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Safety Assessment for Decommissioning – an International Approach

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Introduction

- Worldwide:
 - Significant number of facilities using radioactive material have been finally shut down, some of them were already completely dismantled
 - In several countries: strong need for support to perform safety assessments to ensure safety during decommissioning
- As a consequence
 - IAEA initiated the Action Plan on Decommissioning (2004)
 - IAEA launched inter alia the preparation of
 - safety standards related to safety assessments for decommissioning
 - projects on safety assessments for decommissioning

Introduction

- IAEA projects on decommissioning

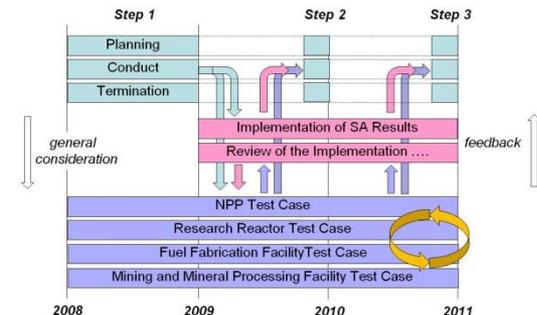
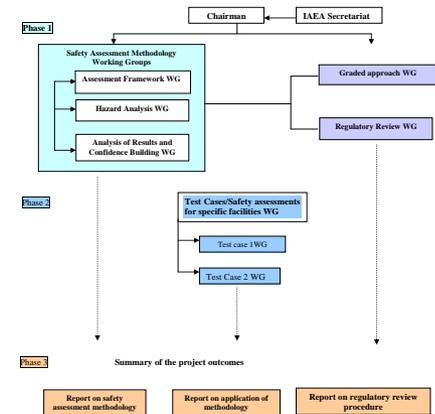
- DeSa Project (2004 – 2007)

- harmonized approach for safety assessment including review and graded approach
- demonstration and illustration of applicability

(➔ outcomes integrated into WS-G-5.2)

- FaSa Project (2008 – 2011)

- evolution of safety assessments during the nuclear lifecycle
- aspects on implementation of safety assessment results and the related review
- illustration of applicability



Safety Assessments and Decommissioning Plans

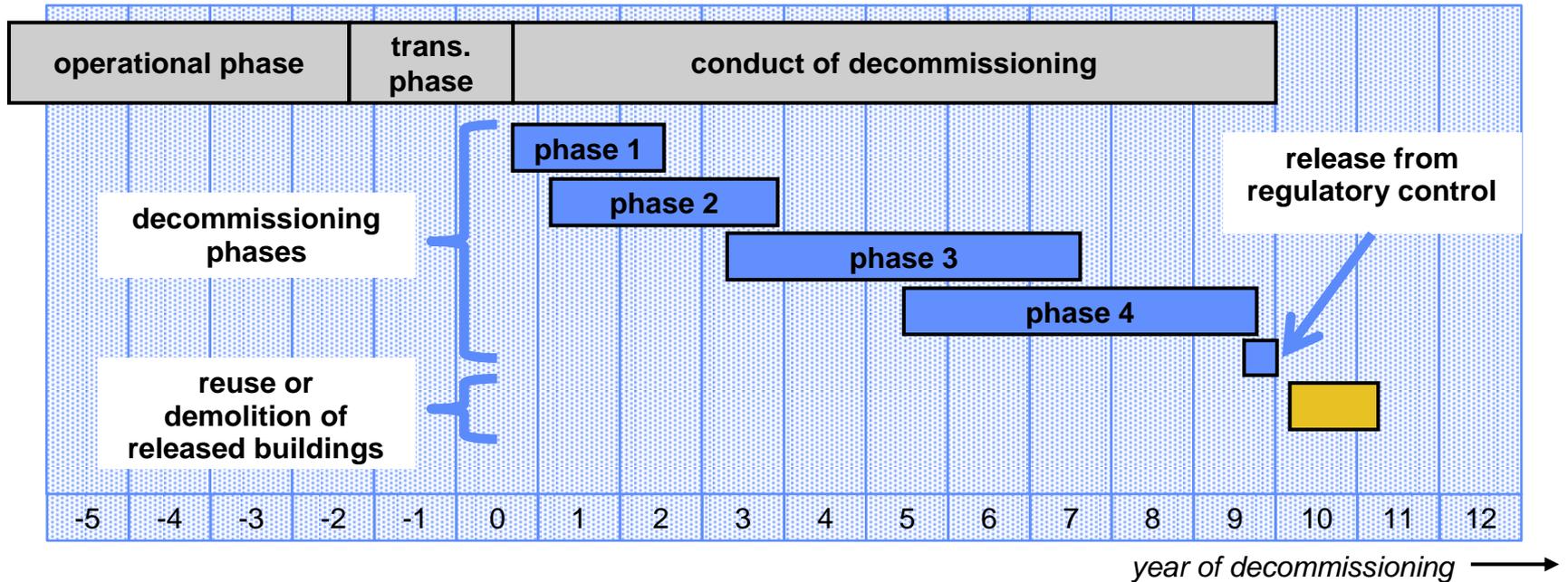
- Safety Assessment and **Initial** Decommissioning Plan
 - Initial Decommissioning Plan, inter alia:
 - to be prepared and **submitted together with the application for permission to operate** the facility
 - to take into account **basic safety issues**
 - to support the fact that decommissioning can be **safely conducted**
 - to include a **generic study** to show the feasibility of decommissioning
 - might indirectly influence the design of the facility
 - Related Safety Assessment
 - to be **appropriate** to the **level of detail** of the initial decommissioning plan
 - is more of a **type of safety consideration**

Safety Assessments and Decommissioning Plans

- Safety Assessment and **Final** Decommissioning Plan
 - Final Decommissioning Plan inter alia
 - to be **submitted to the regulatory body for approval** prior to the implementation phase of decommissioning activities
 - to define **how the project will be managed**
 - **supported by / containing a safety assessment**
 - Related Safety Assessment (→ *IAEA WS-G-5.2*) inter alia
 - to document **how regulatory requirements** and **criteria are met**
 - to **systematically evaluate hazards** and their **consequences**
 - to **identify safety measures, limit controls and measures** to ensure that requirements and criteria are met
 - should be **reviewed and updated**, as appropriate

Safety Assessments and Decommissioning Plans

- Challenge: Multiphase approach for decommissioning



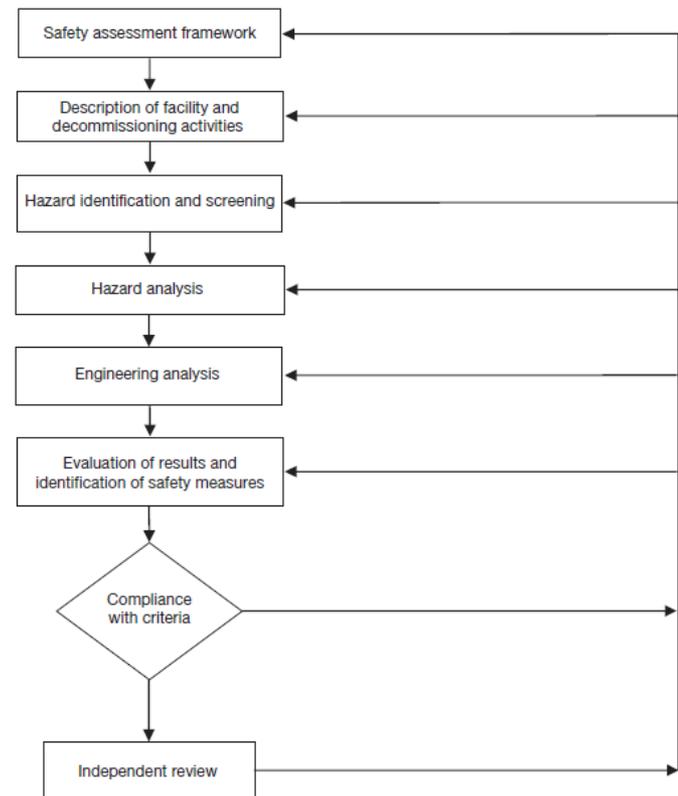
- Each phase to reflect a specific scope of deco. actions
- First / next phase sufficiently detailed, later phases less detailed
 - helps to handle large and complex decommissioning projects

Safety Assessments and Decommissioning Plans

- Challenge: Multiphase approach for decommissioning (cont'd)
 - Safety Assessment comprising of two types
 - Overarching Safety Assessment
 - to demonstrate the overall safety of a multiphase decommissioning project
 - to consider the individual phases with less detail (→ overview)
 - Final Safety Assessment for a specific phase
 - sufficiently detailed to support the approval of the decommissioning activities of a specific phase
 - Both types of safety assessment to follow a systematic approach, as the one explained on the following slides

General Methodology for Decommissioning Safety Assessment

- 8 Steps of the methodology
 1. Safety Assessment Framework
 2. Description of facility and decommissioning activities
 3. Hazard identification and screening
 4. Hazard analysis
 5. Engineering analysis
 6. Evaluation of results and identification of safety measures
 7. Compliance with criteria
 8. Independent review

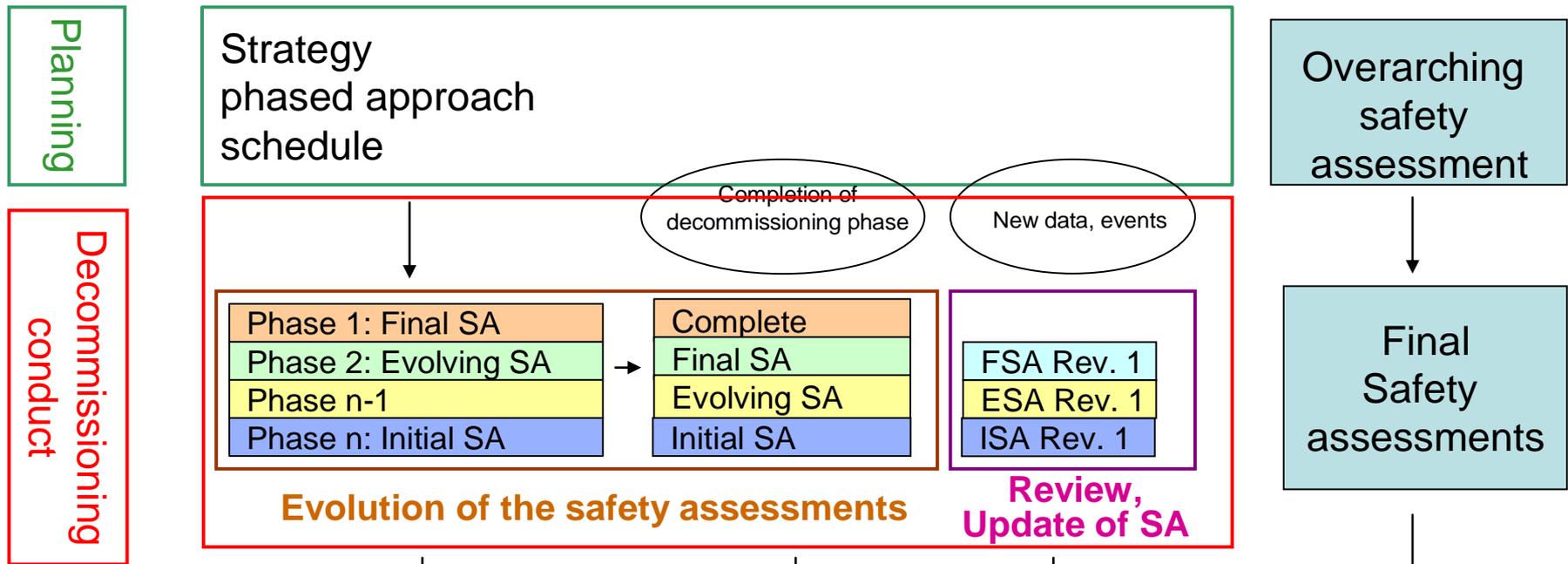


General Methodology for Decommissioning Safety Assessment

- Some remarks related to the methodology
 - Iterative process
 - depending on the outcomes: returning back to previous steps might be necessary e.g. to adjust assumptions or calculation methods
 - After successfully passing the comparison step: a review independent from the team which prepared the safety assessment is mandatory
 - the **regulatory review is not(!) a substitute for the independent review** on behalf of the operator
 - Each process step allows grading, e.g. by
 - use of simple but more conservative calculation models
 - consideration of standard dismantling tools instead of single-of-its-kind tools

Safety Assessments During Conduct of Decommissioning

- Overview



- **At the time of approval** of the first decommissioning actions
 - Overarching Safety Assessment and
 - Final Safety Assessment for phase 1 **need to be available**

Safety Assessments During Conduct of Decommissioning

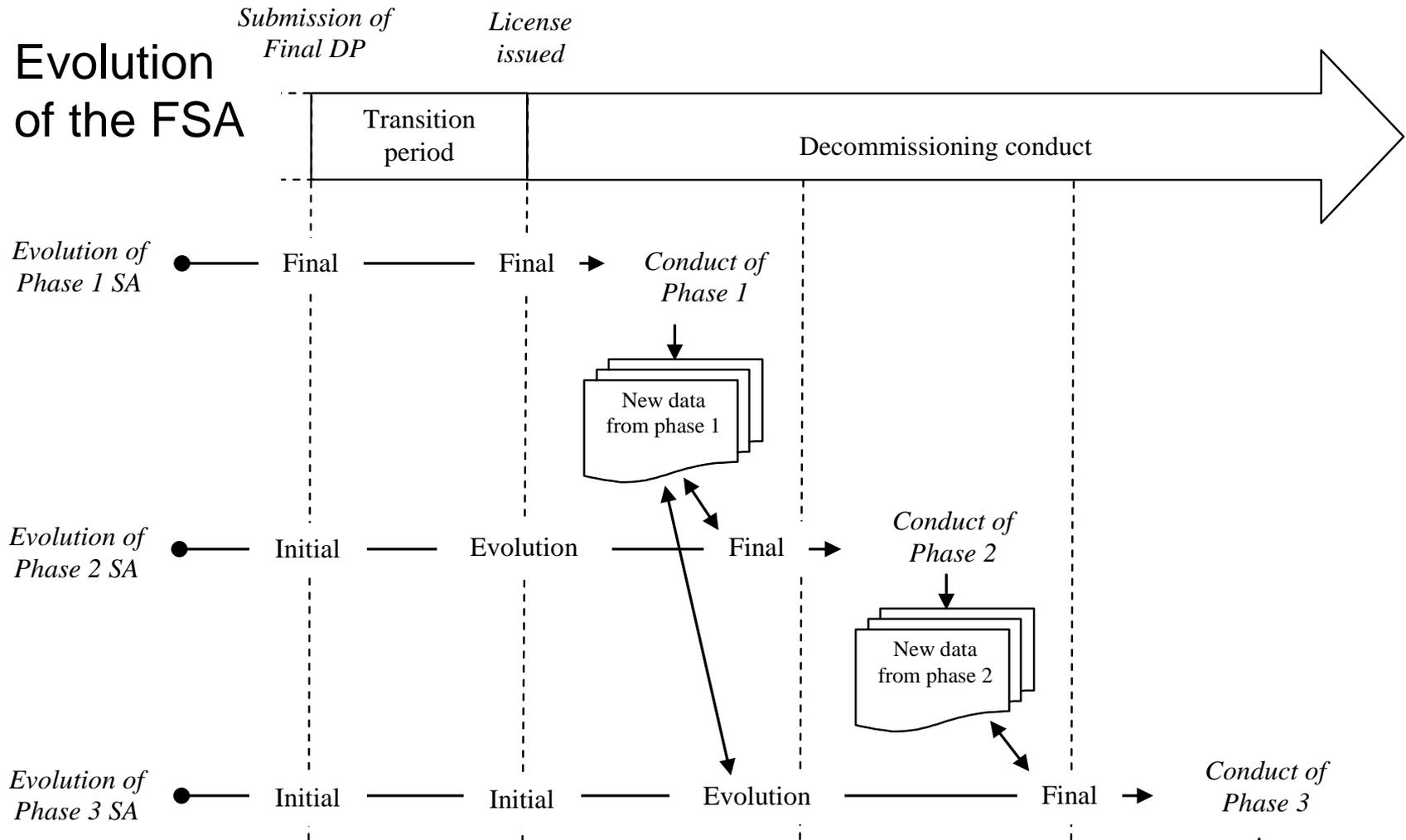
- Overarching Safety Assessment (OSA)
 - OSA and the Final Decommissioning Plan to provide key information on
 - decommissioning strategy and end-state
 - the main phases and associated safety issues
 - the associated time schedule
 - the waste management plan
 - Experience shows that the OSA
 - focusses on identification and justification of the main safety issues of the full decommissioning project
(→ global safety related view of the decommissioning project)
 - often: starting point for the development of the Final Safety Assessments for the specific phases

Safety Assessments During Conduct of Decommissioning

- Final Safety Assessment (FSA) for a specific phase
 - Level of details such to enable the regulatory approval of the related decommissioning actions
 - this is the level meant in IAEA safety standards (e.g. WG-R-5)
 - FSA influences the work details and vice versa
 - The development of a FSA of a later phase
 - offers the opportunity to integrate new information
 - helps to speed up the planning process and to early start first decommissioning actions
 - follows an iterative and continuous process from an initial safety assessment (e.g. from the OSA) to the (mature) Final Safety Assessment

Safety Assessments During Conduct of Decommissioning

- Evolution of the FSA



Conclusion

- 2 IAEA projects with more than 100 participants resulted in internationally accepted methodologies for safety assessments
 - ➔ IAEA Safety Guide WS-G-5.2 and future IAEA safety reports
- Core of the methodology:
 - iterative process comprising of 8 steps, including
 - applicability of a graded approach
 - in case of multiphase projects: differentiation between
 - the Overarching Safety Assessment
 - the Final Safety Assessment for each specific phase
- Follow-up: Deco. Risk Management Project (*DRiMa Project*)

Thank you for your attention!