operational procedures, etc.		
Associated metadata	Nr	Metadata group	Name
Comment	This is the sum of the “Total alpha activity”, the “Total pure beta activity” and the “Total beta/gamma activity”		
Repeatable	No		

Work in progress for definition of metadata groups

Existing metadata standards in non-nuclear fields are the source for the library metadata attributes: e.g. *ISO19156 “Observations and Measurements”, Dublin Core, Minnesota RMS*, etc.

Ongoing activities and future goals

- RepMet extended the Waste Package Library to include HLW and Spent Nuclear Fuel waste packages ready for final disposal:
 - ❑ New library version (including an updated version of the CDM in the conference paper) was presented at the last RepMet meeting (2-3 November).
 - ❑ The library will be finalized after the consolidation of the metadata attribute section.
- RepMet involved a consultant company to support the group in the elaboration of the Geoscience Library:
 - ❑ RepMet people and consultants will produce the *data model* for repository site characterization process, including the relative *data and metadata attribute* sets.
 - ❑ The data model will cover the following site characterization areas:
 - ❖ *Geophysical, geological, hydrogeological measured and process data;*
 - ❖ *Geophysical, geological, hydrogeological models.*
 - ❑ The Waste Package library will take advantage by re-utilising some of the metadata sets that the consultants will formulate for the Geoscience library.
- Working in progress for the new Repository Design Library:
 - ❑ Library object: “repository requirements up to the repository closure”.

**THANKS
FOR THE
ATTENTION**