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International Decommissioning Planning and Cost Estimating Feedback

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Agenda

- Introduction
- Background
- Decommissioning Planning
- Waste Led Decommissioning Planning
- Decommissioning Cost Estimation
- Lessons Learned and Feedback
- Conclusions
- Q&A

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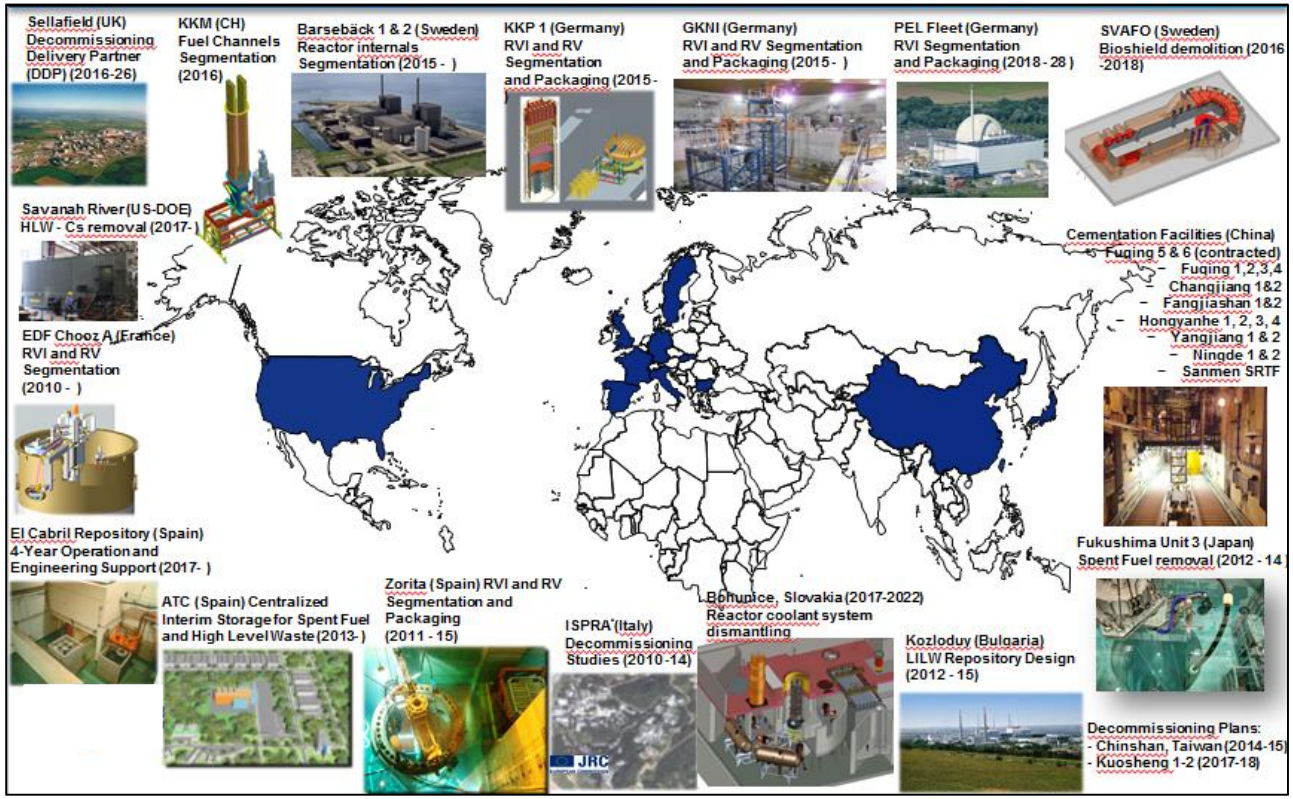
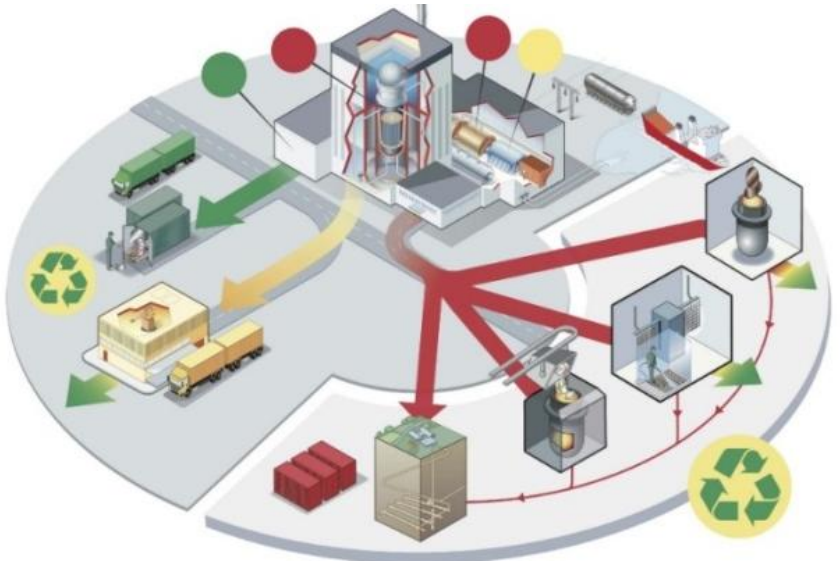
Introduction

- Westinghouse involved in D&D for more than 40 years
- Decommissioning is an expanding market, continuously challenging suppliers to improve and evolve offerings
- Global projects with different boundary conditions and cultures, demanding high flexibility and ability to adapt
- Decommissioning planning critical for a successful project



Background

- Credible decommissioning planning to ensure:
  - Sufficient funding
  - Regulatory compliance
  - Waste disposal capacity
  - Logistical requirements
  - Waste route evaluation
- Starts several years before final shutdown



Do not underestimate the planning phase

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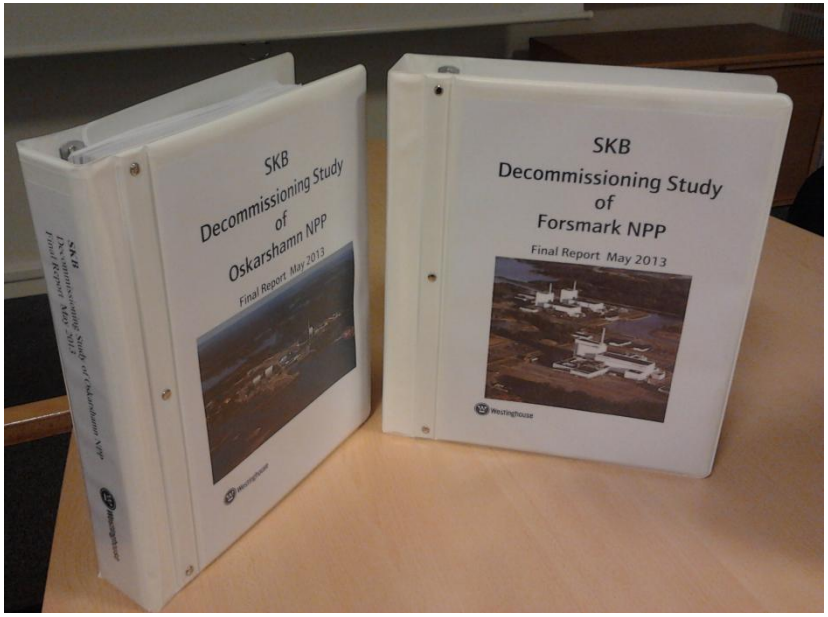
Decommissioning Planning

- Main content of a decommissioning plan
  - General plant description
  - Plant characterization
  - Technical platform
  - Material & activity inventories
  - Waste handling
  - Waste volume estimates
  - Staffing during all phases
  - Decommissioning program
  - Cost estimates



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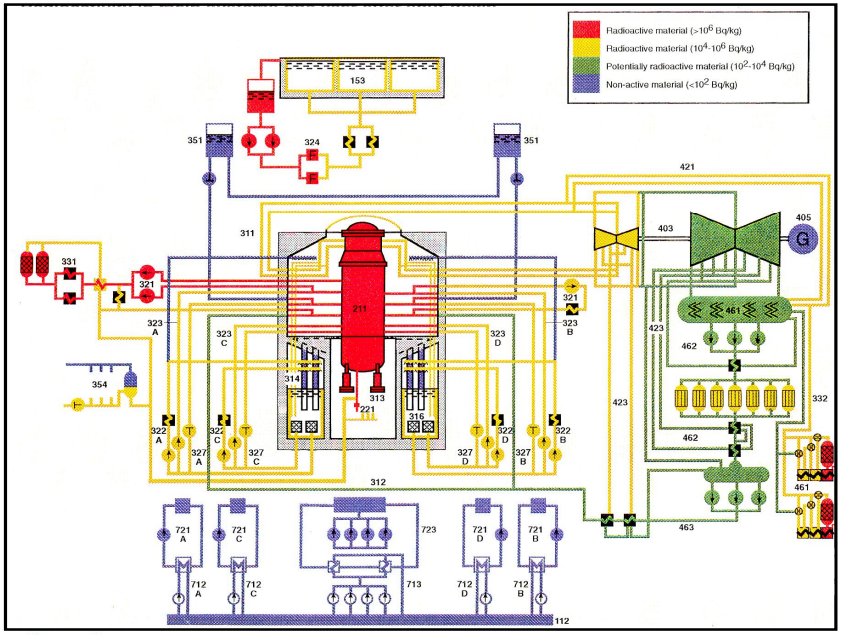
Decommissioning Planning

- … for funding
- … for implementation
- … for licensing
- … for knowledge transfer



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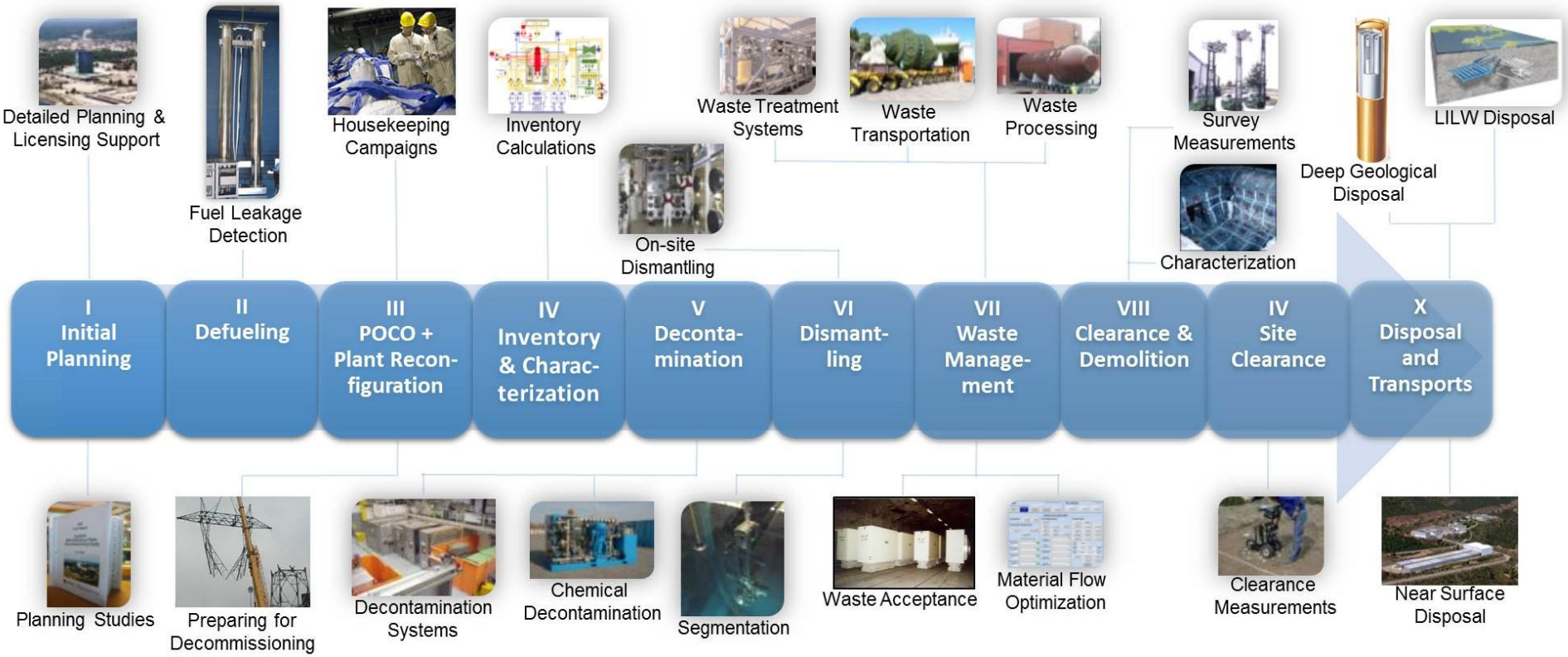
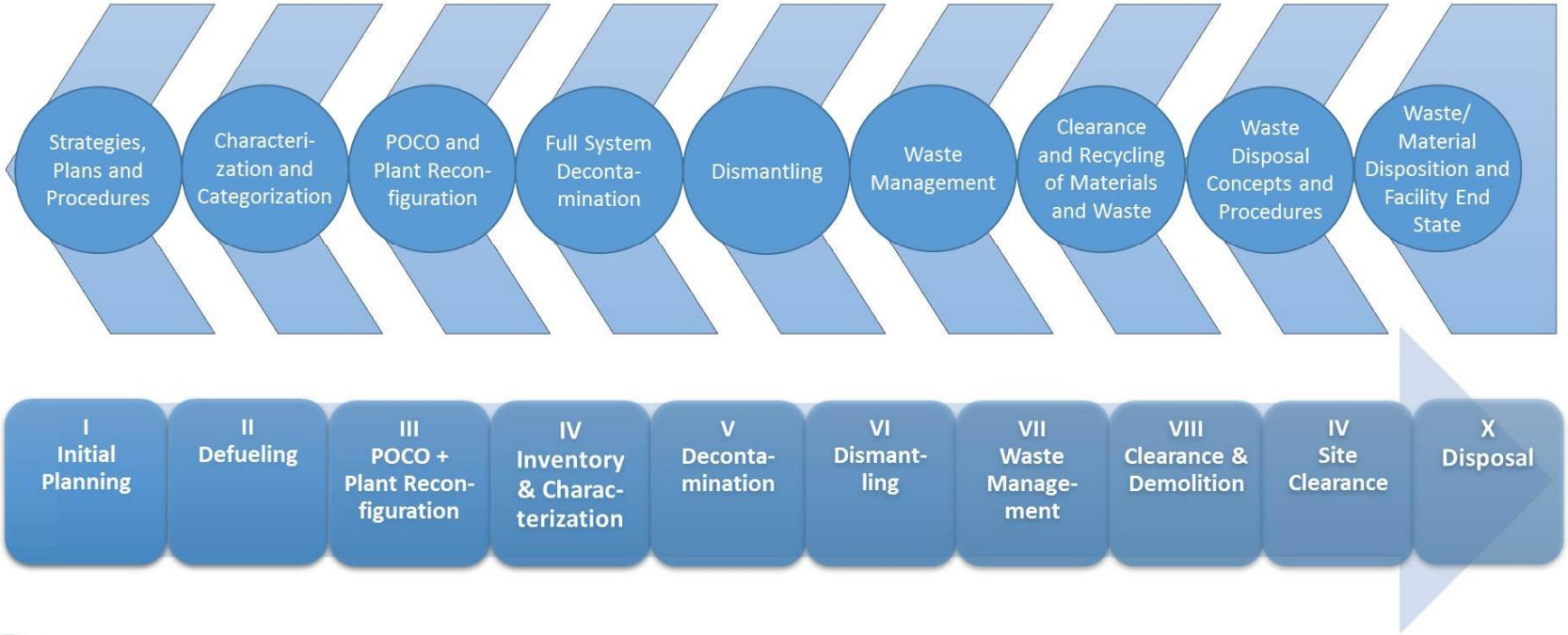
Decommissioning Planning



Important to include the complete scope in the planning

Waste Led Decommissioning Planning

- Plan from Z to A
  - Start with waste disposition, end-state and waste acceptance criteria



Waste Led Decommissioning Planning

- Evaluate available waste routes:
  - Geological disposal
  - Landfill
  - External treatment (e.g. melting)
  - Free release
- Divide waste streams into proper categories:
  - Metal
  - Large components
  - Concrete
  - Incinerables

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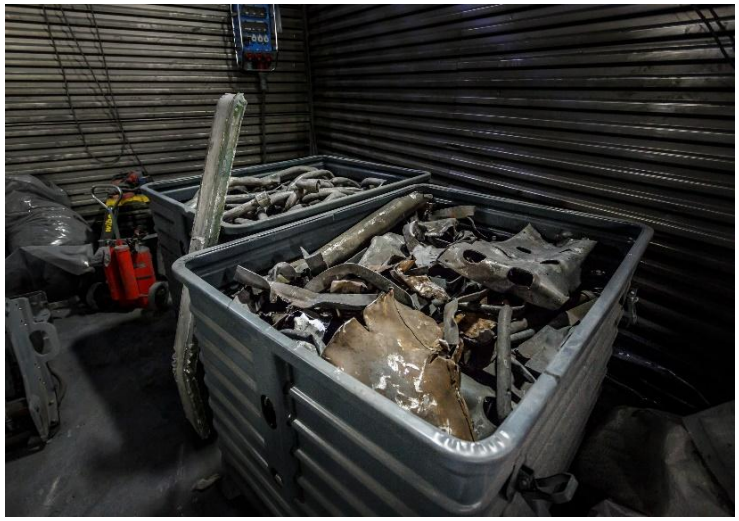
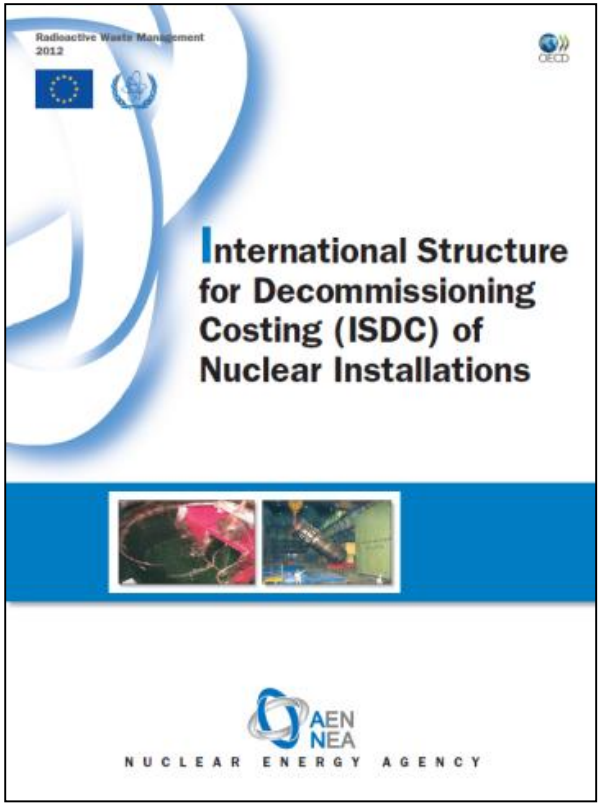
Waste Led Decommissioning Planning

- Start with a Decommissioning Waste Strategy
- All waste streams quantified and evaluated for each disposal route regarding
  - Cost
  - Risk
  - Environmental impact
- Include applicable decontamination, transportation and handling costs



Decommissioning Cost Estimation

- International Structure for Decommissioning Costing of Nuclear Installations (ISDC)
- Standardized list of cost items with related cost-item definitions
- Facilitates comparison between different decommissioning cost estimates
- Developed by OECD/NEA, IAEA and the European Commission



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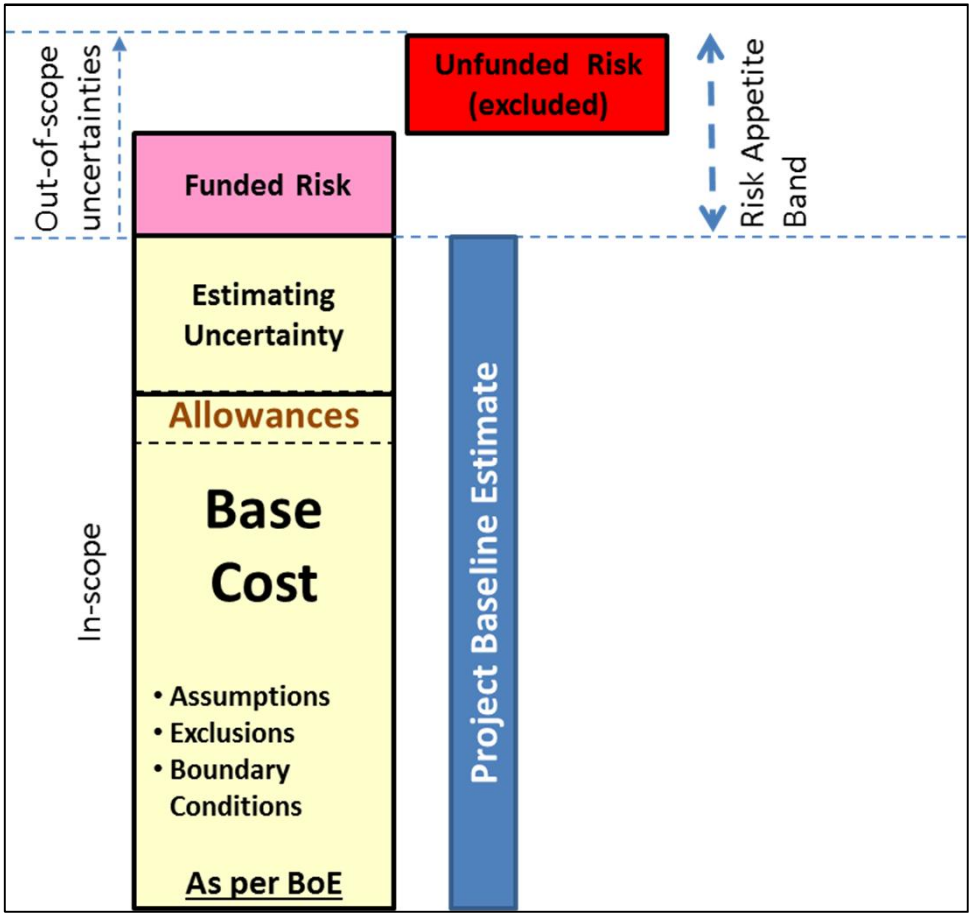
Decommissioning Cost Estimation

- The Basis of Estimate (BoE) is the foundation of a cost estimate
- The BoE describes:
  - Assumptions
  - Exclusions
  - Boundary Conditions
  - Starting point
  - End state
  - Scope
  - Uncertainty calculations
- Elements of a cost estimate
  - Project baseline estimate
    - Base Cost
    - Estimating Uncertainty
  - Risk
    - Funded (included)
    - Unfunded (excluded)



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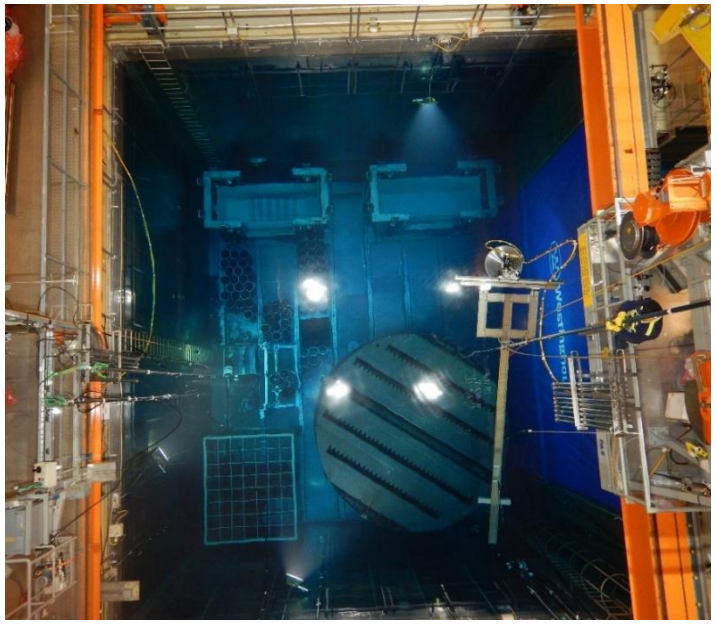
Lessons Learned and Feedback

- Planning with the end state in mind minimizes the risk of re-work
- Create a waste strategy early to identify and evaluate available waste routes
- A holistic view of the decommissioning program is necessary to avoid sub-optimizations
  - Do not look at separate scope individually



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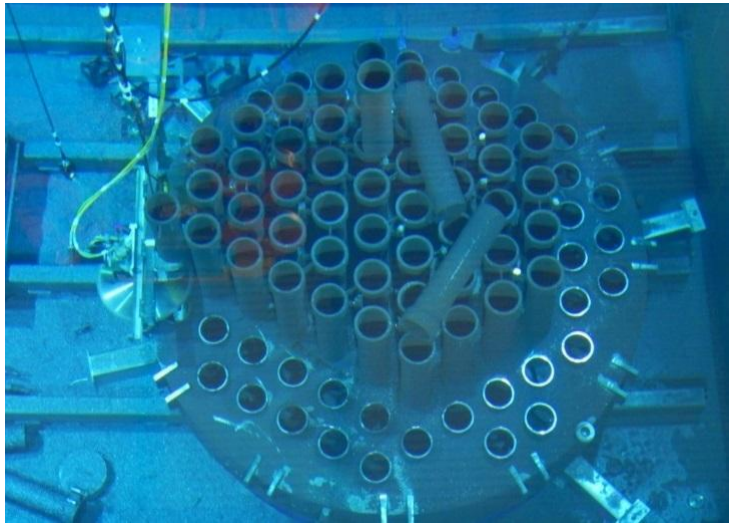
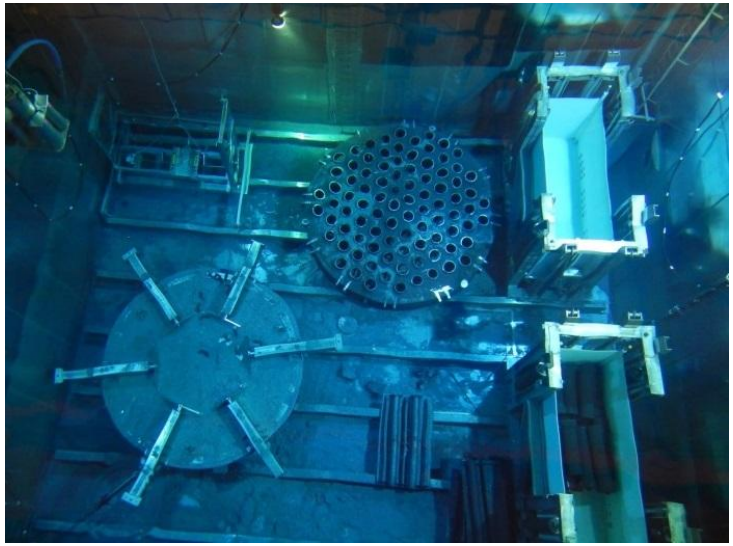
Lessons Learned and Feedback

- Using the International Structure for Decommissioning Costing (ISDC) facilitates understaing of and comparison between different cost estimates
- Experience from real decommissioning projects is invaluable for making a credible planning
- Decommissioning cost estimates should include actual cost experience
  - Will lower contingency values and give more exact base costs





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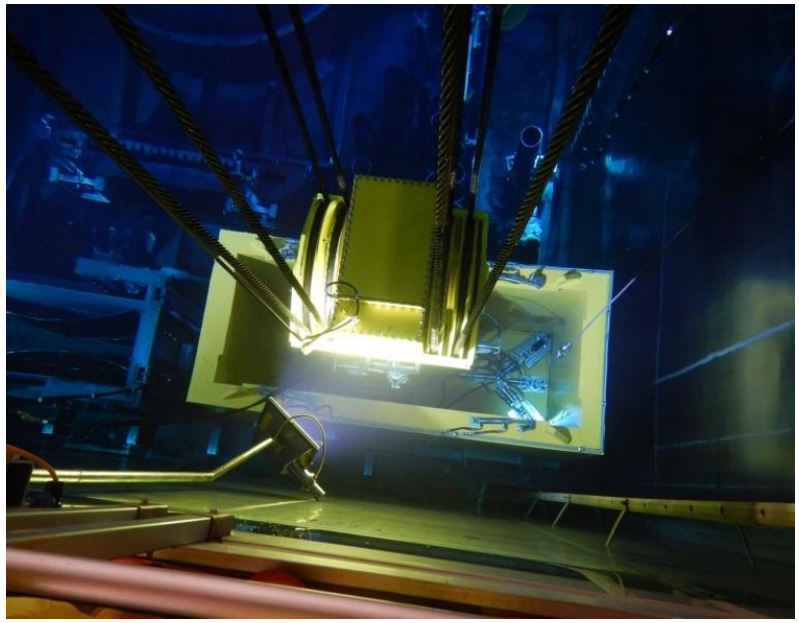
Conclusions

- Understand and include the complete scope of the decommissioning in the planning
- Plan backwards from the end of the decommissioning project
- Waste led decommissioning planning minizes risk of bottlenecks and re-conditioning of waste
  - These are two of the major cost drivers in a decommissioning project
- Define the Basis of Estimate properly
- Incorporate feedback from actual costs into the estimate



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Q&A

Thank you for your attention!

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