



International Atomic Energy Agency

NEW REACTOR DESIGNS IAEA INITIATIVES AND MDEP

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New Reactor Designs

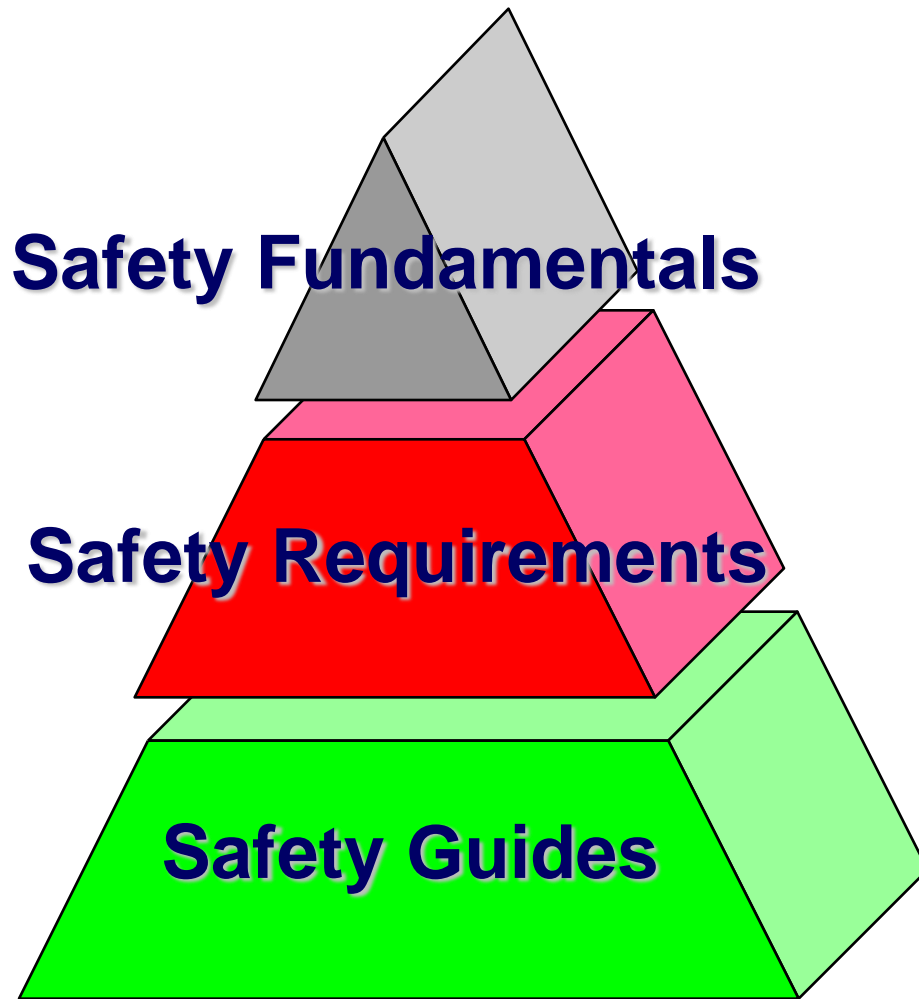
IAEA Initiatives and MDEP

- **IAEA Safety Standards and Services**
- **Recent IAEA initiatives related to new reactor designs**
- **Relation between IAEA initiatives and MDEP**
- **Conclusions**

IAEA Statute (Article III.A.6)

- **“To establish or adopt... [in consultation with...] standards of safety for the protection of health and minimization of danger to life and property”**
- **“...and to provide for the application of these standards”**

Safety Standards Hierarchy



International
References for a
High Level of Nuclear
Safety

General Safety Requirements

Part 1 Governmental and
Regulatory Framework

Part 2 Leadership and Management
for Safety

Part 3 Radiation Protection and
Safety of Radiation Sources

Part 4 Safety Assessment

Part 5 Predisposal Management
of Radioactive Waste

Part 6 Decommissioning and
Termination of Activities

Part 7 Emergency Preparedness
and Response

Specific Safety Requirements

1. Site Evaluation for
Nuclear Installations

2. Safety of Nuclear Power Plants

2.1 Design and Construction
2.2 Commissioning and Operation

3. Safety of Research Reactors

4. Safety of Nuclear Fuel
Cycle Facilities

5. Safety of Radioactive Waste
Disposal Facilities

6. Safe Transport of
Radioactive Material



Development of Safety Standards

- **Development process involving:**
 - **International Commission**
 - **International Technical Committees**
 - **Consultation of IAEA Member States**
 - **Recognized experts**
- **Member States approve standards through the Board of Governors or the Director General of the IAEA**

Status of Safety Standards

Safety Standards represent international consensus on best international practices to achieve a high level of safety

Utilization by Member States

- **Formally adopted (i.e. China, Netherlands)**
- **Direct use of standards to establish regulation (i.e. Canada, Czech Republic, Germany, India, Korea, Russian Federation)**
- **Used as reference for review of national standards and situations (by all States, also by Industry)**
- **Used by International Organizations (European Safety Directive, WENRA)**

IAEA Safety Review Services

- **Regulatory Framework and Activities**
 - IRRS – Integrated Regulatory Review Service
- **Operational Safety**
 - OSART – Operational Safety Review Team
 - SEDO – Safety Evaluation of Fuel Cycle Facilities During Operation
 - SCART – Safety Culture Assessment Review Team
- **Research Reactors**
 - INSARR – Integrated Safety Assessment of Research Reactors
- **Engineering and Technical Safety**

IAEA Initiatives related to new reactor designs

Generic Reactor Safety Review

- **Asses compliance of the design with relevant safety standards**
- **All stages of the design**
(From first conceptual documentation to Safety Analysis Report)

Relevant Safety Standards For Generic Reactor Safety Reviews (GRSR)

**Safety Fundamentals
(SF-1)**

**Safety Assessment Requirements
(GS-R-4)**

**Requirements for the Design of NPPs
(NS-R-1)**

**Safety Standards
against which the
review will be
conducted**

Guides for the Design

Guides for Assessment

**Supporting
Safety
Guides**



Approach for GRSR

Reviews of reactor safety documentation by international experts

- **Completeness**

Gaps with respect to the Safety Standards Requirements?
Evidence that substantiates the safety claims and arguments?

- **Comprehensiveness**

All features of installation?
All modes of operation?
Entire lifetime?

GRSR already performed

Reactor	Document	Counterpart	Member State
ACR 1000	Safety case submitted for UK Bid	NII	UK
AP 1000	Safety case submitted for UK Bid Safety and Environmental Report	NII Westinghouse	UK US
APR 1400	Safety and Environmental Report	KHNP	KOREA
ATMEA 1	Conceptual Design Safety File	ATMEA	FRANCE
EPR	Safety case submitted for UK BID	NII	UK
ESBWR	Safety case submitted for UK BID	NII	UK



Experience from GRSR

- **Can be applied to mature designs as well as to concepts**
- **Support Member States in evaluation of new reactor safety**
- **Contribute to form a basis for harmonization of safety approaches**
- **Valuable feedback for Standards interpretation, clarification and future update**
- **Show potential for early evaluation of innovative reactors**



Support provided by GRSR to Member States

**Provide valuable input for individual evaluation
or the national licensing process**

BUT

**Does not constitute any form of licensing or
design certification**

- **No evaluation of the implementation of the requirements**
- **No evaluation of the correctness of technical claims**

Participation of IAEA to MDEP

IAEA takes active part in the work of MDEP in order to:

- **Ensure effective communication and alignment with activities in similar areas**
- **Provide viewpoints from the IAEA Safety Standards which provide a general level of harmonization**
- **Enhance further the safety standards based on feedback from its use in MDEP**



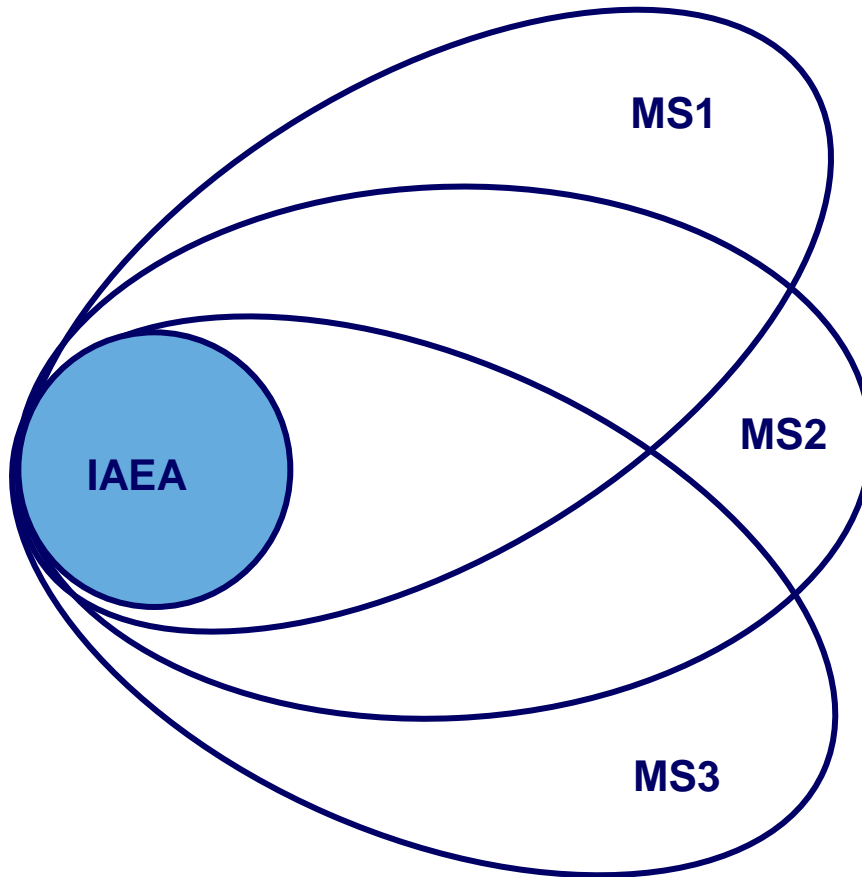
Safety Standards as one of the basis of MDEP

With respect to harmonization, MDEP pilot project concluded that:

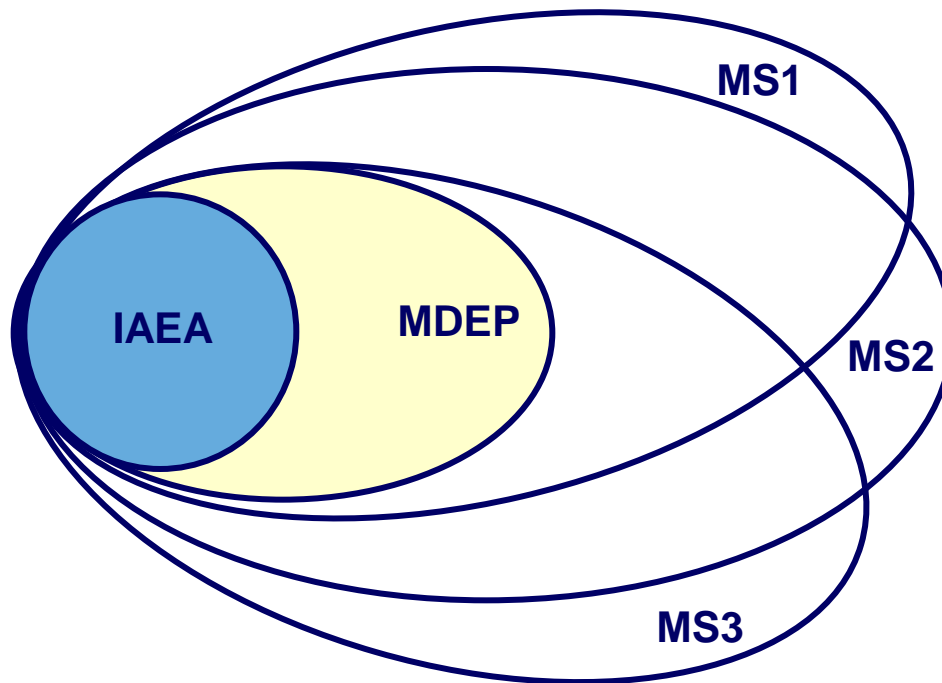
“In many aspects there is already a significant degree of harmonization at a general level in the form of the IAEA safety standards: further harmonization will be assisted by building on these internationally agreed documents.”



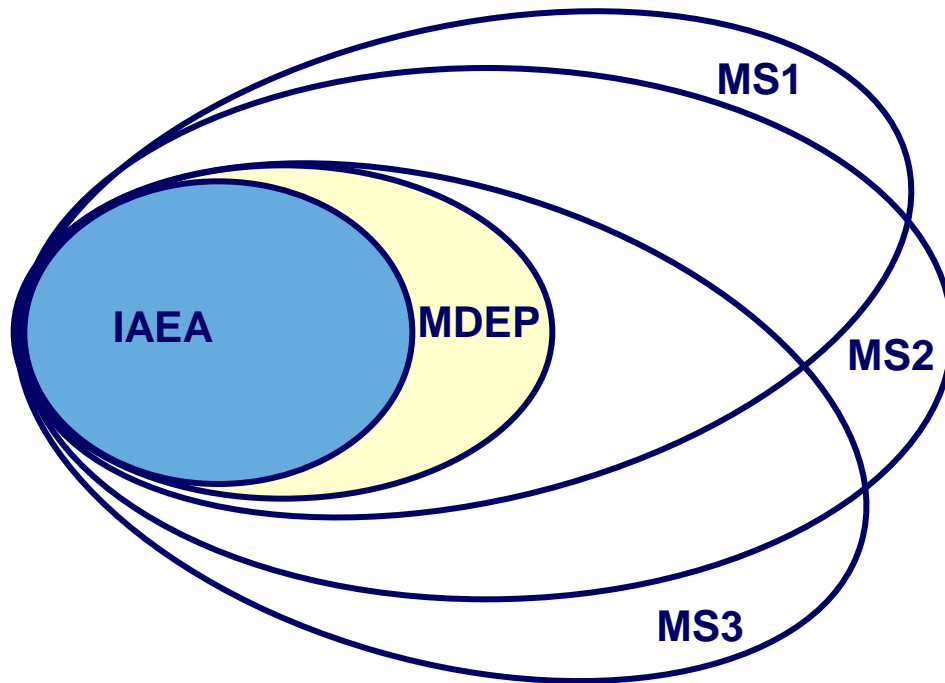
Member States Licensing Process Requirements and IAEA Safety standards



Future MDEP Contribution



Future MDEP Contribution to IAEA Safety standards



CONCLUSIONS

- **IAEA is successfully performing safety reviews of new reactor designs using the current Safety Standards**
- **IAEA is participating actively in MDEP**
- **Current Safety Standards are a first basis for harmonization**
- **The results of MDEP should be used as a basis to further extend the IAEA Safety Standards**