How to apply ALARA in the decommissionning and remediation

Working group 1-b

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4 topics identified :

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ALARA PRINCIPLE APPLICATION TO DECOMMISSIONNING

- Definition of the “R” of ALARA :
  - Often ➔ Reasonable = “Economically” reasonable
  - However :
    - Monetary value of man.Sv is not widely used
    - Consensus to use this tool as a decision assistance only instead of a real decision criteria
- Radiological analysis to be made at the decommissioning planning phase
  - Necessary to take the time to study different options even if the schedule runs fast
  - If not, it will be “to late to say no” !
  - Consensus about “the higher the RP stake is, the more ambitious optimization has to be
  - Distinction has to be made between nuclear and non nuclear facilities according to the risk level

ALARA PRINCIPLE APPLICATION TO DECOMMISSIONNING

- How to convince project management that optimization means first “doses optimization” and not “cost optimization” ?

- Recommendation 1 : Showing benefits generated by a good ALARA study performed at the decommissioning planning phase
  - Considering each phase of the project and dose transfers from workers to another
  - Considering benefits for all fields (i.e. decon can impact dose but also radioactive waste amount)
  - Considering the impact of each unexpected event on schedule delays and costs

- Recommendation 2 : Increasing the RP culture of project management
  - Why is it important to apply ALARA principle ?
  - Probably a long term effort !

RADIOLOGICAL CHARACTERISATION

- Characterization / mapping : What are we talking about ?
  - Radiological inventory for waste management objective ?
  - Radiation protection for ALARA objective ?

- Input data are often conservative for RP assessments when obtained for waste management purposes

- ALARA needs more accurate data leading to cost issues but could be profitable to avoid non useful collective or personal equipment

- Recommendation 3 : Integrating a techno-economic analysis about benefits induced by a better characterization

RADIOLOGICAL CHARACTERISATION

- Characterization : When to proceed ?
  - Don’t wait too much longer before characterizing to avoid losing a lot of information

  BUT

  - Wait sufficiently to identify which data are really necessary according to the schedule evolution ➔ Importance of preliminary ALARA studies

- Which level of confidence do you have about your characterization data ?
  - Historical measurement are not necessarily usable for the future
  - Measurements could have been done with old and not adapted technologies

- Recommendation 4 : Do not forget to perform a preliminary ALARA study including the needs of data and their accuracy ?

RADIOLOGICAL CHARACTERISATION

- Characterization for ALARA purposes :
  - Mainly dose rates but not only
  - Gamma spectrometry can be useful :
    - As input data for modeling and dose rate calculations (shielding studies for example)
    - But needs a high level of expertise and a good knowledge of geometry
  - Alpha characterization : difficult to monitor
    - UV detection devices : raising technology / not mature yet
    - Laser technics : plasma analysis, filtered released substances from oxide layer analysis
  - Core sampling :
    - Very useful for mass activity measurements
    - But destructive and expensive technique
    - Is there any non-destructive mass activity measurement technology available ?
- Advice : Using new technologies can be profitable to ALARA to get more accurate data

ORGANIZATION AND SKILLS

- Holistic approach can be difficult to implement :
  - Industrial safety and RP staff are not necessarily in the same department
  - Communication and team work can be difficult
- Be careful ! There are differences between operation and decommissioning phases
  - Skills are different : RP experts in operation are not RP experts in decommissioning
  - Experience is generally missing : preferring experienced staff instead of workers not used to working in decommissioning (unless if specific training)
  - Vigilance decrease temptation :
    - A plant in decommissioning (no fission reaction, less criticality risk) does not mean “a plant with a lower RP risk level”
    - Low dose rates do not mean low doses. Especially in decommissioning where works can be very long
  - Different issues : alpha contamination and internal incorporation, frequent layout modifications, aggressive dismantling techniques, …
- Recommendation 5 : Integrating a specific module dedicated to RP in decommissioning in RP training courses at schools or before starting a new position in a company

ORGANIZATION AND SKILLS

- RP technical expertise in decommissioning is a rare resource
- How to maintain a high level of RP expertise in sub-contractors ?
- How to strengthen sub-contractors loyalty ?
  - Paying more !
  - Giving a long term vision with long term contracts to avoid massive turn-over
  - Limiting successive layers of sub-contractors

- No recommendation : Open discussion

END STATE IMPACT

- Decision usually made at the beginning of the project according to the end state
- ALARA considerations are implemented according to the expected end state
- But who decides what will be the end state ? Political decision !
  - A beautiful green park or a new nuclear facility ?
  - ALARA could be a balance between workers dose to reach the end state and public dose when the end state is reached ?
  - End state impact on ALARA could be low for worker dose optimization but high for population dose optimization
- How to manage regulation evolutions over a long term ?
  - Decisions made at the beginning can be obsolete 15 years later
  - It's safer to decommission immediately
  - Lobbying to minimize regulation changing impact or having enough time to anticipate changes
  - It's better when Safety Authorities are stakeholders on the project but it's not always allowed (necessary to maintain a certain distance between Safety Authority and licensees)
  - Best recommendation : Follow Safety Authorities guidelines !!
- Open discussion