

The 1st International Forum on the Decommissioning of the Fukushima Daiichi NPS

April 11, 2016

Session III – Risk Assessment

Iwaki-shi, Fukushima, Japan

Risk Assessments for the Decommissioning of Nuclear Facilities

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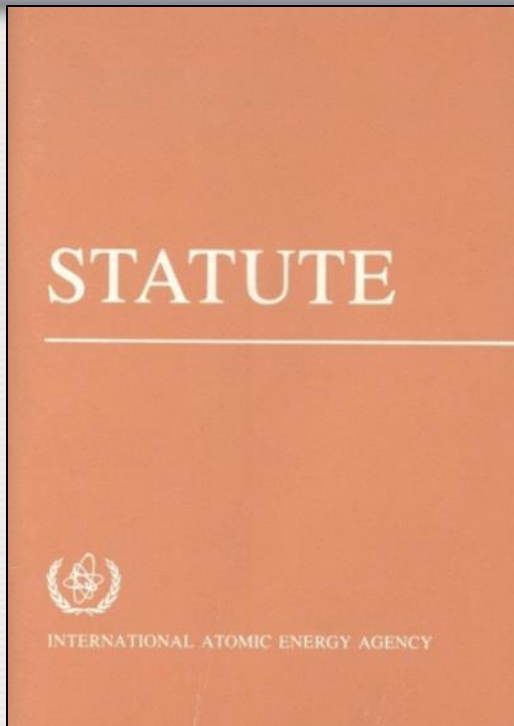
Division of Radiation, Transport and Waste Safety
Waste and Environmental Safety Section



IAEA

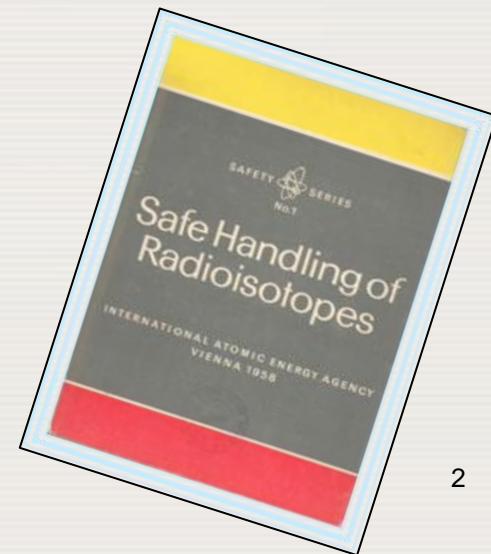
International Atomic Energy Agency

IAEA Statute

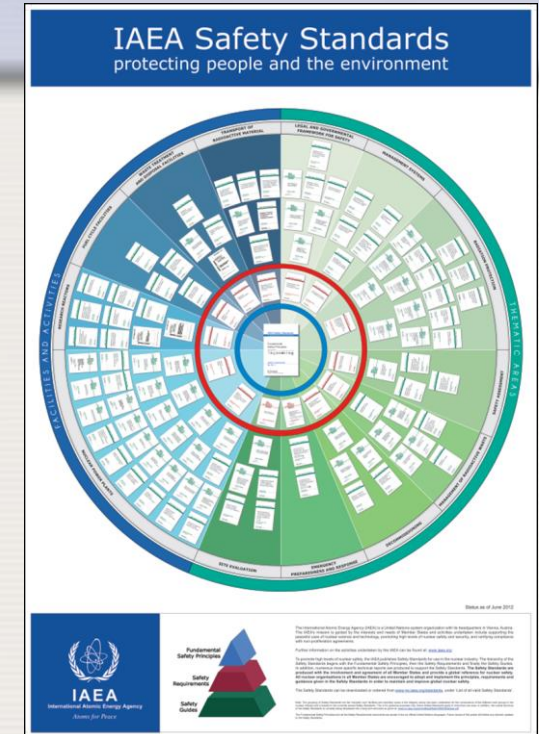
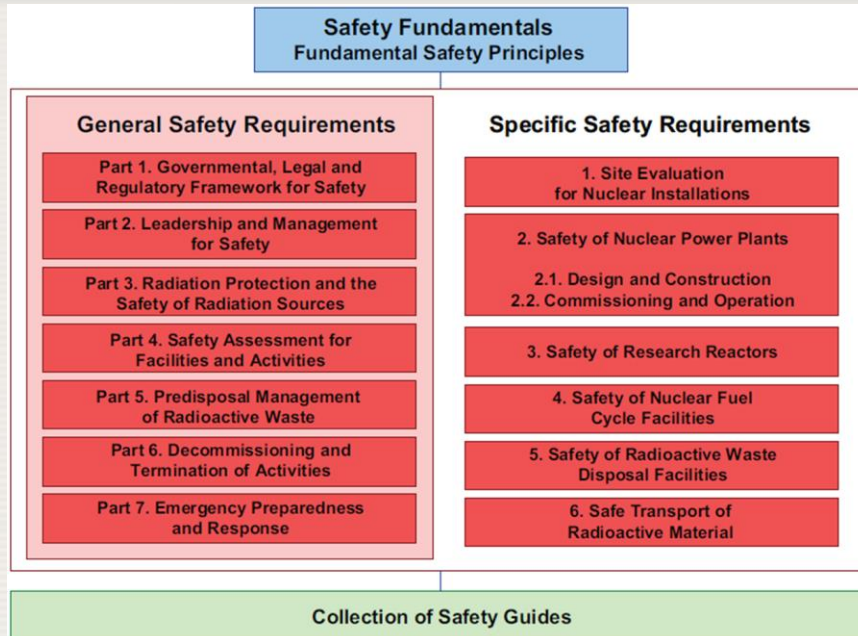


The IAEA Safety Standards have a status derived from the IAEA's Statute, which authorizes the IAEA *"To establish or adopt, in consultation and, where appropriate, in collaboration with the competent organs of the United Nations and with the specialized agencies concerned, standards of safety for protection of health and minimization of danger to life and property ... and to provide for the application of these standards"*.

In **1958**, the IAEA published its first Safety Standard, Safety Series No. 1, **Safe Handling of Radioisotopes**. Over the years, more than 200 publications were issued in the Safety Series.



Promoting International Safety Standards Since 1958



<https://www-ns.iaea.org/standards/documents/general.asp>

- > 200 Safety Standards published which reflect an international consensus on what constitutes a high level of safety for protecting people and the environment, and are a cornerstone of the global nuclear safety regime.
- Regulating safety is a national responsibility, but international standards provide a common basis.
- The Safety Standards support Member States to meet their international obligations (treaties, conventions, agreements).

Safety Fundamentals

- A single top level (fundamentals-level) standard
- Policy document of the IAEA Safety Standards Series
- Present the **fundamental safety objective** and **10 principles** of protection and safety
- Provide the basis for the safety requirements
- Use “**MUST**” statements



IAEA Safety Standards
for protecting people and the environment

Fundamental Safety Principles

Jointly sponsored by
Euratom FAO IAEA ILO IMO OECD/NEA PAHO UNEP WHO

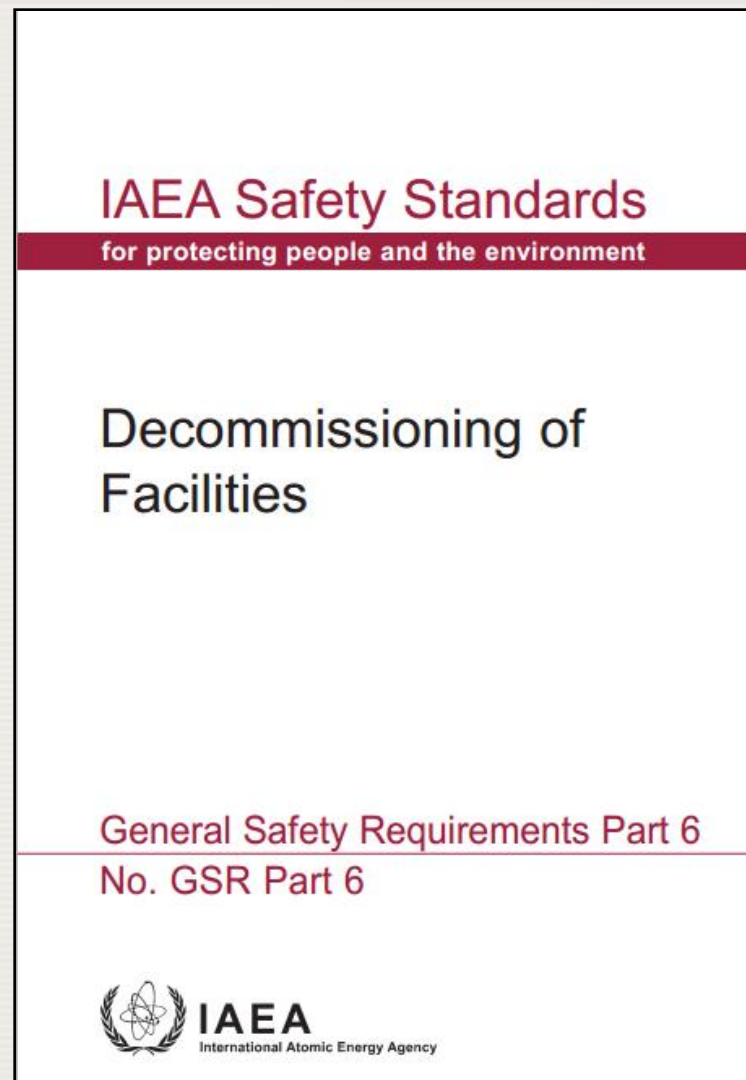
A row of nine logos representing the organizations that jointly sponsored the document: Euratom, FAO, IAEA, ILO, IMO, OECD/NEA, PAHO, UNEP, and WHO.

Safety Fundamentals
No. SF-1

The IAEA logo, consisting of the atomic symbol in a wreath and the text "IAEA International Atomic Energy Agency".

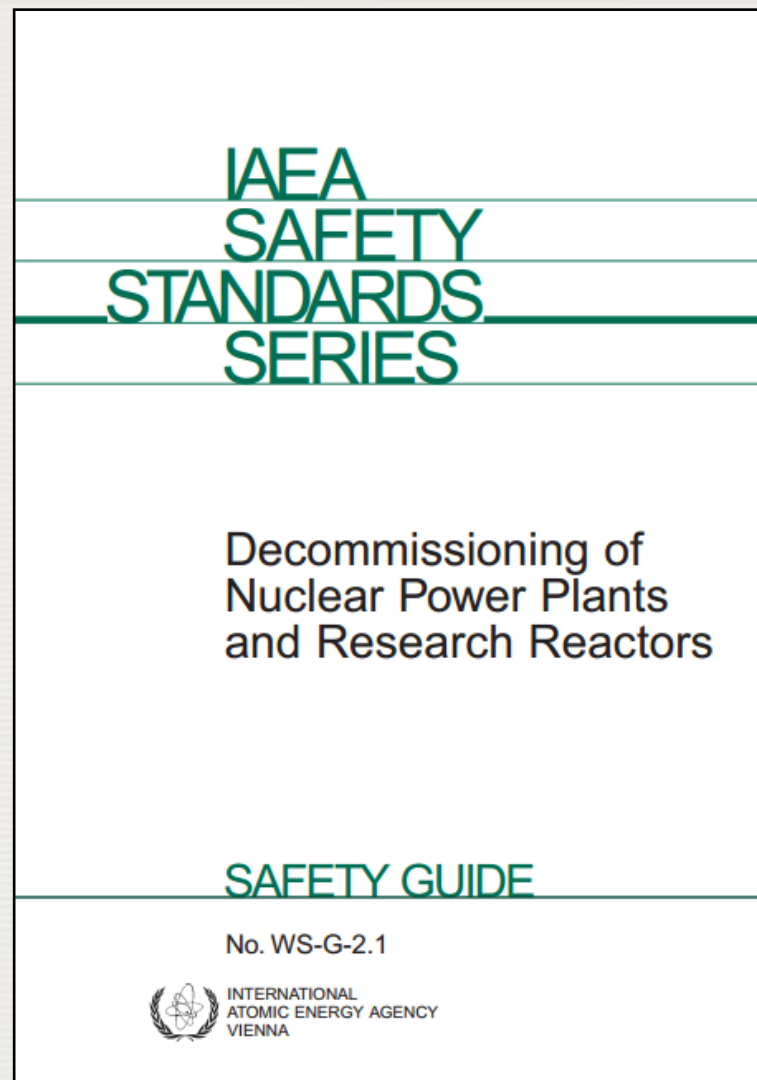
Safety Requirements

- General and specific SR
- Elaborate on the basic objective and the principles of SF-1, as they apply to a specific activity or facility
- Concise, reflect “**WHAT**”, “**WHO**” and “**WHEN**”; associated explanatory text describes “**WHY**” the requirements exist
- Use “**SHALL**” statements
- The format and style facilitate their use for establishment of national regulatory frameworks

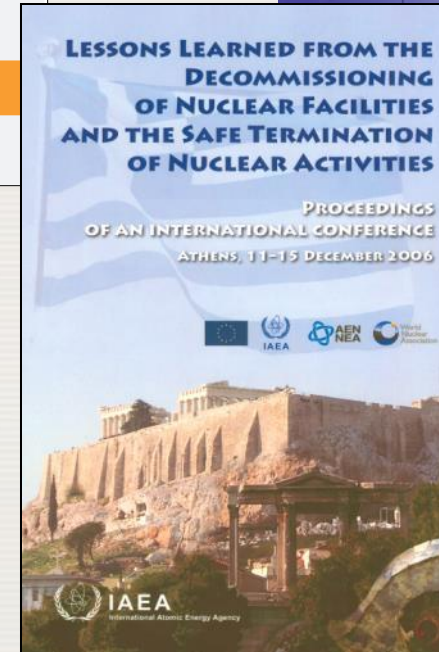
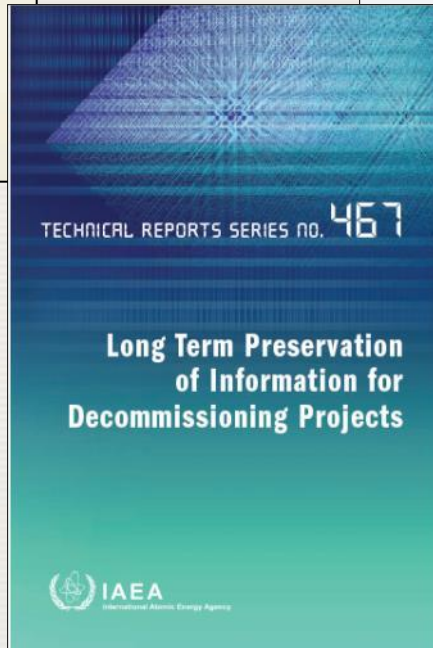
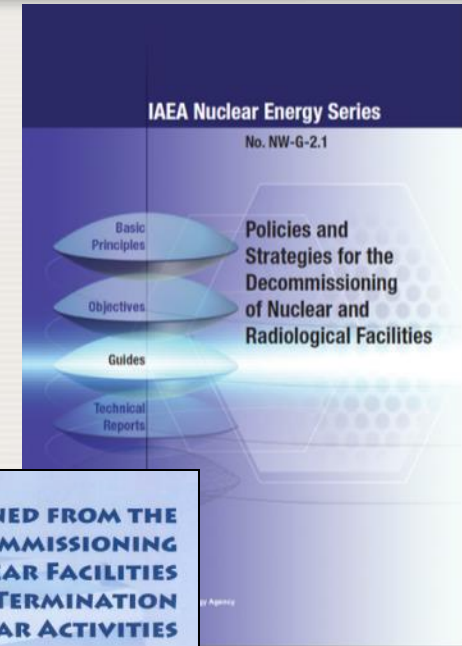
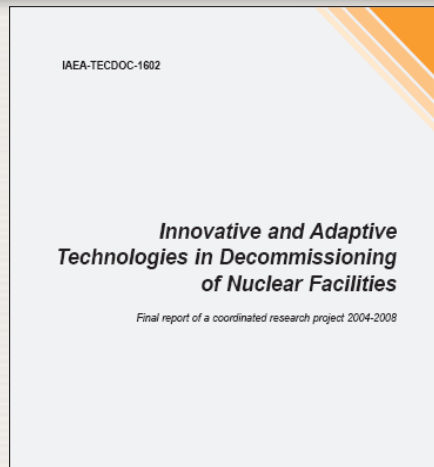
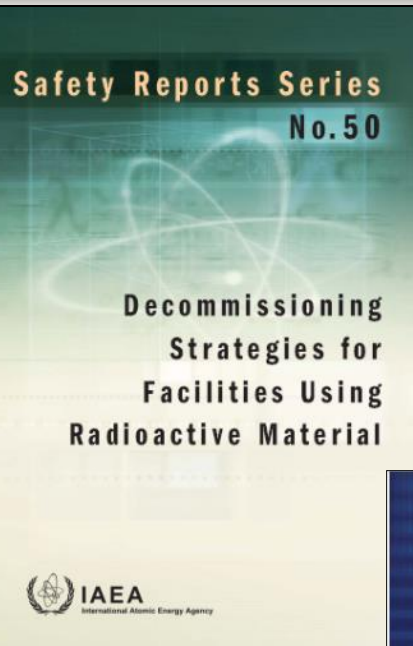


Safety Guides

- General and specific safety guides
- Provide recommendations and guidance on **HOW** to comply with the safety requirements
- Present international good practices, and increasingly reflect best practices, to help users in achieving high levels of safety
- Use “**SHOULD**” statements



Supporting Publications



Decommissioning Objective

Removal of the radiological and non-radiological hazards associated with the operation of a nuclear facility or system that will allow the facility to be released from regulatory control; and protect the worker, general public and the environment during the process.

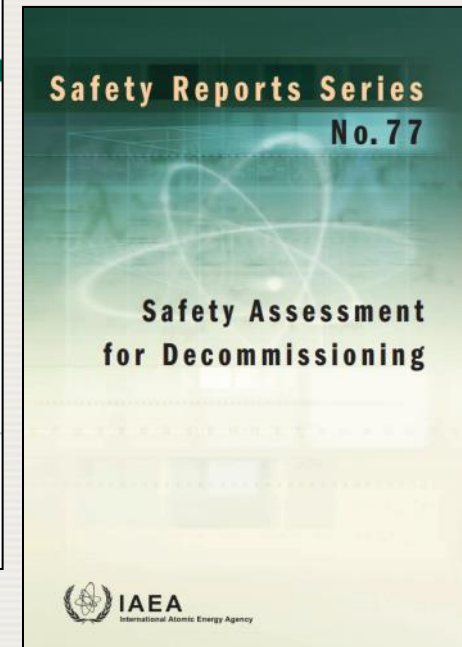
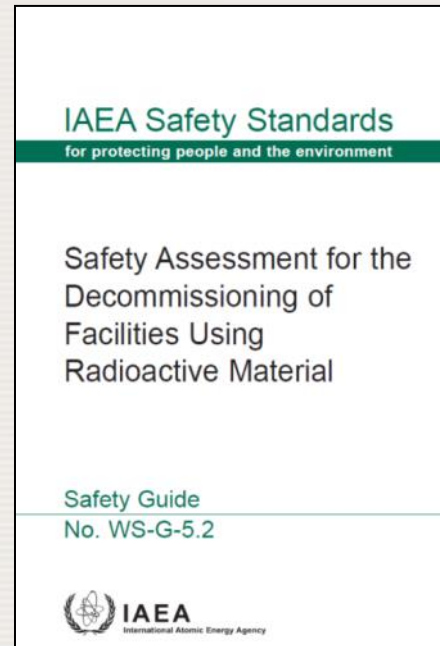
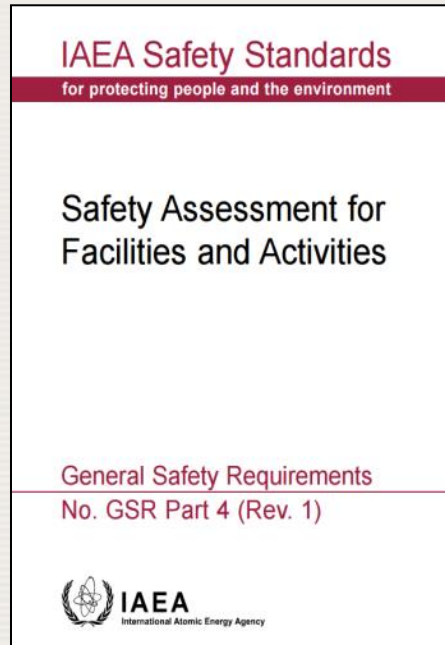
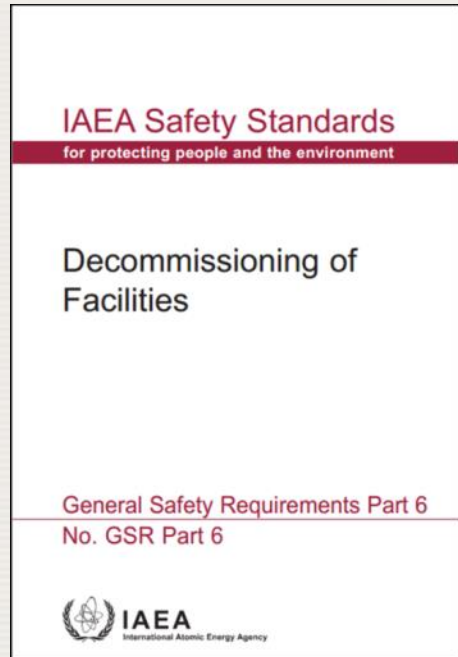
Hazards analysis and risk (safety) assessment is a central element of decommissioning projects...



Risk assessment

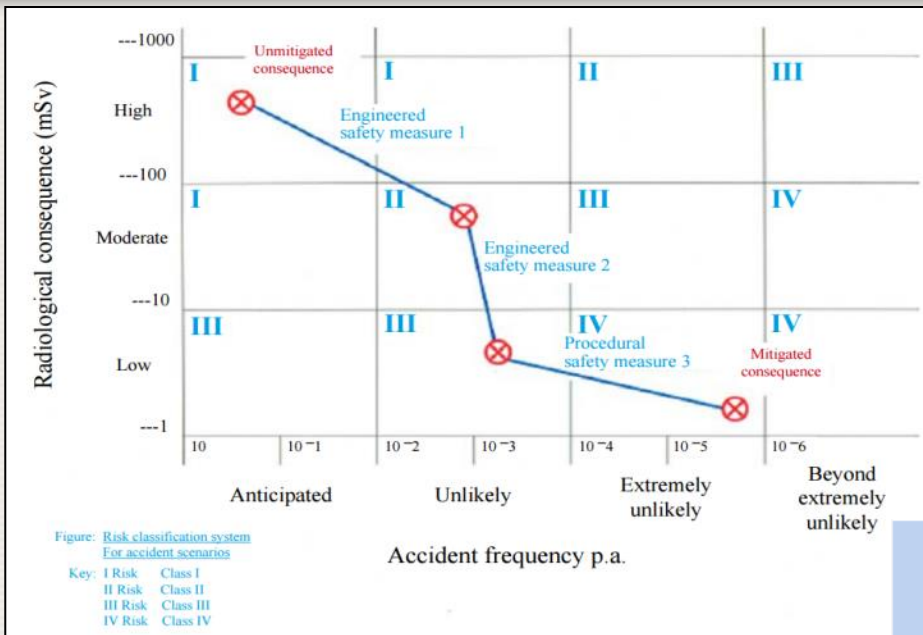
- The term "risk" includes all the relevant types of project-related risks, e.g. strategic, political, organizational, regulatory, technical, safety, commercial/financial, stakeholder related, etc., that may affect the progress of a decommissioning project and/or jeopardize the achievement of the project objectives (removing the hazards while protecting the public, worker and environment).
- Identification
 - What are the hazards and associated uncertainties?
- Evaluate
 - What are the probabilities and consequences?
- Mitigation
 - Prioritization and Decision-Making

Decommissioning and Safety Assessment



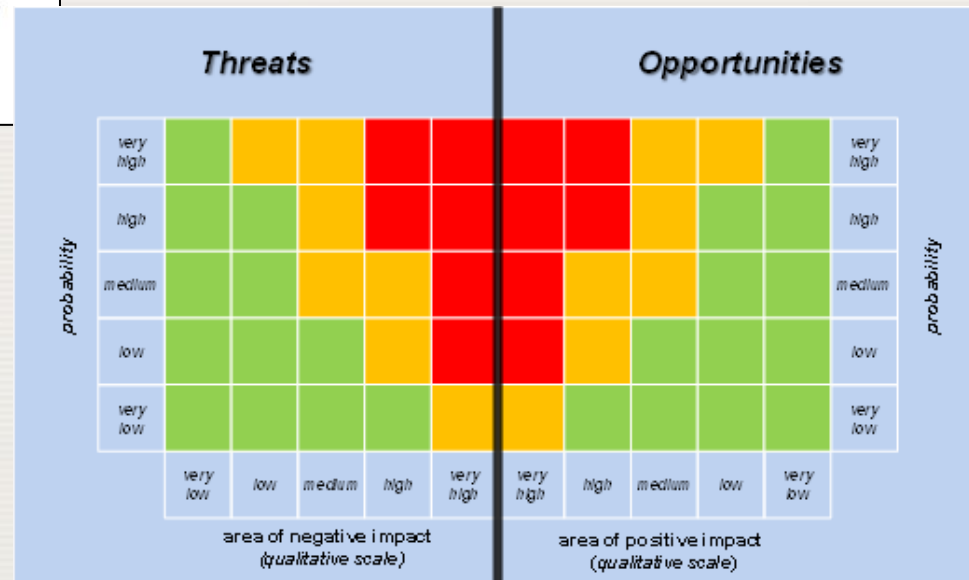
Quantitative Risk Assessment

Qualitative Risk Evaluation



- Risk assessment and evaluation are used to help prioritization and decision-making in multi-faceted and complex situations.

- Complex risk management situations have both threat and opportunity impacts.



DRiMa: International Project on Decommissioning Risk Management

<http://www-ns.iaea.org/projects/drima/>

The DRiMa project commenced in 2012 and completed in 2015, with over 40 representatives from 28 Member States. Final report pending.

- There are well-established risk management methodologies used in many industries and applicable to decommissioning
- Decommissioning projects generally recognize project risks at two levels:
 - **Strategic:** Risk management at the *strategic* level focuses on the **management of assumptions (uncertainties)** and strategic decisions during planning for decommissioning (Initial to Final Decommissioning Plan); key assumptions have a fundamental impact on the decommissioning plan, and thus the uncertainties need to be analysed as development of the plan progresses.
 - **Operational:** Risk management at the *operational* level focuses on risks to the decommissioning project associated with the project conduct (implementation of the Final Decommissioning Plan)
- During implementation of the decommissioning project all risks have to be continuously managed to increase the probability of success in achieving the decommissioning objectives.



Managing the Decommissioning and Remediation of Damaged Nuclear Facilities (DAROD Project).

Project launched in January 2015, 23 countries participating.

Objective is to distil and disseminate practical knowledge for the decommissioning and remediation of damaged nuclear facilities from multiple perspectives.

Has three working groups to address perspectives related to:

- Regulatory oversight
- Policy, strategy and planning
- Technology issues



Conclusions

- The IAEA's Safety Standards represent 5 decades of experience and expertise, and provide international consensus on what is needed to achieve a high level of safety
- Decommissioning standards take into account practices from Member States with advanced programmes
- Application of the Safety Standards to support safe and cost-effective decommissioning
- Input to the Safety Standards from the Member States and feedback from their application essential for the IAEA work
- The present efforts at the Fukushima Daiichi NPP both draw from and contribute to the global expertise in safely addressing the challenges of decommissioning, and a strengthened global nuclear safety framework.





Thank you for your attention !