February 26 – March 1, 2012 ♦ Phoenix, Arizona

Remembering (not) to forget?

Presentation of the OECD NEA project on Preservation of Records, Knowledge & Memory (RK&M) across generations in the context of radioactive waste management

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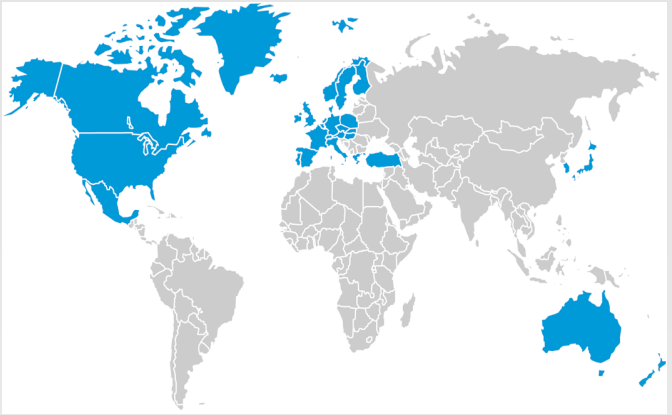
Session 034 and 064 B#

Organization for Economic Co-operation & Development and Nuclear Energy Agency

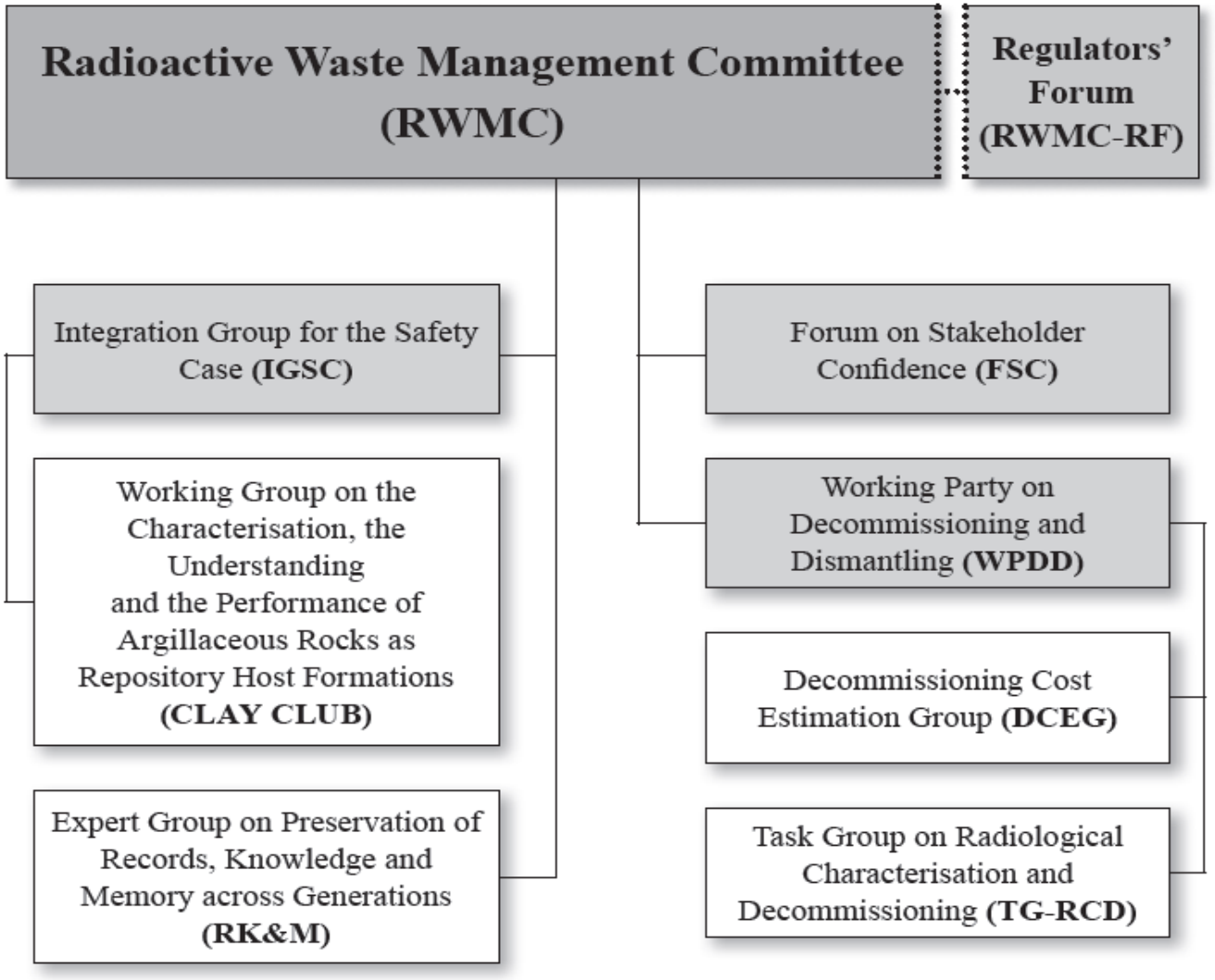


Platform to compare policy and research experiences, seek answers to common problems, identify good practices, co-ordinate domestic and international policies, pool expertise, and promoting international cooperation.

- Australia
- Austria
- Belgium
- Canada
- *Chile*
- Czech Republic
- Denmark
- Finland
- France
- Germany
- Greece
- Hungary
- Iceland
- Ireland
- Italy
- Japan
- Korea
- Luxembourg
- Mexico
- Netherlands
- *New Zealand*
- Norway
- Poland
- Portugal
- Slovak Republic
- Slovenia
- Spain
- Sweden
- Switzerland
- Turkey
- United Kingdom
- United States
- *Estonia*
- *Israel*

Not member of NEA

Nuclear Energy Agency NEA



OECD/NEA joint projects in the radioactive waste management area:

- Co-operative Programme for the Exchange of Scientific and Technical Information Concerning Nuclear Installation Decommissioning Projects (**CPD**)
- Thermochemical Database (**TDB**) Project

The OECD NEA RK&M project

- Topical session at RWMC *On the subject of information and memory preservation* (March 2010)
  - ***large interest***
  - ***survey*** *of status and needs*
  - *suggestions to set up an* ***international project***

→RK&M project officially launched in 2011

- Currently 15 member organisations from 12 countries + IAEA and European Commission

– Aim 2014: *'Manual' "that will allow relevant actors to identify the elements of a strategic action plan for RK&M preservation*"

OECD NEA RK&M project: work done

- PROJECT MEETINGS
- QUESTIONNAIRES
  - 2010 national **Status and Needs**
  - Questionnaire A: **who is responsible** and for what on RK&M keeping in the project countries and **whether current institutional arrangements / provisions are clear**
  - Questionnaire B: examples of **RK&M loss** and retention
- BIBLIOGRAPHY + preliminary analysis
- GLOSSARY of KEY TERMS
- A COLLECTIVE STATEMENT
- A VISION DOCUMENT
- WORKSHOP + proceedings

http://www.oecd-nea.org/rwm/rkm/

Mission of the RK&M project

Deliver **advanced insights** in the issue as a whole and to **flag potential knowledge gaps** and **remaining issues** of concern.

To begin to craft what may become an **international consensus** on what reasonably **can** and **should** be done.

Develop guidance on regulatory, policy and technical aspects of long-term preservation of RK&M.

To incorporate lessons from **sciences not typically represented in WM organizations**, such as history, philosophy, archaeology, etc.

Preservation of RK&M for RWM: History

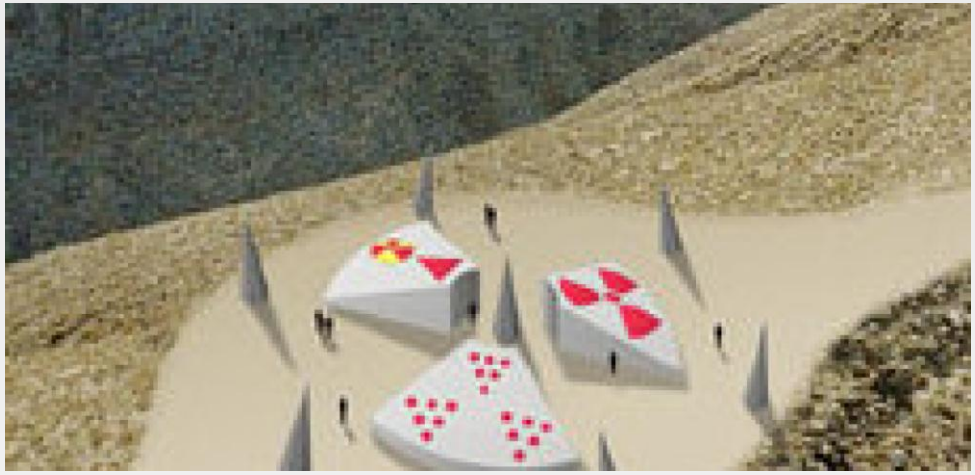
- 80s: exploratory research; how to make people **forget** or how to warn them to **stay away**: focus on **awareness of danger**

- 90s:
  - US marker study, SANDIA NL (1991)
  - Nordic study, KAN-1.3 (1993)
  - Basic coordinate research e.g. NEA (1995)

  Quite some studies on **human intrusion scenarios** + local **communities** (involved through siting) expressing **concerns**

- 2000s onwards: present cannot control the future, but we can and should try to **inform** it
  → how to make people remember: focus on enabling **understanding of previous decisions** and **making informed decisions**

Danger → Understanding



Preservation of RK&M for RWM: History

- < 80s: focus on **awareness** of danger
- 90s: more dedicated research + concerns
- > 00s: focus on **understanding**

- Today: RWM research towards implementation
  - → Renewed interest, placing RK&M in **concrete, formal contexts**
  - → Various ambiguities
    - Purpose?
    - Content?
    - Means?

Problem setting

- **Passive, permanent disposal** : intrinsically safe & final
  - No future use foreseen
  - No reliance on human action
  - Geological stability of a host formation is greater than socio-political stability

➢ Emphasize formerly on
  - **Avoiding inadvertent human behavior**
  - By means of **passive controls**, typically monuments and markers

- Long term preservation in the material sense can perhaps be demonstrated **BUT** how can one demonstrate the long term
  - **awareness of the existence** of records and signs
  - **understanding of & 'compliance' to** their meaning

➔ how to preserve records **+** knowledge **+** memory ?

Key questions
NEA RK&M project

- **WHAT**: Which records need to be maintained?
- **WHY**: For what purpose?
- **WHEN**: Over which timescales?
- **WHO**: By whom? For whom?
- **HOW**: How to provide maximum continuity, accessibility and awareness of RK&M?

How?

Need to be **flexible** and **adaptable** over time, complying with technical, managerial as well as social demands.

A **‘systemic’ approach:** the various components of the system complement each other, provide for **redundancy** of message communication, and **maximise the survivability** of a recognizable message.

How - Language?

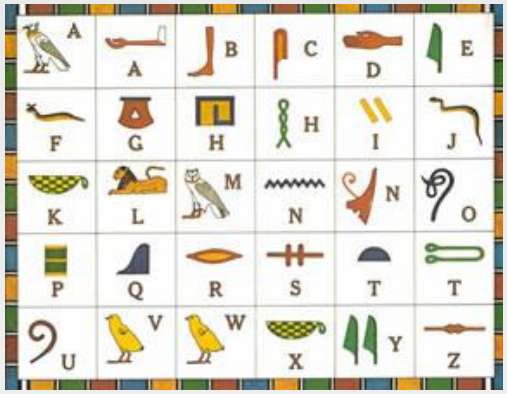
danger

الخط

危险

סכנה

peligro

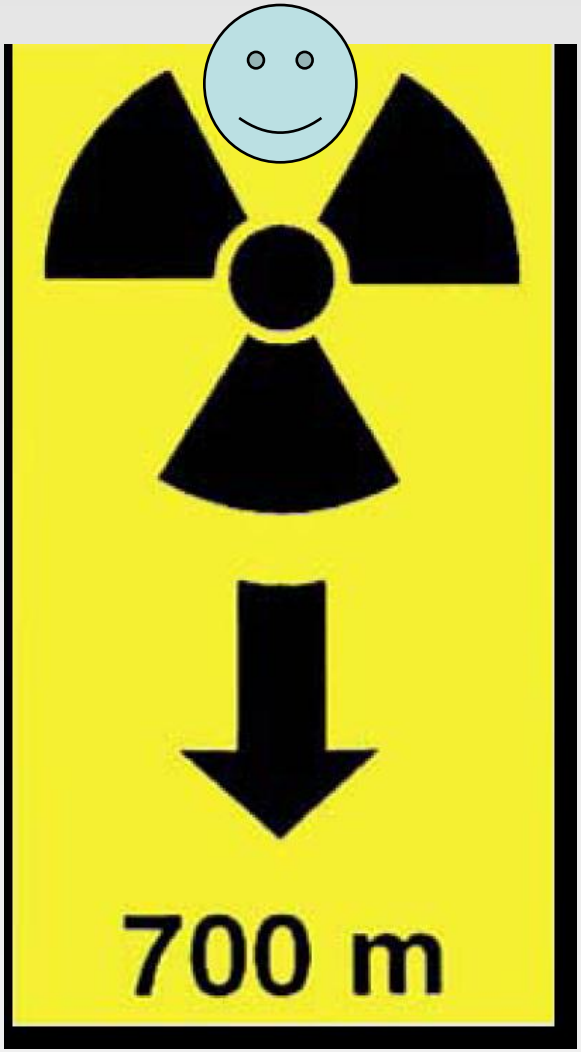


våda

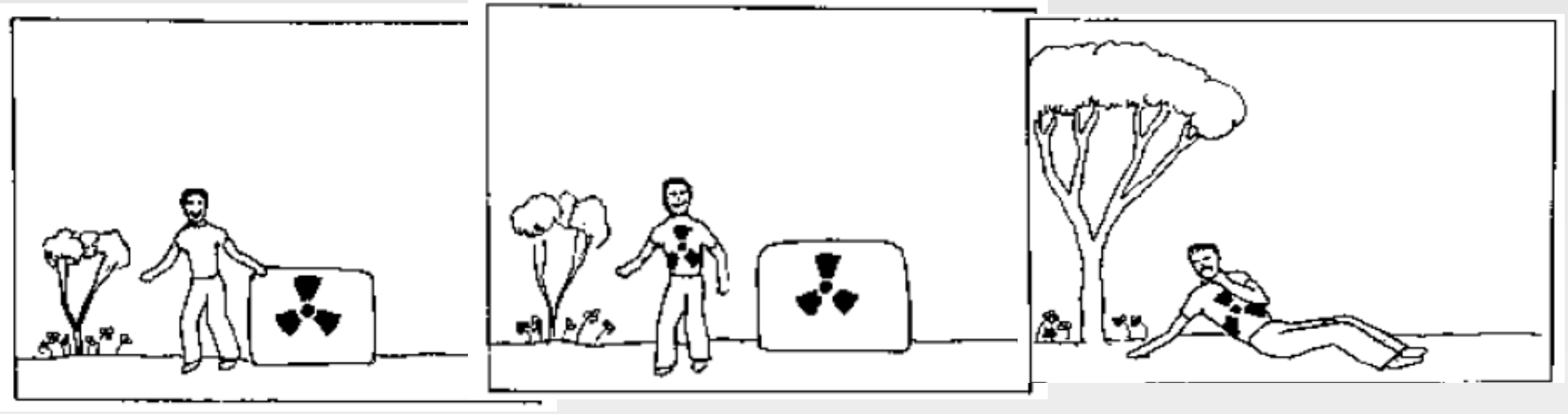
危険

This manuſcript was ſhown to ſeveral learned and ingenious friends, who thought the contents too curious to be conſigned to oblivion, and importuned the poſſeſſor to ſelect ſome of them, and give them to the preſs.

How - Symbols?



How - Images?



How - Markers ?

Tsunami in Japan:
grim reminder of potential **ineffectiveness of markers**

Previous generations erected stone warning signs, 200-600 yr ago, to warn future generations not to live below these signs.

The stone slab reads:
"High dwellings are the peace and harmony of our descendants. Remember the calamity of the great tsunamis. Do not build any homes below this point."

New generations felt they possessed the technology to fend off tsunami danger: sea walls.

How?

Formerly:

- design of markers by technologist has focused on **durability**
- assumption: repository is **isolated from its social environment**

New vision:

- It may be worthwhile to consider the repository as part of a **societal fabric**

→ foster community involvement and heritage inspired transfer mechanisms?

How?

Dual –Track Approach: relies on both direct and indirect transmission methods and on both material and social carriers

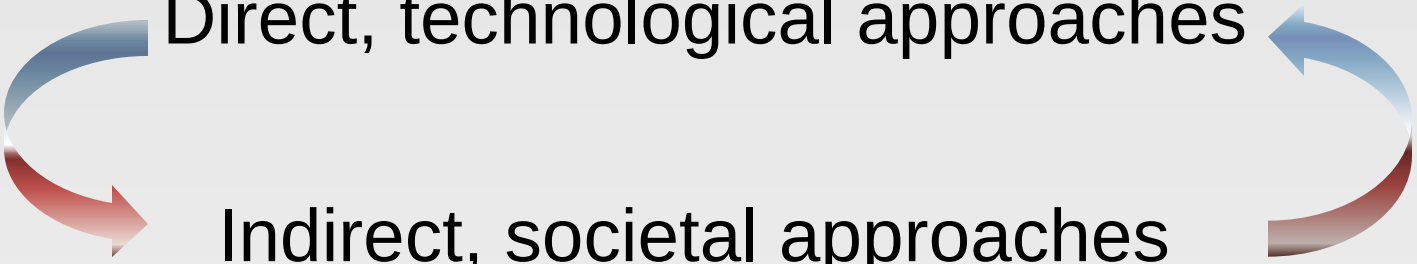
- Managerial, organisational

– **direct** transmission:
  - record is conveyed directly from the present time to the future receiver
  - presence of intermediaries is not foreseen
– **indirect** transmission:
  - passed on from one generation to another
  - by means of a ‘transmission chain’

- Practical, technical, material

– ‘Material’ carriers
– ‘Social’ carriers ‘living memory’

How?

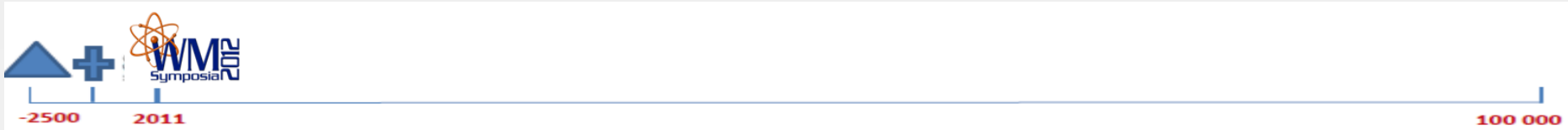


‘Complementary approach’

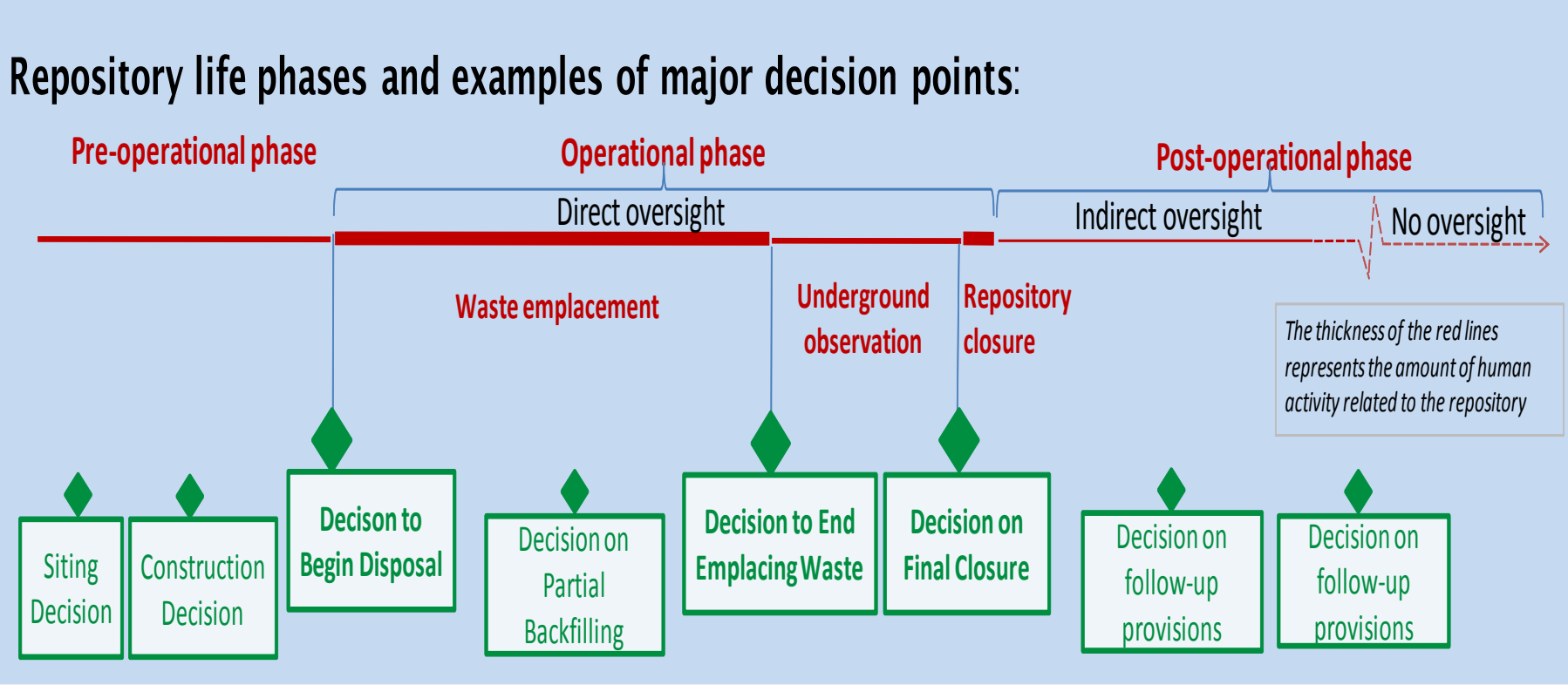
When?

- **Start as soon** and **last as long** as possible

- Different time frames ~ different R, K & M needs
  - **Short term**
    - Production – Disposal closure
    - Ca. 200 years??
  - **Medium term**
    - Period of indirect oversight
    - Few 100 years??
  - **Long term**
    - Period of no repository oversight
    - Thousands of years



When?



OECD NEA Reversibility and Retrievability Conference, Reims, 2010

Why?

- **Legal** (Switzerland, Japan) or **regulatory** (USA, France, …) requirement
- **Passive safety** *(i.e. preventing inadvertent human interference)*
- **'Active' safety and security** *("instructions")*
  - » To maintain confidence in safety and security
    - » accurate and reliable information
    - » visible and transparent oversight across time
  - » Reversibility and retrievability (R&R)
- **Public confidence / communication**
- **Cultural** (heritage – to promote awareness of past activities)
- **Ethical** (freedom to act in an informed manner)

What?

- **Expert information**
  - *Information without the **capacity to act** is information for its own sake!*
- **Factual information**:
  - **Location** of the facility
  - **Design** of the waste management system (containers, barriers, facility structure, …)
  - **Hazard** of its content – radioactivity, toxicity
- **Meta information**:
  - why a site is there and not somewhere else
  - where the waste comes from
  - why we consider it waste
  - why we decide to bury it
  - …

Who?

Preservation of RK&M is the responsibility of **many different actors** with a different role to play over time:

- A '**life-cycle approach**' : all actors within the nuclear fuel cycle, from cradle to grave
- **Implementers**, **regulators** and **governments** carry the main, **formal responsibilities**
- **Affected municipalities** have voiced a strong interest and may **become long-term actors**
- A **multi-disciplinary approach**: scientific, technical and social (societal, cultural, ethical, political, historical, economic, …) aspects are intertwined

Preliminary findings - Salient issues

- **Traditional records** management approaches are **unlikely to be sufficiently robust** or sustainable to meet the demands over the long timescales RWM involves;
- There is a need to try and conceptualize a "**rolling future**" in which each succeeding generation passes on RK&M;
- Records need knowledge, knowledge needs records, memory needs both;
- Maintaining **meaning** is the crucial challenge;

Preliminary findings - Salient issues

- RK&M gets lost. Actions to **mitigate potential loss** should be evaluated and must be implemented;

- **International cooperation**: a catalyst
  - for the present: to ensure that a wide range of approaches and experiences is considered
  - for the future: to make available ‘cross-boundary’ means and meanings

Preliminary findings - Salient issues

- The **economic challenges** for long-term RK&M preservation must be further analyzed:
  - long term costs - making provisions
  - balance present and potential future needs and desires

- The role of RK&M in **regulation** needs to be investigated further, most notably with regard to final licensing of the repository
  - Is the traditional logic of demonstration also valid / realistic for RK&M preservation?
  - What is the exact role of RK&M preservation in relation to safety?

Preservation of Records, Knowledge and Memory across generations?

… is **potentially achievable** via:

a trans-disciplinary, trans-political, trans-generational and socio-technical defence-in-depth process which aims to ensure societal ownership of the issue over time.

Thank you for your attention!

Let’s discuss!

http://www.oecd-nea.org/rwm/rkm/

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