



International Atomic Energy Agency

Decommissioning conduct Working Group

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Third Annual Meeting of the IAEA FaSa Project

**29 November – 3 December 2010
IAEA Headquarters, Vienna,**

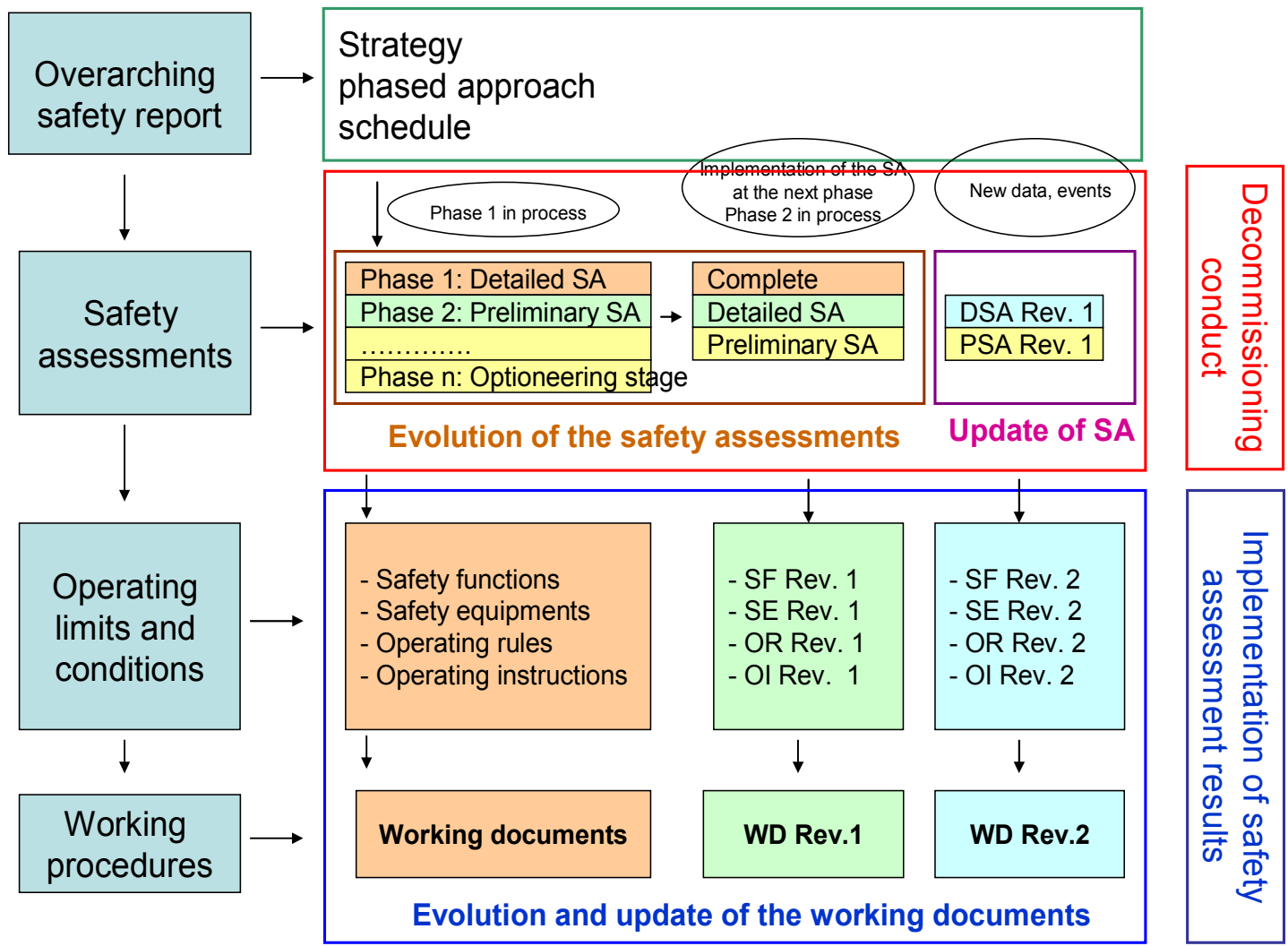
Decommissioning conduct

Working group participants:

- **15 participants:**
 - ✓ **Operators (10)**
 - ✓ **Regulators and TSO/Consultants (5),**

- **10 countries**





Decommissioning conduct

Meetings held in 2010:

- ✓ **Fasa coordinating working groups meeting held in April 2010
28 – 30 April 2010, GRS/Garching – Germany**
- ✓ **Joint meeting on Conduct, Implementation WG and FFTC WG meeting
held in June 2010
31 May – 4 June 2010, IRSN/Fontenay-Aux-Roses - France**



Decommissioning conduct

- **Work done (1/2):**
 - **February - April 2010: A comprehensive review of the draft chapter 4 has been performed in order to include:**
 - Additional contribution
 - The approach developed to describe the evolution process of the safety assessments and the related studies
 - The internal authorization process
 - The update of the “overarching safety report”
 - **April 2010: An updated version of the draft chapter 4 has been sent to WG members and WG leaders prior to the Fasa coordination WG meeting held in April in Garching**



Decommissioning conduct

- **Work done (2/2):**
 - **May 2010: A new version of the draft chapter 4 has been prepared following the Fasa coordination WG to:**
 - **Propose a new structure of the chapter 4:**
 - Part I: Decommissioning conduct approach
 - Part II: Experience feedback from decommissioning projects
 - NPPs
 - Research reactors
 - Fuel cycle facilities
 - Part III: Appendix of specific member states experience feedback
 - **Include additional developments:**
 - A definition of “decommissioning conduct”
 - Safety assessment issues
 - **June 2010: The new version has been discussed between working group members during the combined meeting held in Paris.**

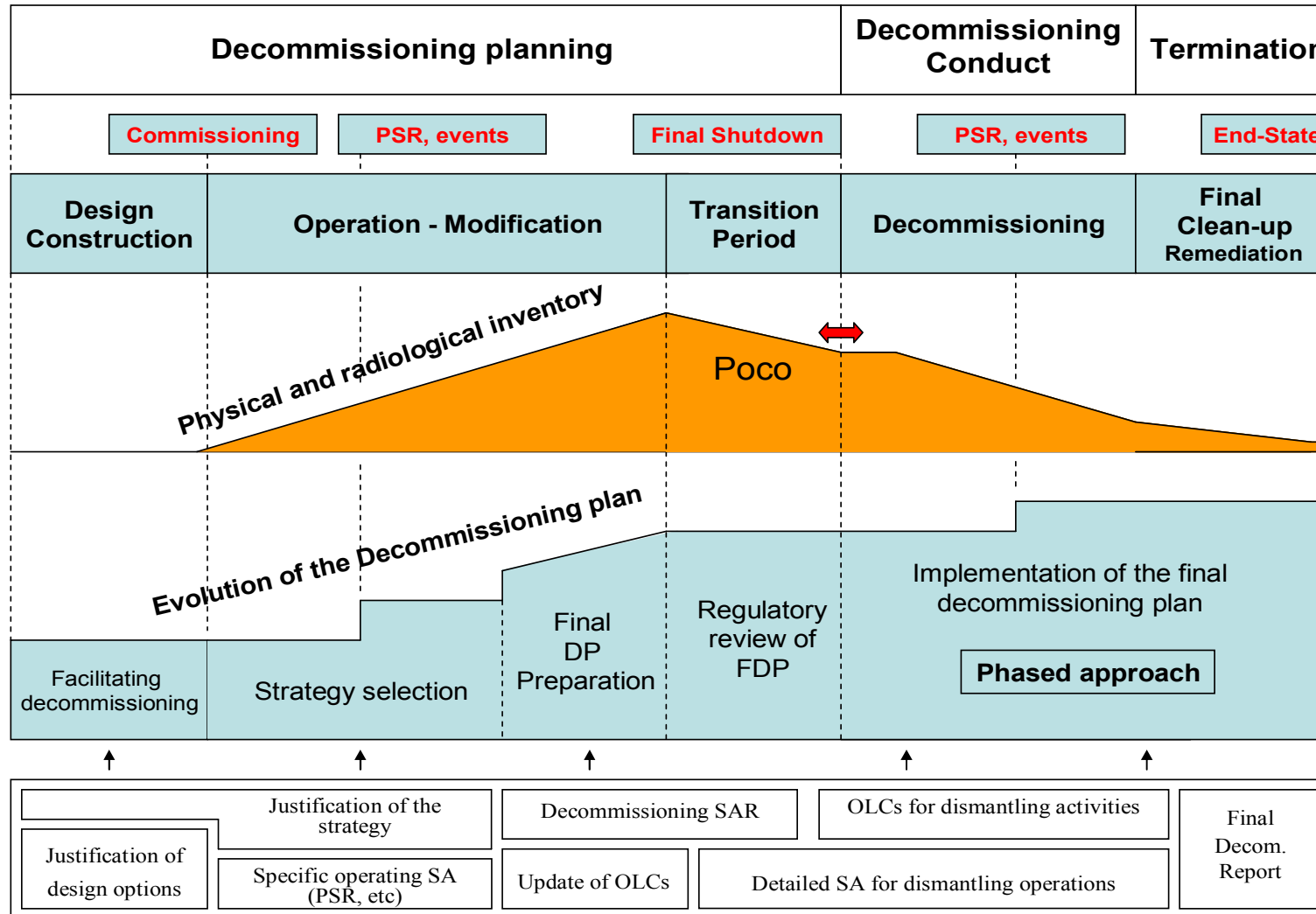


Decommissioning conduct

- **Main Findings:**
 - **During the meeting held in April 2010, explanation have been provided to illustrate the possible evolution of the Decommissioning Plan during the lifetime of a nuclear facility**
 - **Additional development of the draft chapter 4 (Part I and Part II) have been performed**
 - **Definition of “decommissioning conduct” (Part I),**
 - **Level of detail of the safety documentation (Part I),**
 - **Examples of main issues of the safety assessments(Part II)**



Evolution of the Decommissioning Plan



Safety issues



Decommissioning conduct

- **Main Findings:**
- **Structure of the chapter 4 (Part I)**
 - Definitions
 - Key issues of the implementation of a Final Decommissioning Plan
 - The phased approach in decommissioning
 - Evolution of the safety assessment through the implementation of a phased approach
 - Management of modifications during decommissioning
 - Update of the decommissioning safety documentations
 - Safety assessment
 - Overarching safety report
 - Final decommissioning plan



Decommissioning conduct definition

The Decommissioning conduct is the implementation of the decommissioning (and related waste management) activities in compliance with the national safety standards and requirements.

The decommissioning conduct starts when the decommissioning license has been granted by the regulatory body.

The decommissioning activities have to be performed in compliance with the decommissioning license and the license conditions. The decommissioning activities must be consistent with the approved Final Decommissioning Plan, the related “overarching safety report” and detailed safety assessments.



Key issues during decommissioning conduct

The following key technical issues have been considered in this order:

- the decommissioning strategy:
 - immediate, deferred, entombment, or a potential combination,
 - a phased approach
- the sequence of works/options:
 - the sequence of work proposed to perform a specific decommissioning task for a given phase
 - the identification of the main safety issues
- the techniques:
 - tools chosen to perform the works, such as the choice of which dry cutting techniques is used (grinder, laser, plasma torch, etc.) or which kind of decontamination solutions is proposed.

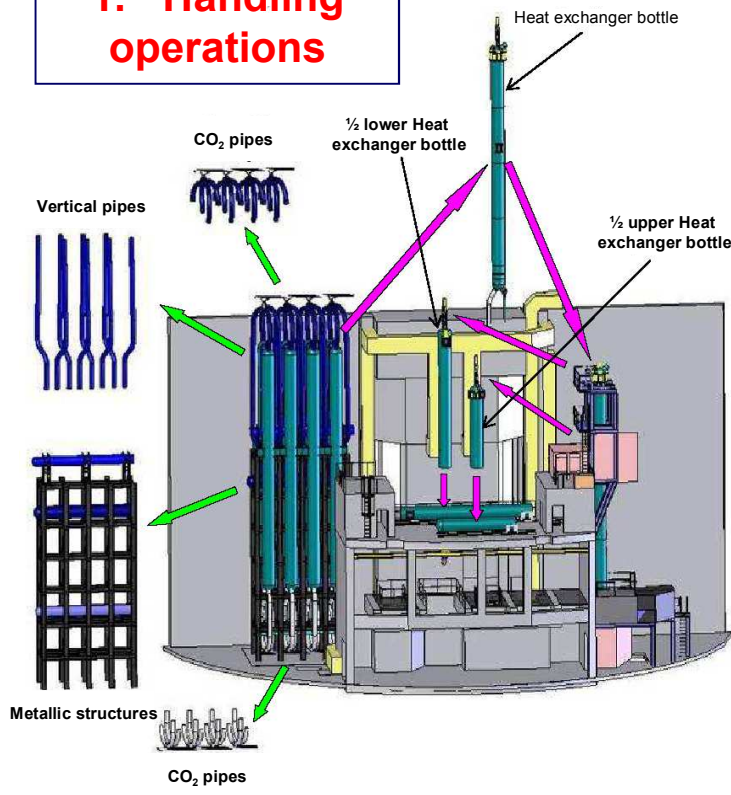




Dismantling of the Heat exchangers

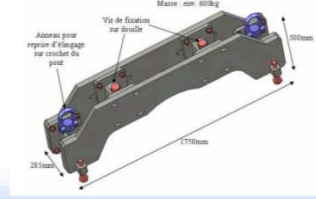


1. Handling operations

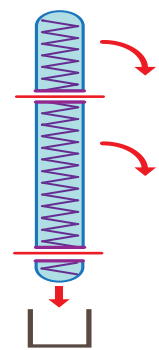


3. Handling Studies

4. Mock-up cutting tests

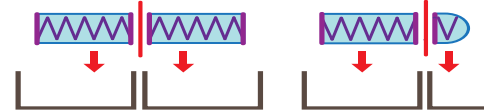


1. Cutting: Vertical configuration

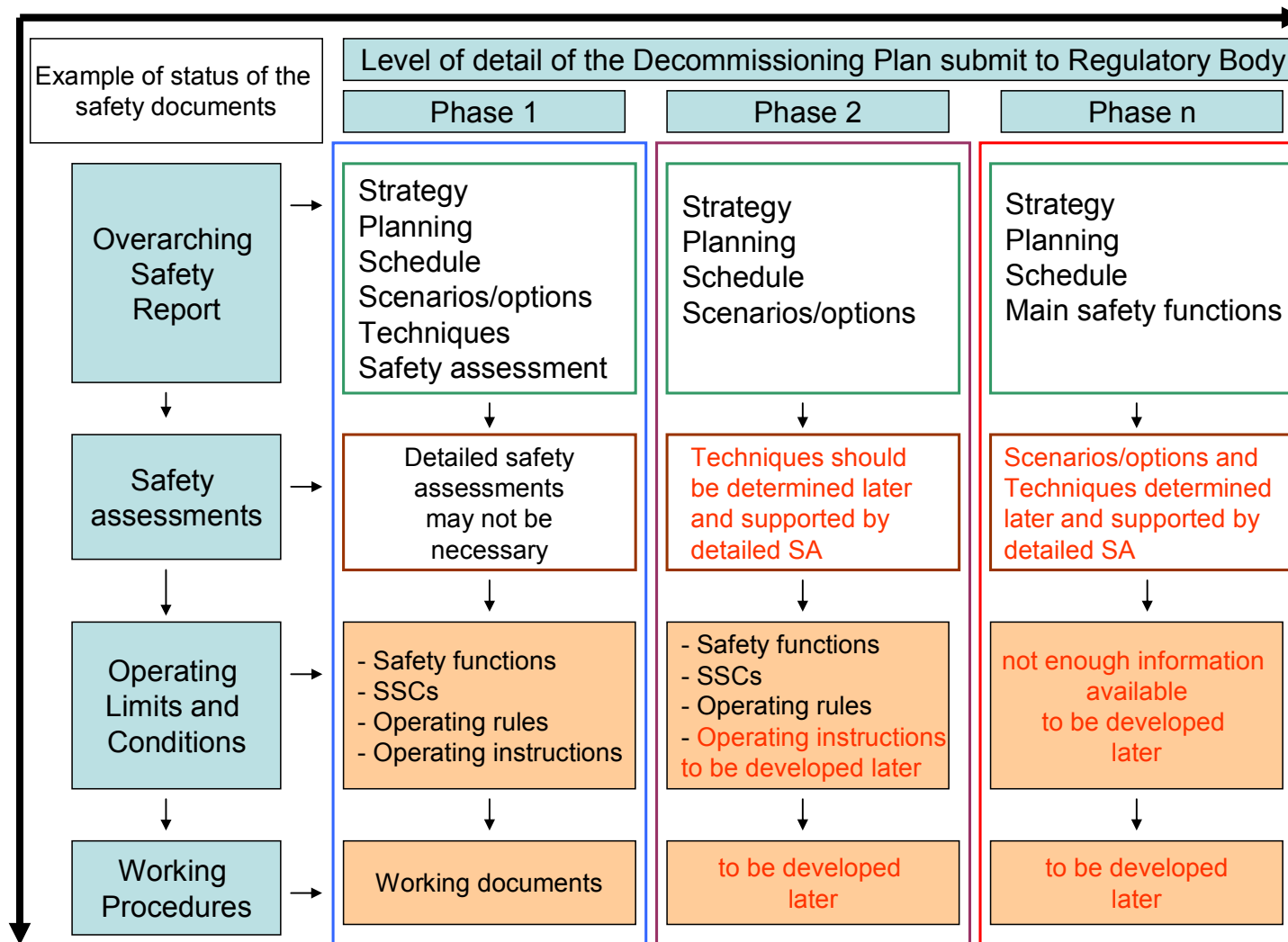


2. Handling operations

3. Cutting: Horizontal configuration



2. Cutting sequence



Example of a phased approach

- Phase 1:** Removal radioactive waste and dangerous substances used and produced during the operating life of the facility (when these works have not been done during the transition phase between operation and decommissioning);
- Phase 2:** Preliminary operations to prepare the dismantling work (new working areas, supporting facilities, interim storage of wastes, etc.);
- Phase 3 to n:** Dismantling operations in order to reduce the radiological source term of the facility;
- End Phase:** Final cleanup activities (buildings, etc.)



Levels of safety assessment: main outcomes

- **The evolution of the safety assessments follows an iterative and continuous process starting from:**
 - ✓ **an initial safety assessment**
 - ✓ **ended by a final safety assessment.**
 - ✓ **The initial safety assessment is taken from the decommissioning plan.**
 - ✓ **Preliminary safety assessments may be needed according to the significance of the safety issues concerned.**
 - ✓ **The final safety assessment is the one used for the implementation of works**
- **Safety assessments (initial, preliminary or final) are supported by studies. The level of details of these studies generally increases according to the significance of the risk and the implementation of the phases.**



Levels of safety assessment: main outcomes

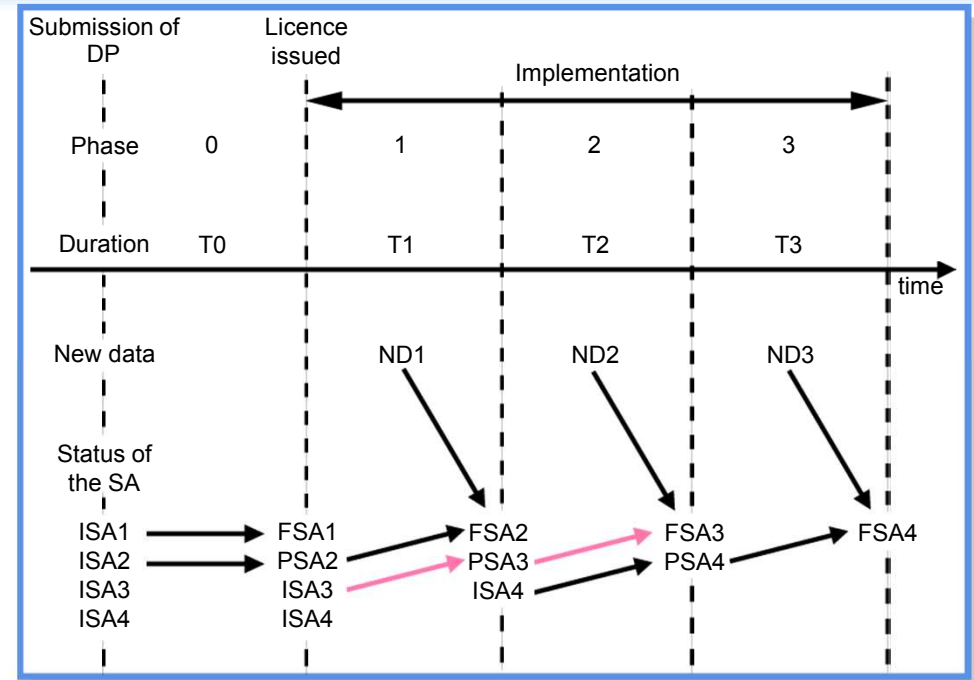
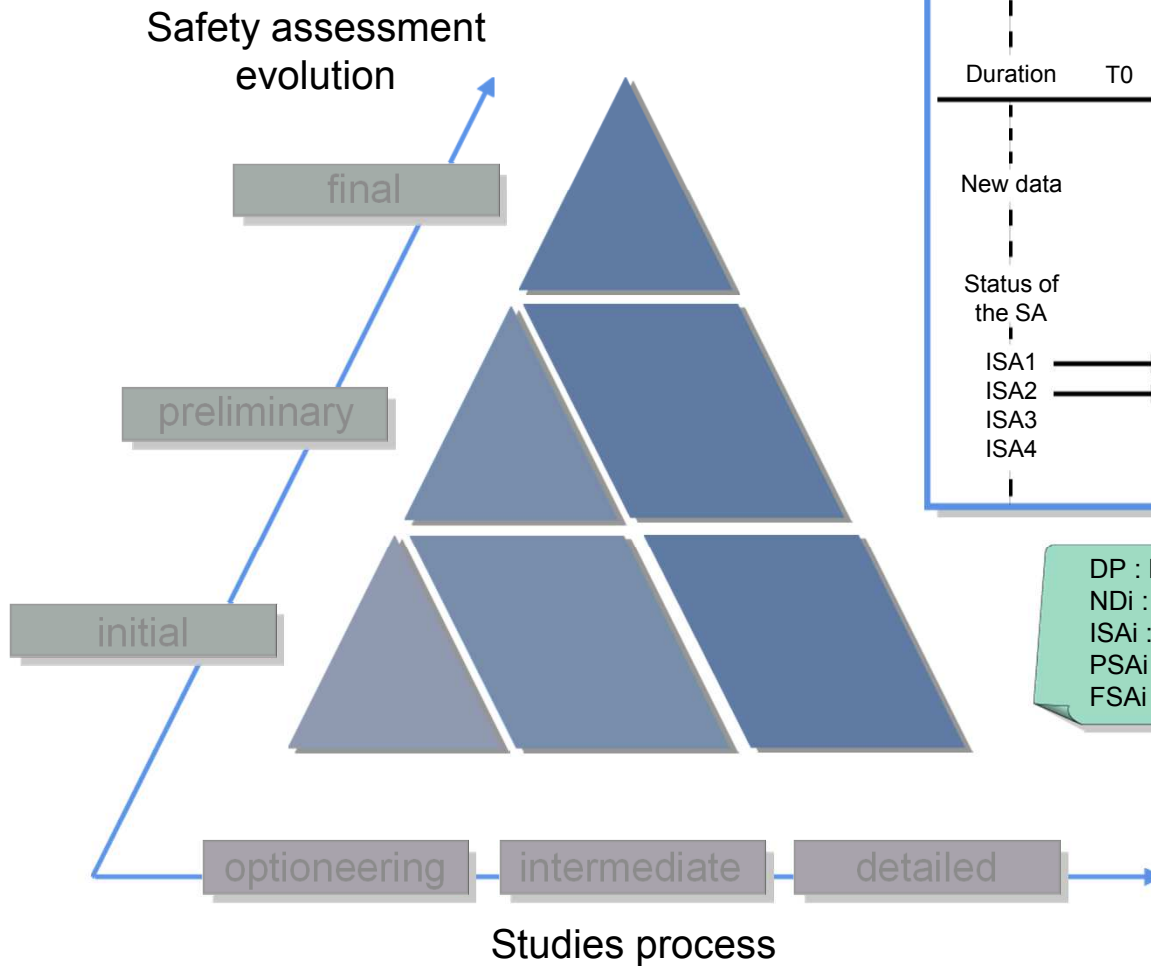
- **As an example, different levels of studies has been identified:**
 - **Optioneering studies:**
 - The aim of the optioneering is to identify a “reference dismantling scenario” for the phase considered based on:
 - Basic data,
 - Selection of dismantling scenarios,
 - Multicriteria comparison based mainly on:
 - Safety issues
 - Radioprotection issues
 - Waste management issues
 - **Intermediate studies:**
 - The aim of the intermediate studies is to assess the selected dismantling sequence, the related radiological impact on workers, public and environment and the safety functions needed and associated structure, systems and components (SSC's).
 - **Detailed studies:**
 - The aim of detailed safety assessments is to confirm the dismantling techniques and to identify the operating limits and conditions of the SSC's..



Levels of safety assessment: main outcomes

- In order to reflect practices and experience feedback in the implementation process of a decommissioning project following a phased approach, initial, preliminary and final safety assessments should not be systematically linked to optioneering, preliminary and detailed studies,
 - ✓ except for the final safety assessment which necessarily has to be detailed.
- **Summary of outcomes**
 - ✓ Flow diagrams have been developed by participants in order to illustrate the evolution of the safety assessments

Link between safety assessments and related project studies



DP : Decommissioning Plan
 ND_i : New Data Collected during the implementation of phase i
 ISA_i : Initial Safety Assessment for phase i
 PSA_i : Preliminary Safety Assessment for phase i
 FSA_i : Final Safety Assessment for phase i

Decommissioning conduct

- **Main Findings:**
- **Structure of the chapter 4 (Part II): Experience feedback**
- **Decommissioning of a Nuclear Power Plant**
 - Context of the decommissioning project
 - Proposed phased approach for a NPP decommissioning project
 - Management of safety assessments
 - Main issues of the safety assessments performed
 - Specific issues of the safety assessments
 - **Technical feasibility**
 - **Spread of contamination**
 - **The internal and external dose exposure**
 - **Seismic event**
 - Evolution process of the safety assessments



DECOMMISSIONING CONDUCT CONCLUSION

- The draft chapter 4 have been updated and a new structure is proposed in order to address:
 - Generic issues on decommissioning conduct
 - Detailed experience feedback of Members states
- Additional detailed experience feedback of Members states are welcome to enhance the level of confidence of the generic issues identified in the draft chapter 4
- The work to be done with the implementation WG may provide additional issues that may have to be considered in the draft chapter 4
- The draft chapter 4 can still be improved during the next year

