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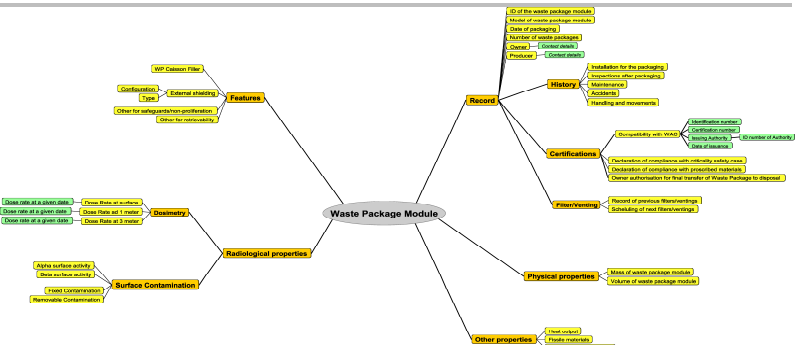

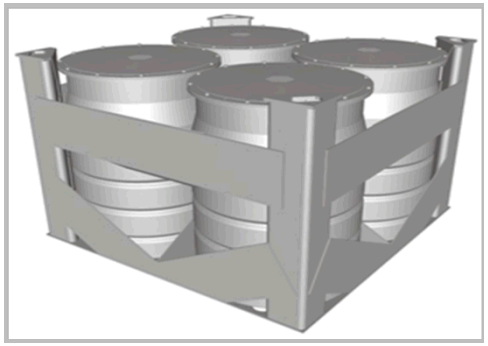

RepMet Conceptual Data Model

LILW , HLW & SNF Status Update

April 18, 2016, Budapest, Hungary

Presented by: Massimo Ciambrella & Kevin McMahon

U.S. DEPARTMENT OF ENERGY

National Nuclear Security Administration

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Outline

- Data Modeling refresher
  - What is Data Modeling?
  - Why are we using Data Modeling for RepMet?
  - How did we get to where we are now?
- LILW CDM
  - Current iteration
  - Associated glossary
  - "Why" should we store the attributes and Mind-Mapping
- HLW/SNF CDM
  - Current iteration
- Merged LILW with HLW/SNF CDM (NOTE: Will remove this section if merged CDM doesn't make sense)
- Discussion

What is a data model?

(1) A data model is a representation of a real world situation about which data is to be collected and stored. A data model will depict the logical interrelationships among different data elements.

(2) Data models may be created in one of three perspectives:

1. **Conceptual Data Model** - describes semantics of a domain, being the scope of the model…consists of entity classes, representing things of significance in the domain, and relationship assertions about associations between pairs of entity classes
2. **Logical Data Model** - describes the semantics, as represented by a particular data manipulation technology. This consists of descriptions of tables and columns, object oriented classes, and XML tags, among other things
3. **Physical Data Model** - describes the physical means by which data are stored. This is concerned with partitions, CPUs, tablespaces, and the like.

(1) http://www.businessdictionary.com/definition/data-model.html

(2) American National Standards Institute. 1975. *ANSI/X3/SPARC Study Group on Data Base Management Systems; Interim Report*. FDT (Bulletin of ACM SIGMOD) 7:2.

Why RepMet data modeling?

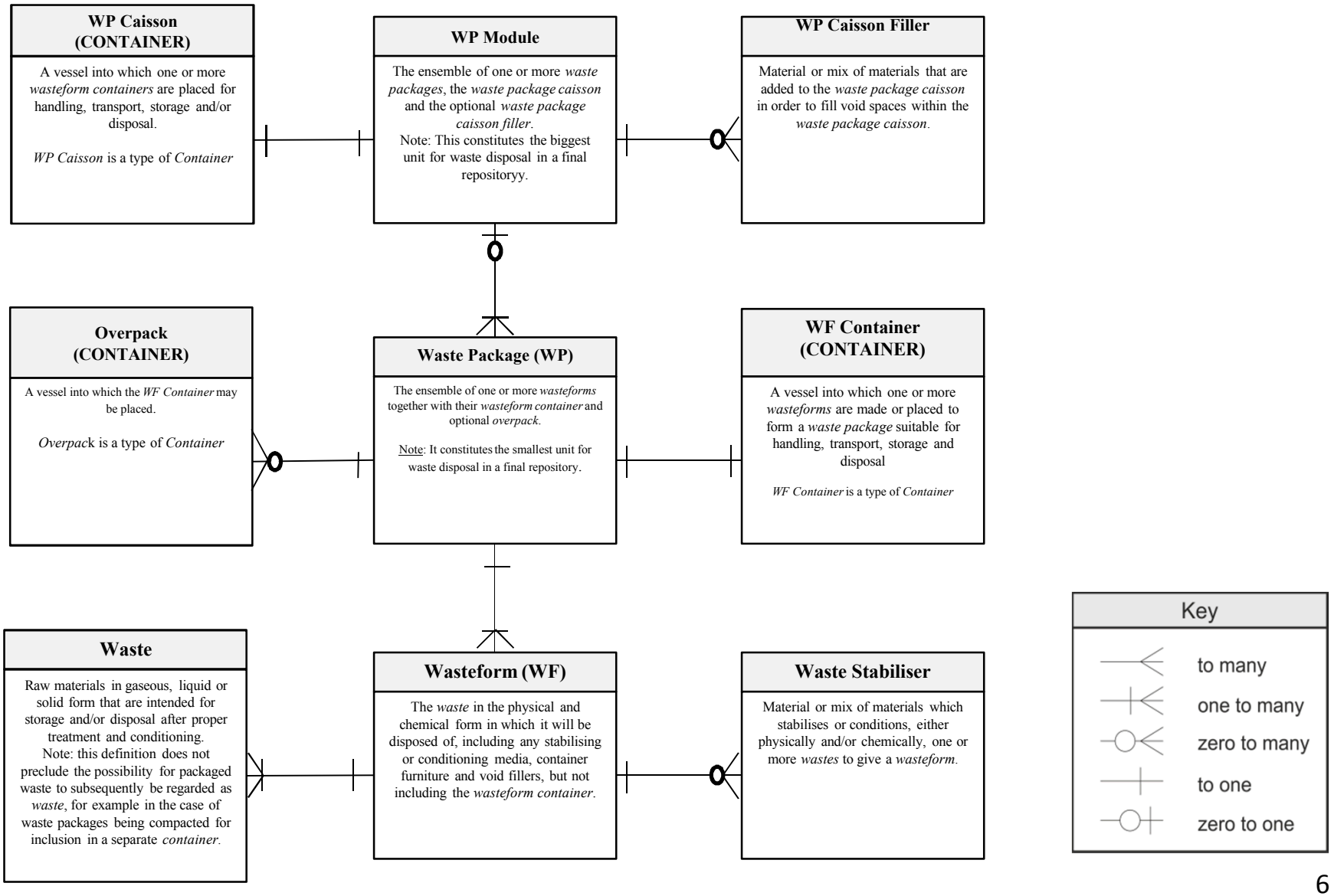
- Data modeling is a ***process*** that is being used to better understand and come to a common understanding of waste package data.
- Using data modeling, we discovered that different members of our team ***understand and interpret*** individual waste package terms differently, AND we were able to come a to common agreement and understanding of the waste package data.
- Data is connected to metadata (and vice-versa), so to get to the metadata, we first ***identify and understand*** the data involved through data modeling
- Data models are ***progressive***; there is no such thing as the final data model. Instead a data model should be considered a living document that will change in response to changing needs.
- Data models may be created using relationships amongst entities[3] (***Entity-Relationship Diagram***) or objects (Object-Relationship Diagram).

[3] Entity - a class of persons, places, objects, events, or concepts about which we need to capture and store data

How did we get where we are now?

- A team of RepMet participants worked to create a Conceptual Data Model (CDM)
  - Gordon Appel
  - Alexander Carter
  - Massimo Ciambrella
  - Pierre-Henri de La Codre
  - Jozsef Fekete
  - Kevin McMahon
  - Zoltan Nagy
  - Claudio Pescatore (through late 2015)
- Multiple iterations of the CDM were developed and discussed amongst the team
- Consideration was given to attempt to ensure various countries' programs would "fit"
- Accomplished by weekly Skype sessions and exchanges of working products

LILW CDM – Current Iteration



The RepMet Glossary

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Glossary sections currently under development include:

1. General (data, metadata)
2. Waste Package (container, overpack, waste, waste package…)
3. Geoscience (terms being identified)

"…*prepared to provide clear, understandable, definitions of how certain terms are used within the RepMet project*…"

Definitions in the glossary have their meaning as in common dictionaries of the English language except for those terms explicitly defined otherwise.

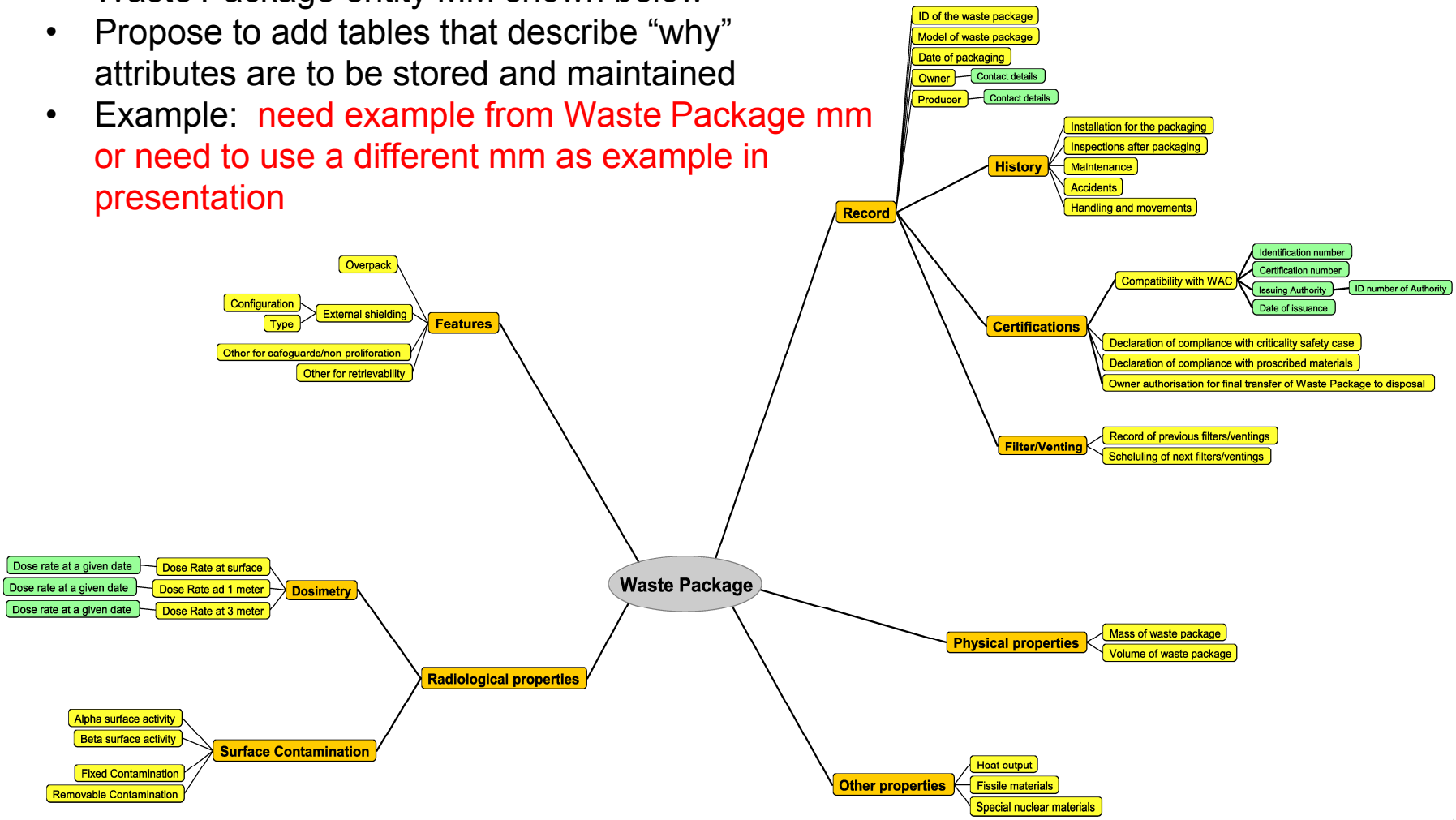
Subject to periodic revision. Available at https://www.oecd-nea.org/rwm/igsc/repmet (once published)

Recommended changes or additions repmet@oecd-nea.org

Why store attributes?

Mind-mapping

- Mind-mapping (*FreeMind*) software used to "map" the attributes of an entity.
- Waste Package entity MM shown below
- Propose to add tables that describe "why" attributes are to be stored and maintained
- Example: need example from Waste Package mm or need to use a different mm as example in presentation



HLW/SNF CDM – Current Iteration

Need current iteration inserted here Massimo

Merged LILW & HLW/SNF CDM

Current Iteration

I will insert the merged CDM here. If we decisde not to use it, it will be easy to remove from the presentation (including from the outline).

KMcM

Discussion

Grazie,

Massimo Ciambrella

Thank you,

Kevin McMahon