

International Atomic Energy Agency

Current IAEA Decommissioning Activities

M.Hannan and M.Laraia

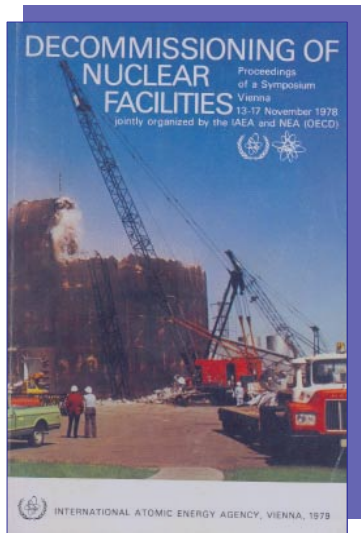
International Decommissioning Network & Decommissioning Peer Review

3rd Nov – 7th Nov 2008, IAEA, Vienna

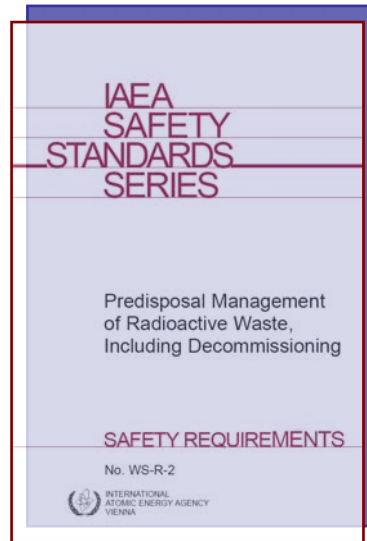
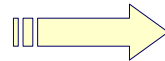
Outline

- **Safety standards evolution**
- **Safety assessment methodology (DeSa project)**
- **Use of safety assessment in decision making (FaSa project)**
- **Summary**

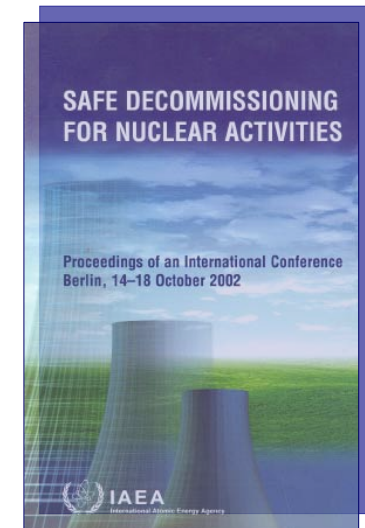
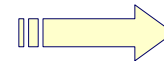
Safety Standards Evolution



(1970s)



(1999)



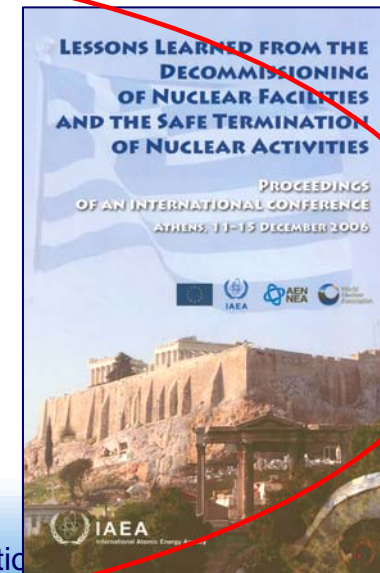
(2002)

- Safety Requirements for decommissioning
- Revision of existing Safety Guides
- International forum for exchange of lessons learned on safety assessment for decommissioning

Action Plan

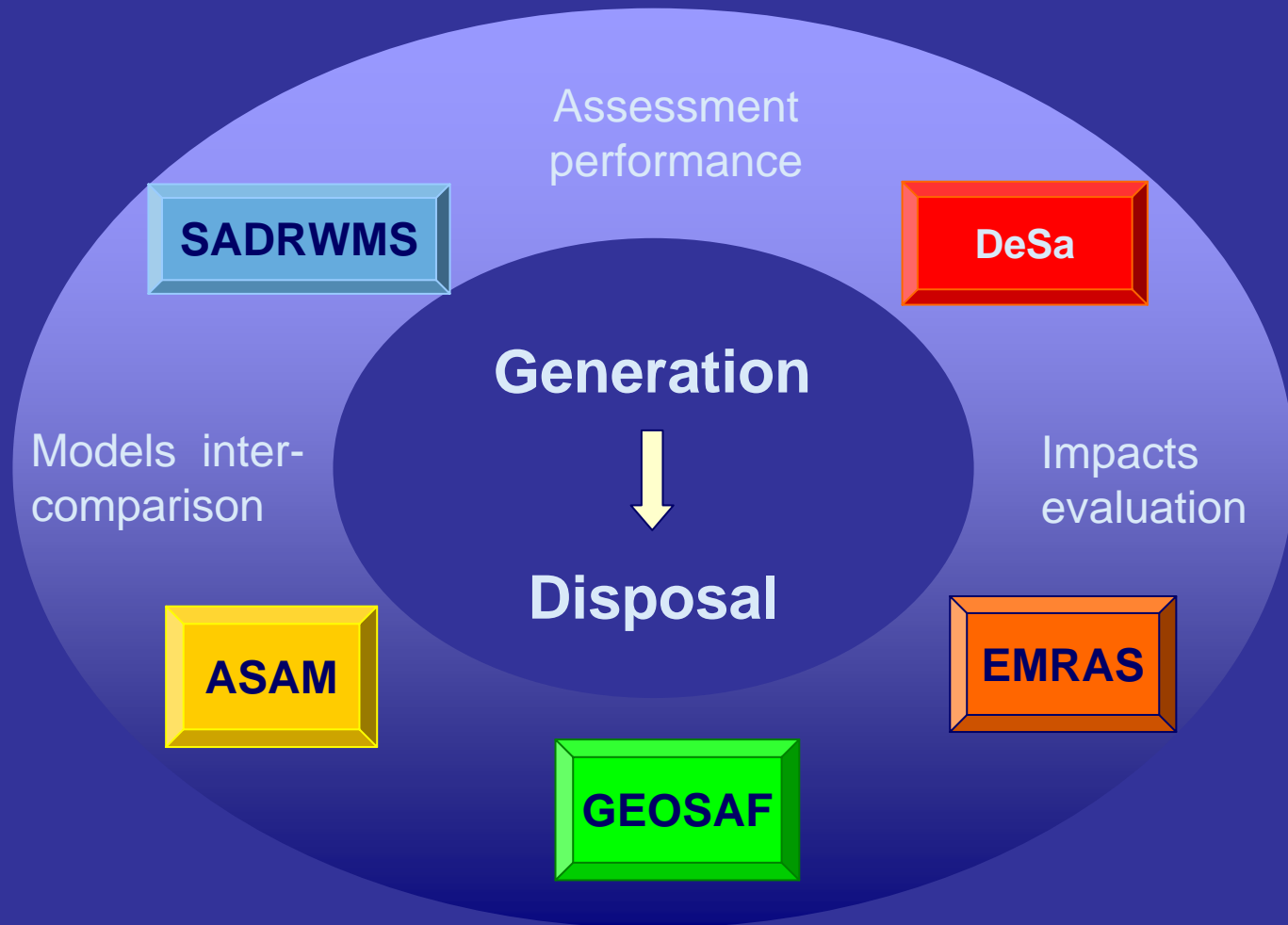
(2004)

(2004-6)



(2006)





Safety Demonstration Framework for Management of Radioactive Waste and Decommissioning

DeSa Project

Evaluation and Demonstration of Safety during Decommissioning of Nuclear Facilities

(Nov. 2004 – Nov. 2007)

- **Scope**

- Safety assessment methodology
- Regulatory review
- Graded approach
- All types of facilities
- All types of decommissioning strategies
- Radiological hazards
- Normal and accident conditions

DeSa Project

Evaluation and Demonstration of Safety during Decommissioning of Nuclear Facilities

(Nov. 2004 – Nov. 2007)

● **Scope**

- Safety assessment methodology
- Regulatory review
- Graded approach
- All types of facilities
- All types of decommissioning strategies
- Radiological hazards
- Normal and accident conditions

Objectives

- Harmonise safety assessment approaches
- Illustrate the methodology on different types of facilities
- Develop recommendations on the regulatory review of such assessments
- Provide a forum for exchange of information between experts from IAEA Member States

DeSa Project (cont.)

Over 100 participants from 33 Member States

Armenia, Australia, Belgium, Brazil, Bulgaria, Canada, China, Croatia, Czech R., Denmark, Egypt, France, Germany, Hungary, India, Iraq, Italy, Japan, Korea R, Lithuania, Netherlands, Pakistan, Romania, Russian F., Serbia, Slovenia, S. Africa, Slovakia, Sweden, Turkey, UK, Ukraine and USA



- 2007 – 9 Working Group meetings
- Majority financially supported by the Member States

Example :France – ASN, CEA and IRSN

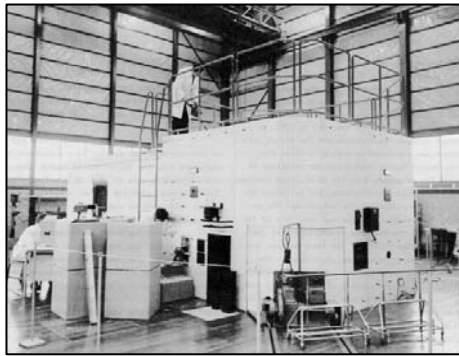
UK – NII, NDA, Sellafield and UKAEA (Dounreay)

DeSa Project Outcomes

- I Harmonised safety assessment methodology developed
 - Main steps defined and examples provided
 - Decommissioning projects Sweden, Ukraine, China, etc.
- II Safety assessment for real facilities developed



NPP



Research reactor



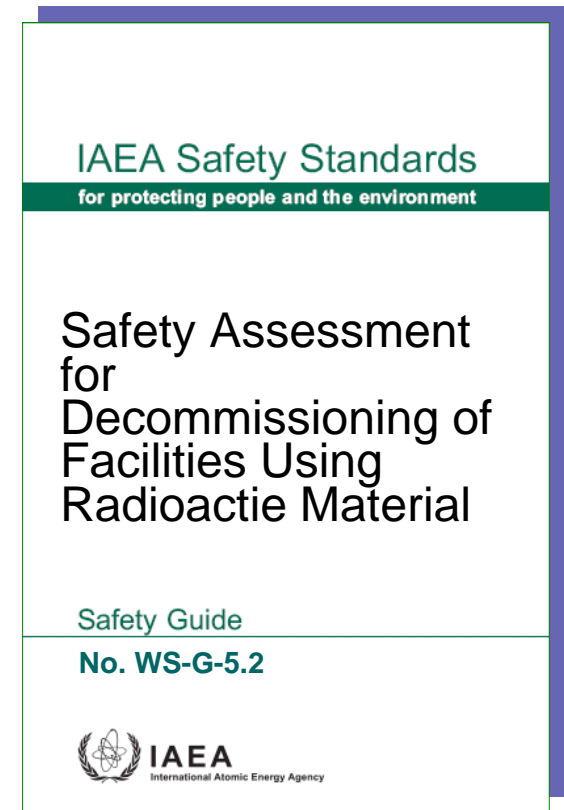
Pu Laboratory

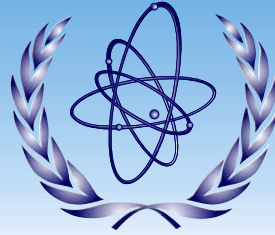
- III A procedure for review of safety assessments developed and applied
- IV Recommendations on application of graded approach

DeSa Project Outcomes

International Level

- **Input to the new IAEA Safety Guide WS-G-5.2**
- **Safety Report (4 vol) to be published in 2008**
- **Network of specialists in the field of decommissioning**
- **Development and application of SAFRAN tool**
- **Input to IAEA support to MS (incl. peer review service on decommissioning)**
- **Input to the WENRA Reference Levels**





International Atomic Energy Agency

Follow-up to DeSa

**- *FaSa Project* -
(2008-2011)**

**Use of Safety Assessment in Planning
and Implementation of
Decommissioning**

Objectives

- A To explore and develop harmonized approaches**
- **Use of safety assessment in development and review of decommissioning plans through facility lifecycle**
 - **Use assessment results in the conduct of decommissioning activities (e.g safety functions and controls)**
 - **Update of safety assessment and operator/regulator review of safety assessments from lessons on application of DeSa methodology**

Objectives

- A** To explore and develop harmonized approaches
- Use of safety assessment in development and review of decommissioning plans through facility lifecycle
 - Use assessment results in the conduct of decommissioning activities (e.g safety functions and controls)
 - Graded approach in the application of safety assessment
 - Update of safety assessment and operator/regulator review of safety assessments from lessons on application of DeSa methodology
- B** Demonstrate the application of these recommendations on selected real facilities

Objectives

- A** **To explore and develop harmonized approaches**
 - **Use of safety assessment in development and review of decommissioning plans through facility lifecycle**
 - **Use assessment results in the conduct of decommissioning activities (e.g safety functions and controls)**
 - **Graded approach in the application of safety assessment**
 - **Update of safety assessment and operator/regulator review of safety assessments**

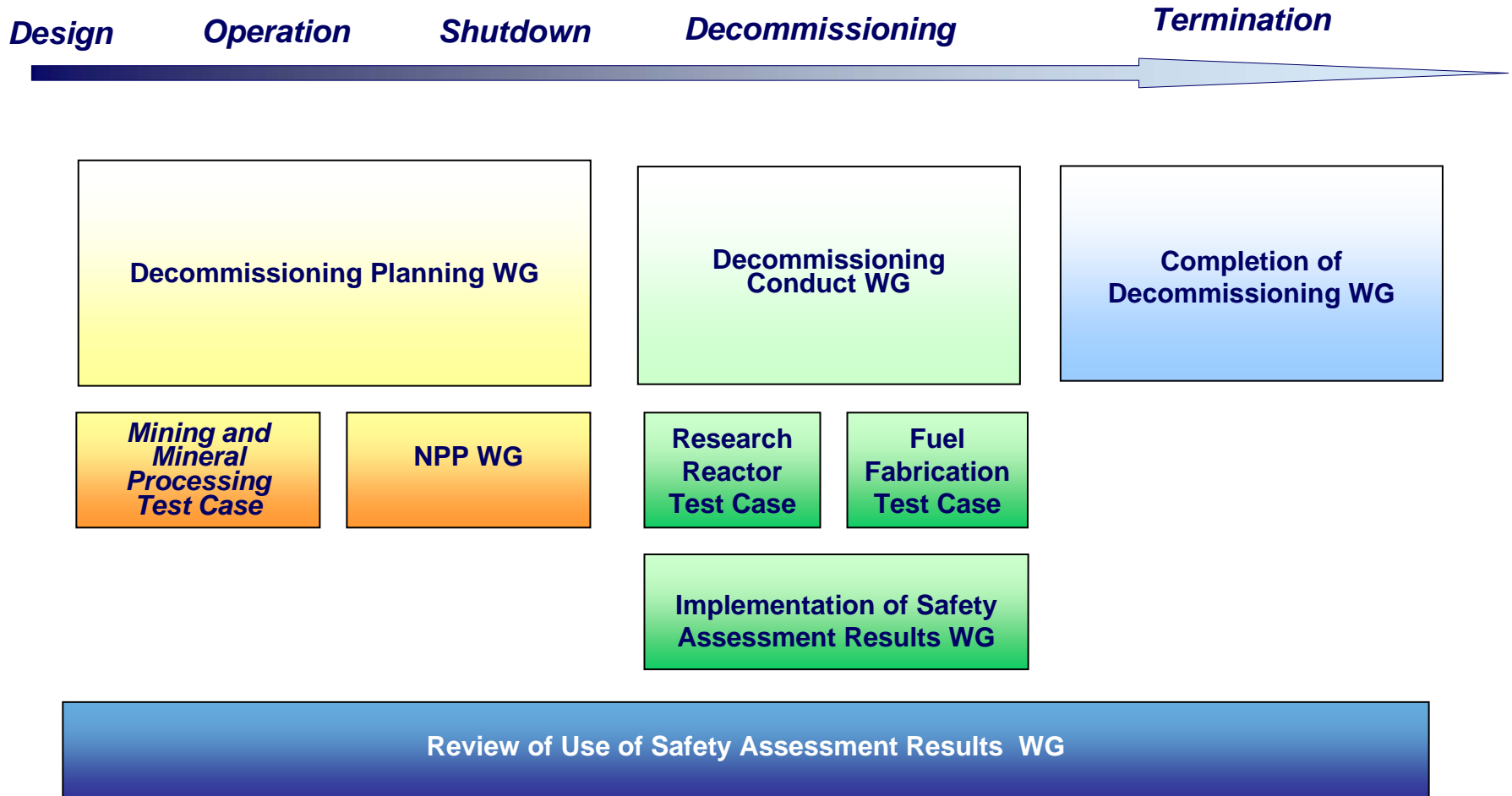
- B** **Demonstrate the application of these recommendations on selected real facilities**

- C** **Provide a forum for exchange of information and lessons learned**

Scope

- ✓ **Use of safety assessment results**
 - **Decommissioning plans**
 - **Conduct (e.g. working procedures)**
- ✓ **Planning, conduct and termination**
 - **Preliminary and detailed assessments**
 - **Periodic update, review and re-assessment**
- ✓ **DeSa methodology**
- ✓ **All facilities - single and multi-facility sites**
- ✓ **Immediate and deferred strategies**
- **Except waste disposal, tailings and entombment**

Planned FaSa Activities



Proposed Test Cases



NPP

WWER

70 MW

1966-1990



**Fuel
Fabric.
Facility**

MOX fuel

1971-1992

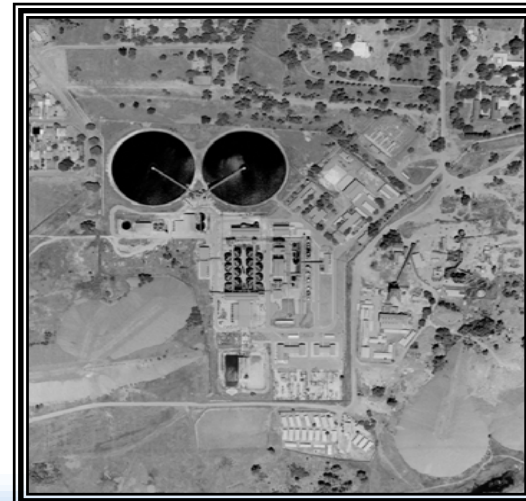


**Complex
research
reactor**

35 MW

**Pool type
reactor**

**1963-
1997**



**Mineral
process.
facility**

**Gold and
uranium**

1987-2002

Opening meeting of FaSa project



17-21 Nov. 2008, IAEA, Vienna

(<http://www-ns.iaea.org/tech-areas/waste-safety/fasa/default.htm>)

Expected outcomes

International Level

2004-2007

2008-2011

2011 -

DeSa
project

FaSa
project

FaSa follow-up
project

Safety
Assessment
Methodology

Use of Safety
Assessment
Results in
Planning, Conduct
and Termination

Safety Assessment
and
Decommissioning
Plan/Safety Case



WS-G-5.2

Revision of WS-G-
2.1, 2.2. and 2.4.

Revision of WS-R-5

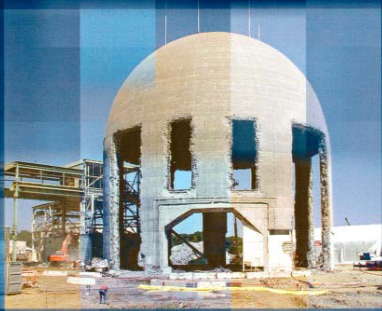


Summary

- **Safety assessment methodology (DeSa)**
 - Reference safety assessments developed
 - Regulatory review procedure recommended
 - Recommendations on the application of the graded approach
- **Application of results (FaSa)**
 - More specific and with practical examples
 - Evolution of DP during facility lifetime
 - Graded approach
- **International projects very efficient, important and useful mechanisms**
- **International assistance**
 - Legal and regulatory infrastructure
 - Implementation of decommissioning projects
- **International activities**
 - Safety Standards development (WS-G-5.2), peer reviews, demonstration projects, etc.

Further Information

Decommissioning of Nuclear Facilities: A Major Undertaking



Worldwide some 100 power reactors, 250 research reactors and many other fuel cycle facilities are already or will in the near future be decommissioned. Decommissioning is now an industrial scale activity in which adequate planning, funding, regulatory control and measures to ensure safety and cost-effectiveness during and after decommissioning have become increasingly important. The total decommissioning liability for reactors, fuel cycle facilities and research activities over the next 50 years is estimated at approximately \$1000 billion.

Global Nuclear Safety Regime Applied to Decommissioning

The IAEA objective is to apply a global nuclear safety regime to decommissioning and to assist Member States in termination of practices and release of facilities and activities from regulatory control by using appropriate technologies in a safe, timely and cost effective manner.



PROCEEDINGS

International Project on Evaluation and Demonstration
of Safety during Decommissioning of Nuclear Facilities
(DeSa)

*The First Four Years
(2004-2007)*



Limited distribution
October 2007

<http://goto.iaea.org/decommissioning>

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