Day 1 Group Discussion: Needs and Opportunities for Improving Decommissioning Practices

1 Which areas of decommissioning have developed and improved fastest, and which areas are lagging to adopt?

Developed fast:

- Technologies, techniques and tools
- Characterization: start as early as possible
- Recent development early and thorough planning, learning, experience exchange
- The number of decommissioning companies
- Modeling of decommissioning
- Mature dismantling techniques
- Use of gamma cameras and portable spectrometers
- Remote operations (but still expensive and limited)

Still lagging:

- Criteria for final clearance of sites
- General harmonization of e.g. international standards for packaging and clearance levels in general
- Requirements for waste management for packaging for disposal sites
- Licensing of sites in general
- Remote operations (but still expensive and limited)
- General project management and quality assurance
- Human factors
- Automation

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2 What are the main challenges we foresee in upcoming decommissioning work?

- Resources for decommissioning:
  - Market situation and contractors, increasing number of decom projects

    - Young generation in the business, needs training for decom
- Availability of waste disposal routes and final repositories, incl criteria for packaging
- Packaging optimization
- Legacy waste, repackaging, characterization of exixting waste packages
- Decom is not a science – keep it practical
- International cooperation – e.g. sending materials across borders
- Preservation of knowledge across generations
- Get information from commercial companies on decommissioning
- Reduce costs

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3 What were major pitfalls and what are the best practices that you have seen or experienced to avoid those?

- Choosing a dismantling strategy for the wrong reason, and then having to come up with a new reason for the established strategy
- Need to think for yourselves – finding out too late that an established technique might work in other cases, but not for your particular system
- Delaying:
    - Loss of knowledge
    - Inaccurate records
    - Political difficulties (e.g. change of government impacts funding)
    - Installation falls apart and requires investments before dismantling (e.g. ventilation systems)
- Know the end of your waste stream route before you commit to an early stage process
- Lack of flexibility: Need to be prepared to make changes and take advantage of unforeseen opportunities
- Need to define goals early on
- Engage with the public, and not forget that decommissioning

also has social impacts

- Make sure you characterize sufficiently before planning
- Difficulties in compiling historical data and events of significance for the plant (e.g. poor documentation)
- Characterization:
    - Failure to carry out adequate physical, radiological and non-radiological in advance
- Failure to have a plan B, …C, and D
- Pitfalls are not reported properly
- Not let only researchers perform decommissioning on their own
- Implementing new technology too late or not at all

4 What are the differences in decommissioning needs and opportunities between research reactors and commercial reactors? What experiences and lessons learned could be shared between the two industries?

- Research reactors usually do more measurements, and usually know more. Affects the strategy.
- Usually more of a logistics problem in an NPP than a research reactor
- Priorities for organizations are different. Research staff usually stays in place, less time and cost pressure, not so concerned with laying off people to reduce cost as necessary for NPPs.
- Infrastructure is different. NPP makes sense to own, research better to outsource
- Need for change management does not receive much attention from authorities in e.g. waste managements systems
- Possibility to pass down cost efficient methods discovered on research reactor projects for further development for NPPs.
- Success on research reactor projects is good PR for nuclear in general.

5 What kind of smaller incidents have occurred during decommissioning in the past that we might learn from today?

- General change in radiological challenges: Need to be more conscious of these
- Tend to run into chemical surprises – consciousness of non-rad hazards
- Need for more detailed multi-discipline planning for decom
- More and different training needed
- No information about characterization led to some incidents
- Existing support systems sometimes fail within the facility, experience is to use new systems
- Decontamination of systems can have different results than expected, may have to be repeated or you get more rad waste than expected
- Underestimation of thermal isolation that you did not expect to be contaminated may also give more rad waste than expected
- Waste management,
- Characterization problems
- Uncertainty measurements
- Retaining ownership so we have an operator with an operating fleet and a decommissioning fleet able to own and maintain the solution

6 Is sharing of decommissioning experience sufficiently done today? What improvements would you suggest?

- Information shared is often not very detailed. Getting also commercial companies to share information is important.
- Cost information – not enough consistency yet
- Lessons learned and good practices should be shared
- Big differences between countries in terms of reactor technologies, legal issues, available man power and financial resources
- Common knowledge and shared information could help
- This type of workshop could help
- Encourage more visits to research reactors

When decommissioning is funded with public money, there should be a requirement that knowledge obtained is shared

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