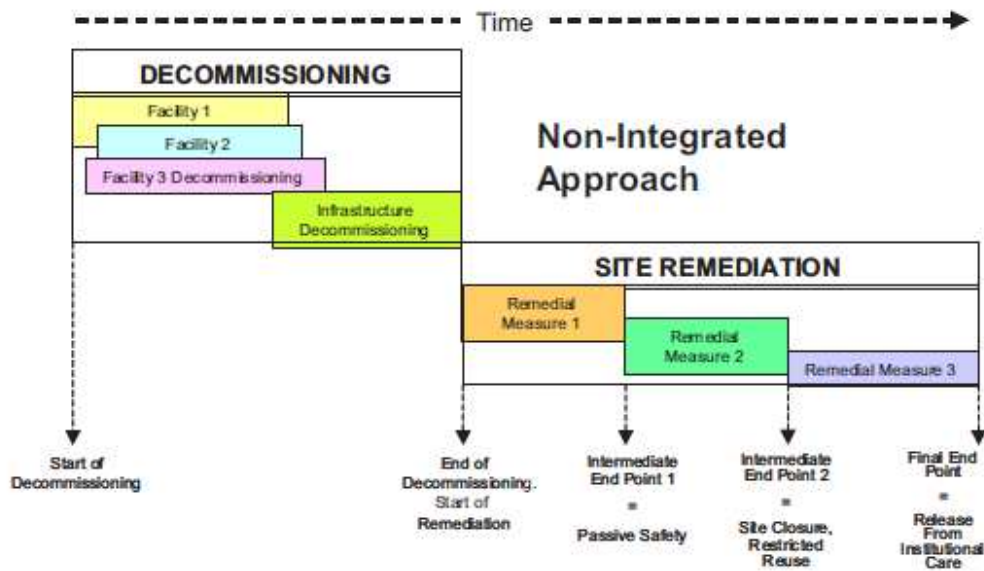




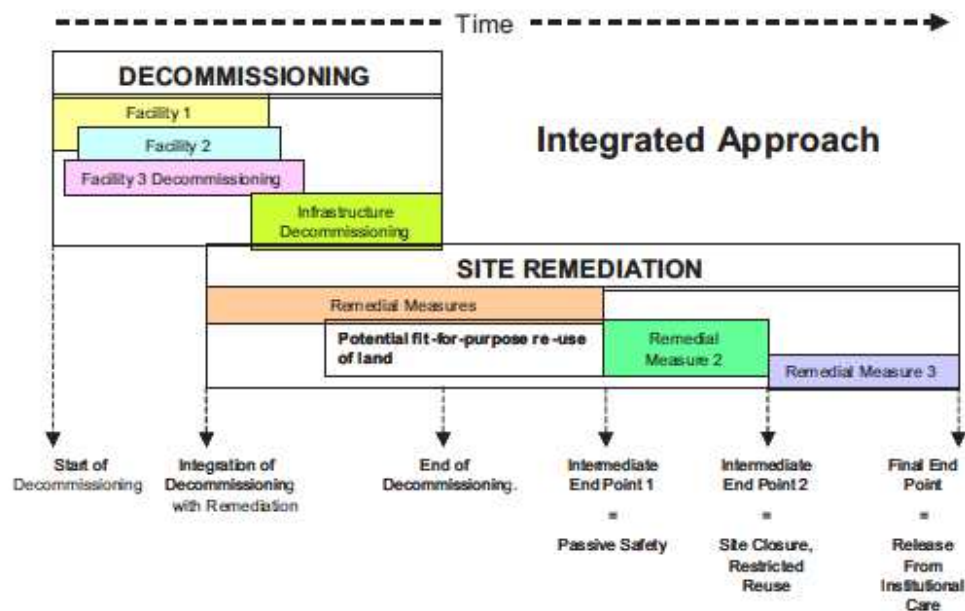
International Atomic Energy Agency

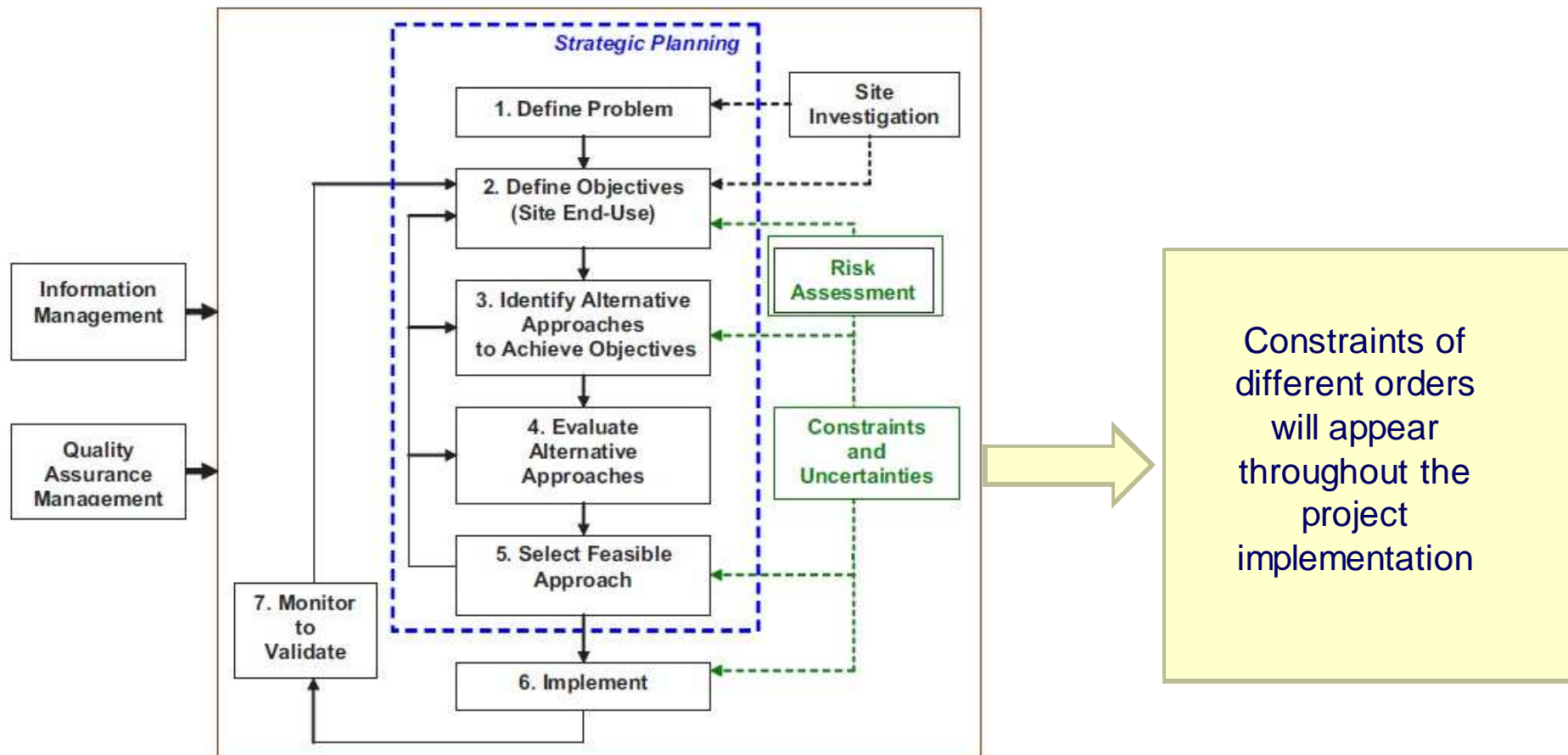
Constraints in D&D ER

**Peter Booth
(on the Behalf of
H. Monken-Fernandes)
Waste Technology Section – IAEA
Waste Management Conference 2012**



Ideally D&D and ER can happen simultaneously taking advantage of the synergies between both activities





Basics

- **Most NPP's were designed and built before the problem of how to dismantle them had been solved or was even seriously considered**
- **Similarly, several nuclear facilities (including uranium mining and processing) were developed without major concerns with environmental issues and without appropriate regulations**



Decommissioning

- **150 reactors still operating that are over 30 years old, 13 of which over 40 years old**
- **Research reactors are even more numerous (majority over 40 years old)**
 - **250 operating**
 - **1 construction**
 - **248 already shut down**
 - **170 decommissioned**

Decommissioning

- **Only 17 of the 129 shut down NPP's have been fully decommissioned and sites removed from regulatory control**
- **A final strategy for the decommissioning of the majority of sites has not yet been decided**
- **In addition to NPP's there are uranium mines, particle accelerators, nuclear vessels**



Decommissioning

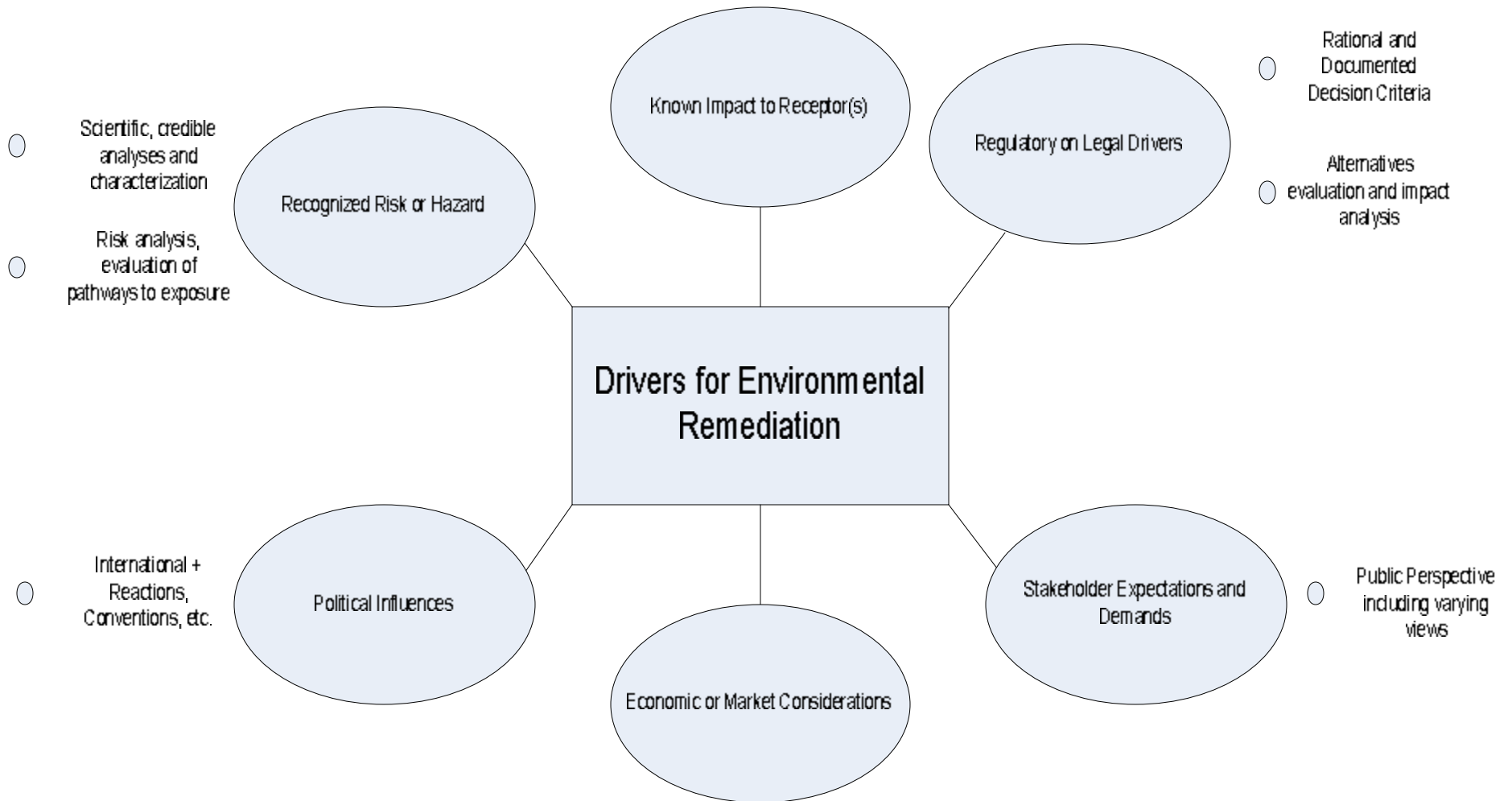
- **Problems**
 - **Finding equipment for defueling**
 - **Identifying sites for the waste**
 - **Acquiring sufficient funds**
 - **Lack of trained professionals**
 - **Disputes over access and liability**



Environmental Remediation

- **Contaminated sites continue to exist all over the world**
- **They are not related only to the nuclear fuel cycle but include NORM-industries. Accidents (Chernobyl, Goiania, Fukushima) also play a relevant role in generating contaminated sites**
- **Contaminated areas can be large**

Drivers for Environmental Remediation



CRESP Perspective

Consortium for Risk Evaluation with Stakeholder Participation (CRESP) was asked by the United States Department of Energy (US DOE) to consider the root causes of remediation projects that fail to entirely achieve their goals and then to offer suggestions to assist the Department

- 1) complex science, engineering, and technology;
- 2) ambiguous economics;
- 3) project management shortcomings;
- 4) political processes and credibility; and
- 5) history and organizational culture



Environmental Remediation Managerial Constraints

- **Lack of:**
 - **Policy and Strategies for ER**
 - **Appropriate regulatory framework**
 - **Funding mechanisms**
 - **Database (information)**
 - **Stakeholder involvement**
 - **Technical expertise and difficulties in the appropriation of international experience**

Environmental Remediation

Technical Constraints

- The behaviour of contaminants in the subsurface is poorly understood (High)
- The long-term ability of cementitious materials to isolate wastes is not demonstrated (High)
- Site and contaminant source characteristics may limit the usefulness of baseline subsurface remediation technologies (Medium)
- The long-term performance of trench caps, liners, and reactive barriers cannot be assessed with current knowledge (Medium)
- Substantial amounts of waste may be generated after clean-up (High)

How to overcome this situation?

- **Examine what works in some countries and see to what extent experience can be transferred**
- **Explore innovative mechanisms to support D&D and ER**
- **Analyse role of international organisations (is there room for improvements? Coordination)**
- **Going beyond regulatory issues**

How to overcome this situation?

- **Expertise and infrastructure to:**
 - Handling radioactive materials
 - Conduct engineering and pilot-scale tests
 - Determining contaminant behaviour in the environment
 - Utilizing state-of-the-art science to develop advanced technologies

THANKS FOR YOUR ATTENTION