

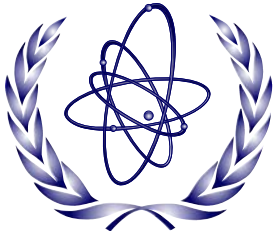
International Atomic Energy Agency

**Evolution of Safety Standards
and the Requirements in
Respect of the Safety Case**

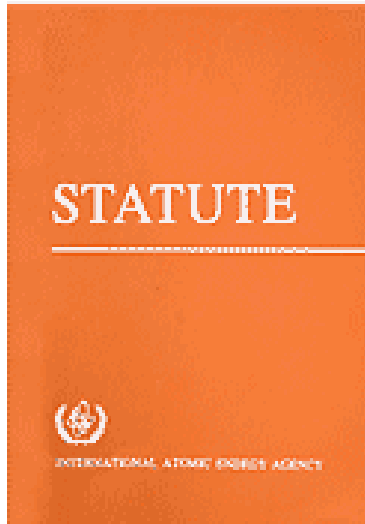
Phil Metcalf

IAEA

- **International nuclear safety standards**
- **Geological disposal**
- **Safety case requirements**
- **Use of the safety standards**



143 Member State specialist agency of the UN concerned with nuclear safety, technology and safeguards



inter alia - to establish or adopt, in consultation and, where appropriate, in collaboration with the competent organs of the UN 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 ...

IAEA Safety Standards

for protecting people and the environment

Fundamental
Safety Principles



Safety Fundamentals

No. SF-1



IAEA Safety Standards

for protecting people and the environment

Geological Disposal of
Radioactive Waste



Safety Requirements

No. WS-R-4



IAEA Safety Standards

for protecting people and the environment

Management of Waste
from the Use of
Radioactive Material
in Medicine, Industry,
Agriculture, Research
and Education

Safety Guide

No. WS-G-2.7



FUNDAMENTAL PRINCIPLES

REQUIREMENTS - LEGAL, TECHNICAL & PROCEDURAL SAFETY IMPERATIVES

GUIDANCE ON BEST PRACTICE TO MEET REQUIREMENTS

Safety Fundamentals

Thematic Areas

Legal & governmental infrastructure

Emergency preparedness & response

Management systems

Assessment & verification

Site evaluation

Radiation safety

Radioactive waste management

Decommissioning

Rehabilitation of contaminated areas

Facilities & Activities

Nuclear power plants

Research reactors

Fuel cycle facilities

Radiation related facilities & activities

Waste disposal facilities

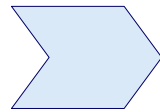
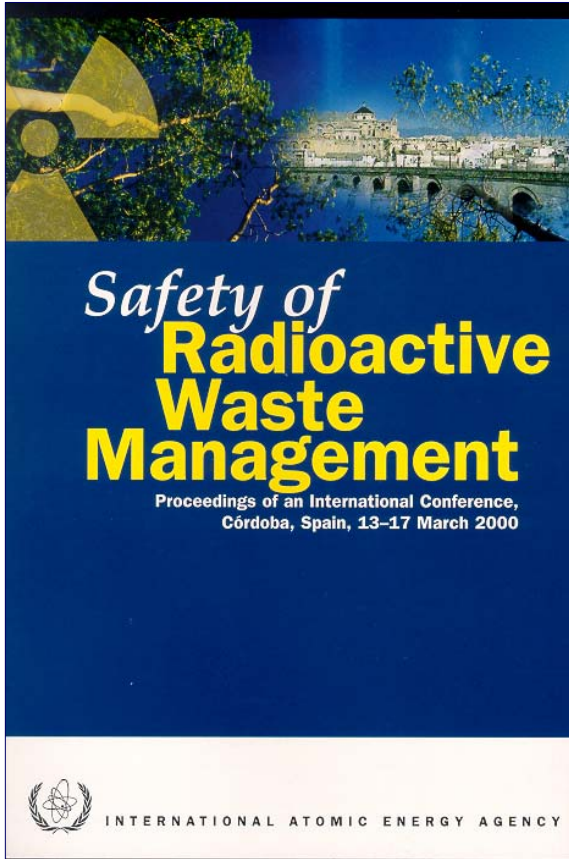
Transport of radioactive material

Around 150 standards



- **Mining and minerals processing tailings disposal facilities**
- **Near surface disposal facilities**
- **Intermediate depth caverns**
- **Borehole facilities**
- **Geological disposal**

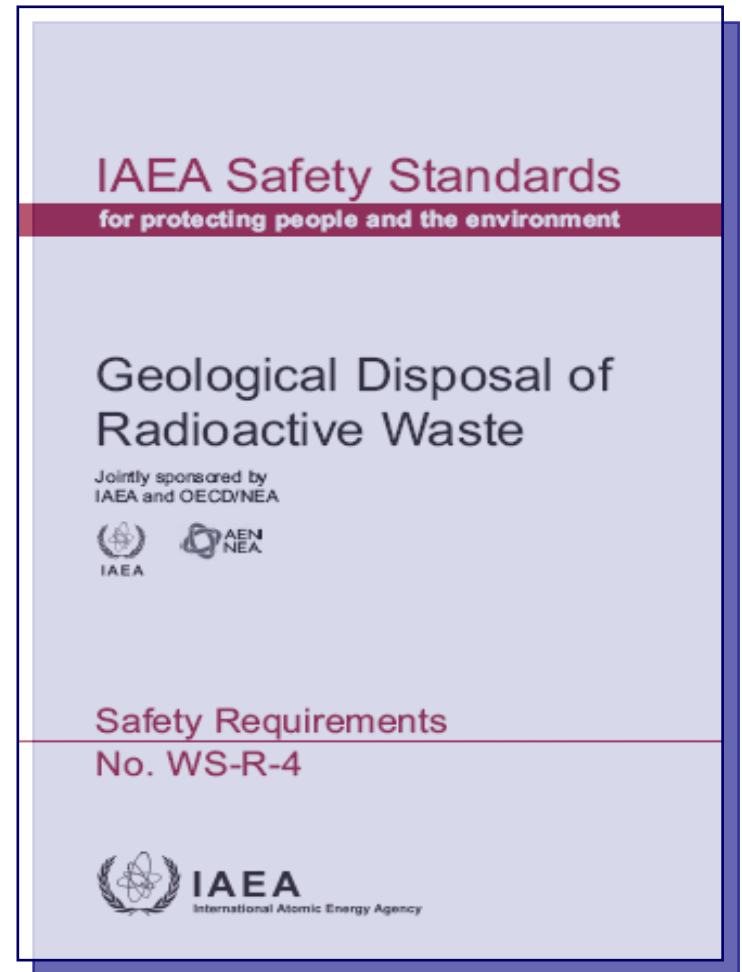
Geological disposal



WASTE SAFETY ACTION PLAN

Action #3 - Promptly develop safety standards for geological disposal, addressing, inter alia, issues of human intrusion, institutional control, retrievability, the content of the safety case and any implications of nuclear safeguards requirements for the design of the repositories

- **Process commenced 2001 in cooperation with NEA**
- **Safety Requirements approved 2005**
- **Safety Guide under development**



Process

- International workshop
- Technical meetings
- ✓ Set down clear safety objective and criteria
- ✓ Requirements for:
 - ✓ Before development
 - ✓ During development
 - ✓ Assuring safety
- ✓ Operational and post closure safety

Oversight, review and approval

IAEA

WASSC
CSS
BOG

NEA

RWMC
SC



Structure and content

- **Introduction**
- **Safety objectives and criteria for operational and post closure periods**
- **Safety requirements**
- **Appendix – assurance of compliance with safety objectives and criteria**
- **Annex – geological disposal and the principles of radioactive waste management**

Safety Requirements

- **Planning**
 - Legal and organisational
 - Safety approach
 - Safety design principles
- **Development, operation and closure**
 - Framework for geological disposal
 - Safety case and safety assessment
 - Steps in the development of a facility
- **Assurance**

Safety case requirements

Safety Case and Supporting Safety Assessment

- **Central to development, operation and closure**
- **Substantiate safety, contribute to confidence - essential to decision making**
 - **Design and design logic**
 - **Supporting evidence and reasoning on robustness and reliability of facility**
 - **Output of safety assessment**
 - **Quality of safety assessment and underlying assumptions**
 - **Perspective on results of SA and issues to resolve**

Safety Assessment

- **Systematic analysis of hazards and ability of facility to provide safety functions and meet safety requirements**
 - Quantification of performance
 - Analysis of uncertainties
 - Compliance with criteria
 - Site/facility specific
 - Evolve with project
 - Identify areas for further work, guide research and provide basis for control and monitoring

Requirements for the Safety Case and Supporting Safety Assessments

Preparation

- ✓ Shall be prepared and updated by the operator, as necessary, at each step in the development, operation and closure of the facility
- ✓ Shall be sufficiently detailed and comprehensive to provide the necessary technical input for informing the regulatory and other decisions necessary at each step

Scope

- ✓ **Shall describe all the safety relevant aspects of the site, the design of the facility, and the managerial and regulatory controls**
- ✓ **Shall illustrate the level of protection provided**
- ✓ **Shall provide assurance that safety requirements will be met**

Documentation

- ✓ **Shall be documented to a level of detail and quality sufficient to support the decision to be made at each step and to allow for their independent review**

Safety Case Development

- Prepared early
- Basis for licensing decisions
- Guide research and development, siting and design
- Progressive development
- Update for moving to next project step

- **Scope and structure depend on project stage and maturity**
- **Consider needs of interested parties**
- **Justification – explain basis for choices arguments for and against options**
- **Traceability – enable independent review**
- **Clarity – good structure and presentation at appropriate level of detail**

Use of safety standards

- **Basis for international undertakings e.g. Joint Convention (Spent fuel and radioactive waste safety)**
- **Legislation and regulatory guidance**
- **Facility design and operation**
- **Peer review**
- **Training**
- **International inter-comparison and harmonisation projects e.g. ISAM / ASAM**

