Radiological Characterization in Decommissioning of Nuclear Facilities

International Good Practice on Practical Implementation

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on behalf of the Task Group

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Background

- NEA WPDD initiated in 2010 a project on "Strategies for Radiological Characterisation in Decommissioning of Nuclear Facilities"
- The project (Phase I) completed in 2013
- In 2014 a new mandate (Phase II) was given on …waste and materials end-state perspective”
Presentation of task group

Task group composed of:
- Independent experts
- Decommissioning organisations
- Regulators
- Repository organisations
- Specialist consultants
- Utilities
- Waste Management organisations

Representatives from 11 countries
ACKNOWLEDGEMENTS

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A lot of questions
Phase I
(2011-2013)

Overall strategies
General characterisation issues
Characterisation – in a life cycle perspective

- Construction, licensing
- Operation
- Transition period
- Dismantling, remediation

- Background radiological conditions
- Preliminary decommissioning plans
- Decommissioning plan
- Planning of specific projects
- Final survey of end state

- Material compositions
- Cost estimations
- Safety analysis
- Validation of nuclide vectors
- Regulator’s confirmatory survey

- Environmental impact assessment
- Reduction of radiological hazards
- Planning of final survey

Radiological characterisation
Phase I – conclusions

• Radiological characterisation is a key activity in all phases of decommissioning
• Characterisation activities to support the decommissioning should start very early
• Well defined objectives and a structured approach is essential
• Generic steps exist, relevant for all projects, independent of size, independent of the nuclear facility lifecycle phase.
• Gathering and appropriate evaluation of historical data and knowledge is crucial.
• Do not get lost in technical details when forming strategies and plans

Read the report gives a good overview of identified Best Practice

http://www.oecd-nea.org/rwm/wpdd/
Phase II (2014-2017)

Strategies for optimization of radiological characterization in a waste and materials end-state perspective

Focus: Characterisation in practice.
Phase II - Main activities

- Perform a Questionnaire to gather views on Good Practice, experiences and examples
- Arrange an international workshop (PREDEC)
- Case studies to gather experiences, well working practices and lessons learned
- Collect and analyze standards and guiding documents
- Define set of Good Practice and areas for further development
  - Development of NEA WPDD status report
Questionnaire – conclusions

- Solid experience in radiological characterisation among regulators as well as owners
- Survey is allowing distillation of key learning/good practice
- A common view of regulators and owners/implementers on Good Practice
- Highest priorities:
  - Reducing uncertainty about waste and
  - Identification of waste classification
- Major differentiators:
  - National legislation on clearance
  - Set-up of the disposal programs
- Some areas may benefit for development of further guidance

Conclusions have been internationally circulated for review. Confirmed.
Findings – PREDEC 2016

- **Characterisation is crucial** in all steps
- Early characterisation **lower costs and financial risks**
- Early characterisation mainly are to **confirm and validate**
- **High interdependency** between waste management, dismantling and characterisation
- Characterisation and categorisation performance may reduce radioactive waste for disposal with up to a **factor 10**
- **Non-radioactive characterisation** becomes more and more important
- **Quality audits** appear to focus on the paperwork side of characterisation rather than the practical implementation
- Example: decommissioning project **delayed 10 years** due to characterisation during dismantling instead of in advance
- Defined **needs for further improvement**

230 participants from Asia, Europe and North America
Findings – case studies

Initiation:

• Definition of stakeholders and contributors and their acceptance was crucial
• Decision on final destination of material/waste was considered to optimise efficiency and effectiveness of characterisation
• Introduce databases for managing plans, historical data and characterisation results

Planning:

• Review of historical information, unexpected events and characterisation activities important to develop list of radionuclides of concern and to make initial categorisation of the plant
• Assessment of historical data collection in the light of current requirement
• Involvement of retired staff in planning
Findings – case studies (cont’d)

Implementation:
• Combination of calculations, in-situ measurements and sampling
• Numerous cycles of sample collection was needed

Data assessment:
• Statistical methods was helpful to determine radioactivity distribution
• Verification of activity calculation models by sampling and analysis
• Combined materials – analysed separately and combined
• “Four eyes” principle to secure quality. QA in two steps.

Reporting and use of results:
• Characterisation data was key input to decommissioning design, plans and actual implementation
The evidence base will be provided in annexes to the report.

Report expected to be published Q3-2017
THANK YOU FOR YOUR ATTENTION!