IAEA 60 Years
Atoms for Peace and Development

The Abdus Salam International Centre for Theoretical Physics

Introduction to Workshop

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IAEA International Atomic Energy Agency

IAEA 60 Years Atoms for Peace and Development

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Atoms for Peace

The IAEA is widely known as the world's "Atoms for Peace" organization within the United Nations family. Set up in 1957 as the world's centre for cooperation in the nuclear field, the Agency works with its Member States and multiple partners worldwide to promote the safe, secure and peaceful use of nuclear technologies.

Nuclear Technology & Applications

This work involves helping countries use nuclear and isotopic techniques to promote sustainable development objectives in agriculture, human health, water resource management, marine environment and industrial applications.

- Department of Nuclear Energy
- Department of Nuclear Sciences and Applications
- Department of Technical Cooperation

Nuclear Safety & Security

This work is being carried out mainly to provide a strong, sustainable and visible global nuclear safety and security framework, protecting people and the environment from the harmful effects of ionizing radiation.

- Department of Nuclear Safety and Security

Safeguards & Verification

This work is being carried out to fulfill the duties and responsibilities of the IAEA as the world's nuclear inspectorate, performing an indispensable role in global efforts to stop the spread of nuclear weapons.

- Department of Safeguards

More than 200 staff members carry out the work of the Department of Nuclear Energy, which includes three Divisions and ten Sections.

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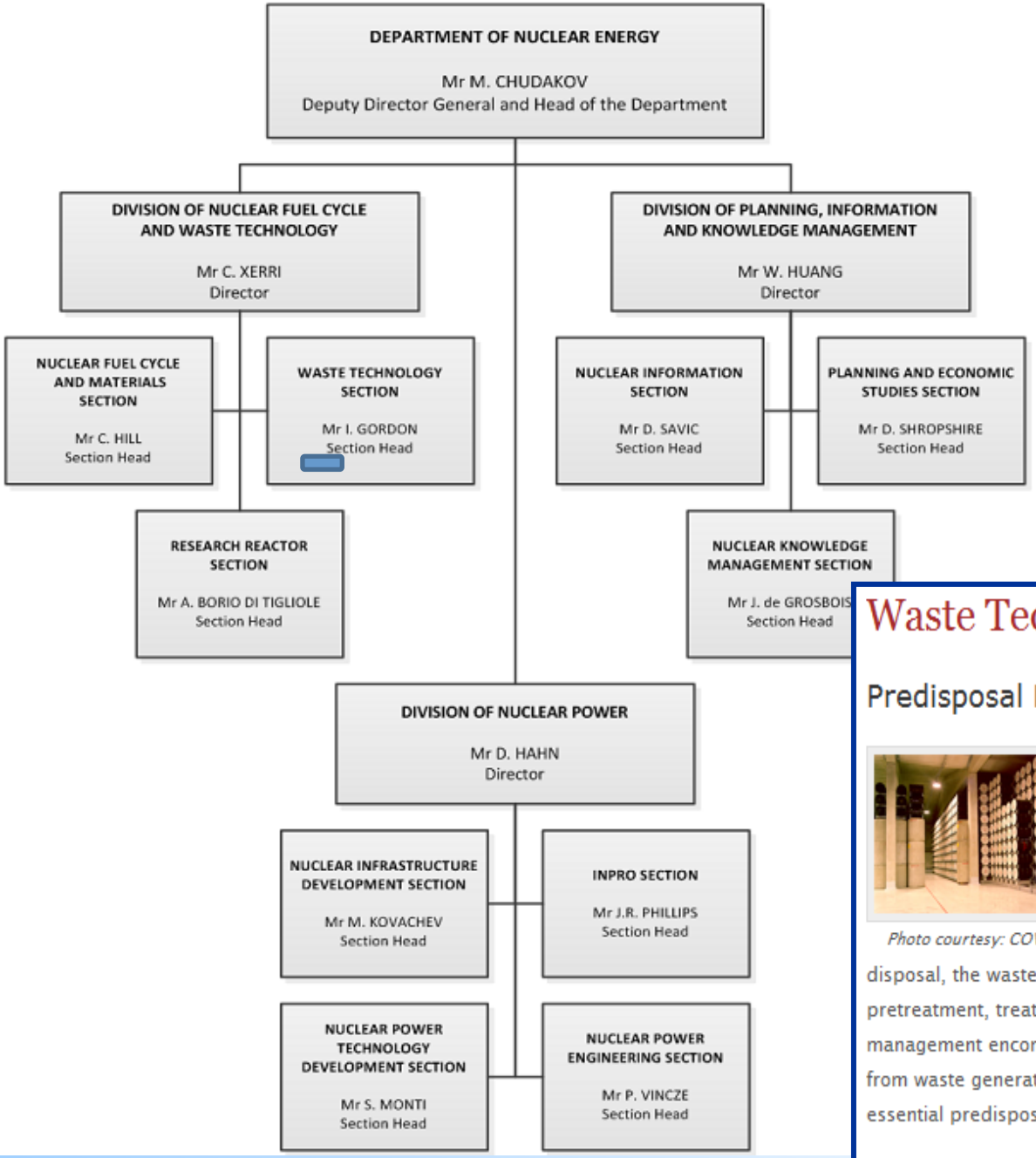

Waste Technology Section

Predisposal Management of Radioactive Waste

Photo courtesy: COVRA

Depending on the origin, radioactive waste can occur in different physical state (solid, liquid, gas) and can have a variety of characteristics such as activity levels and half-lives of the radionuclides present in the waste. In the life cycle of radioactive waste, disposal is the final step. Before final disposal, the waste usually goes through a number of steps such as pretreatment, treatment, conditioning, storage and transport. Predisposal management encompasses all of these steps that collectively cover the activities from waste generation up to final disposal. Characterization of waste is also an essential predisposal activity that is common to all of the steps above.

IAEA | IPN

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Welcome to the IAEA International Predisposal Network - IPN

Prior to disposal, the radioactive waste usually goes through a number of steps such as pre-treatment, treatment, conditioning, storage and transport with characterization utilised within the entire cycle of radioactive waste. Predisposal management encompasses all of these steps that collectively cover the activities from waste generation up to final disposal.
The International Predisposal Network (IPN) is a forum for the sharing of practical experience and international developments on radioactive waste management activities before disposal.

The IPN is being established to increase efficiency in sharing international experience in the application of proven, quality assured practices for the predisposal management of radioactive waste including used nuclear fuel declared as waste.

The IAEA intends to support Member States either currently engaged in or seeking to develop predisposal technologies through their inclusion in the IPN to cooperate and coordinate relevant actions, training and technical advances. IPN members will include organisations and communities with current and future interest in radioactive waste management with focus on predisposal management. These include operators and regulatory bodies, as well as supporting organisations and scientific institutions and organizations that are involved with education and training.

For further information or questions please contact: IPN.Contact-Point@iaea.org

Not a member?

Partnering Organizations

NEA NUCLEAR ENERGY AGENCY

European Commission

Current Highlights

- New CRP "Long-lived Alpha Bearing Waste Management - Characterization, Processing and Storage" to start in 2017.
- Consultants Meeting on the Development and Implementation of CRP on 19-22 July 2016, IAEA, Vienna.

Events

- Joint ICTP-IAEA Workshop on radiation effects in nuclear waste forms and theirconsequences for storage and disposal
  (12-16 September,Trieste, Italy)

More on IPN

- Terms of Reference (ToR)

https://nucleus.iaea.org/sites/connect/IPNpublic/Pages/default.aspx

Radioactive Waste inventory is predominantly from peaceful use of: **Research Reactors; NPP's; and Sealed Radioactive Sources.**

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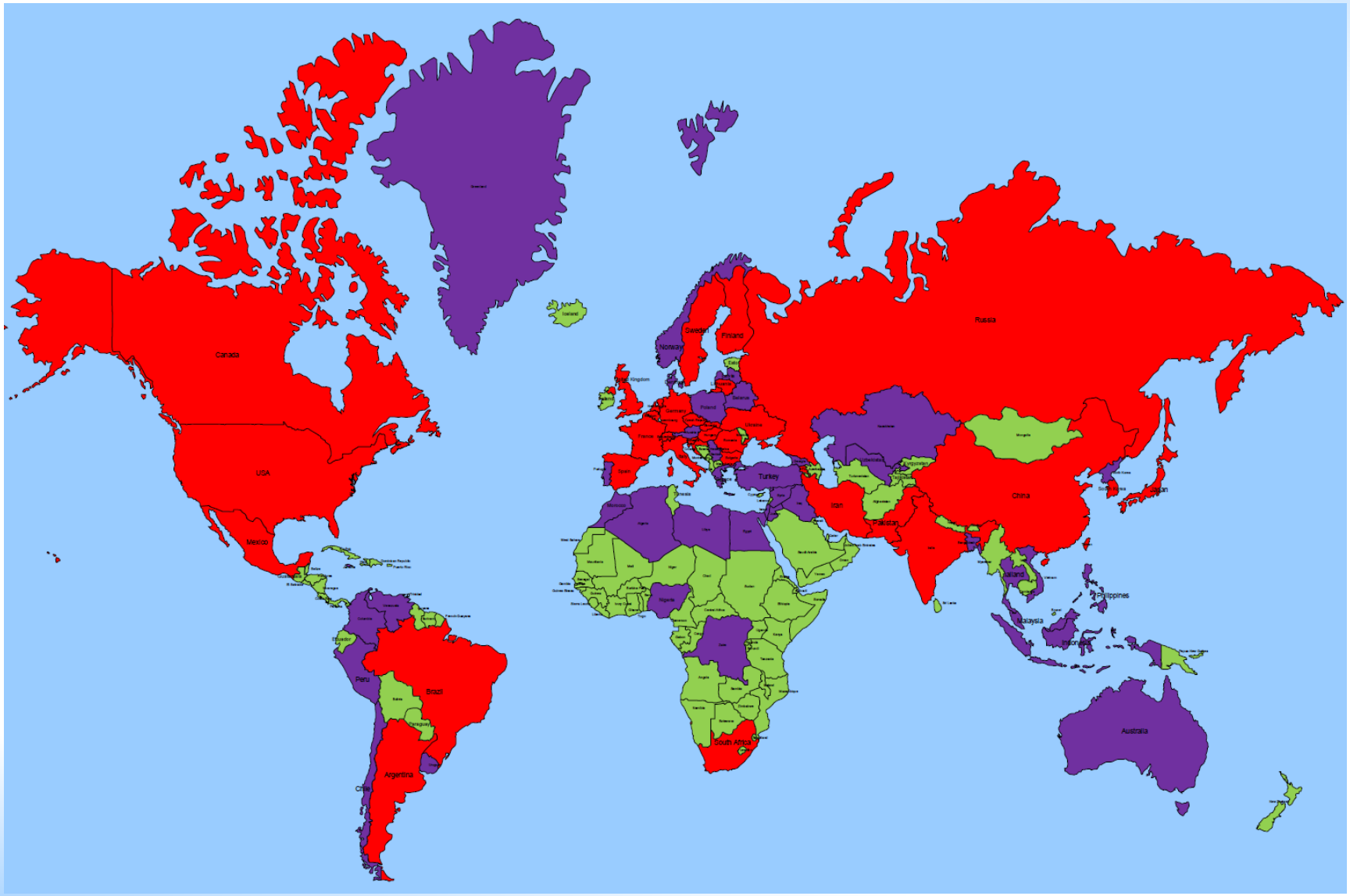
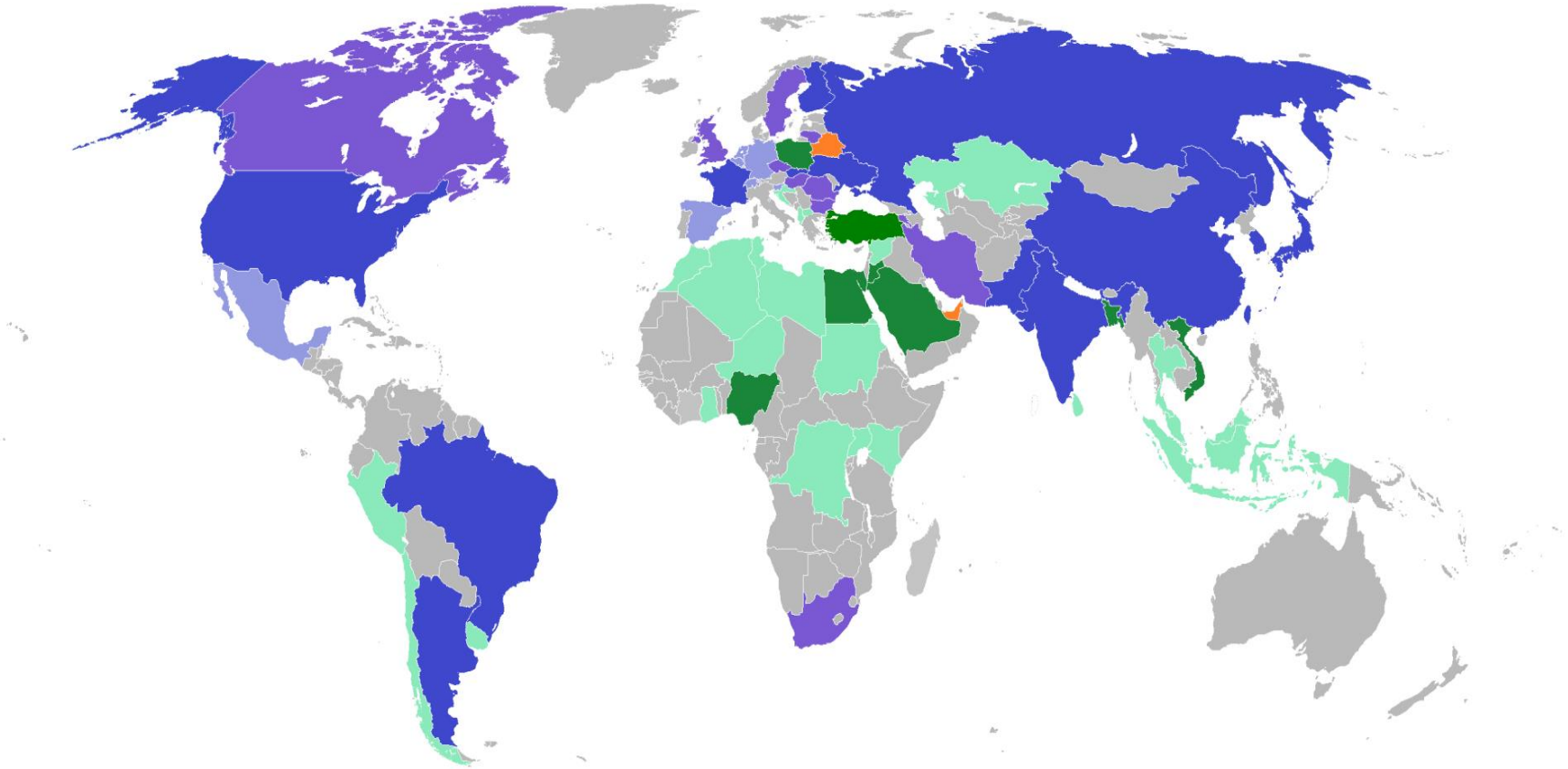


Nuclear power



- Operating
- Operating and Constructing
- Operating with plans to expand
- 1st NPP Under Construction
- Considering nuclear power introduction
- Decided to introduce nuclear power

Status: Q2-2014

Nuclear power

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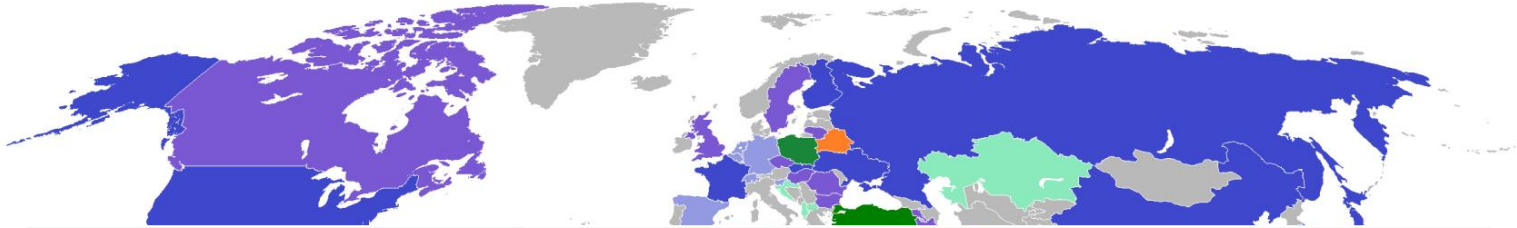
Status: Q2-2014



First nuclear power plant ordered	**Belarus, Turkey, UAE**
Decided and started preparing infrastructure	Bangladesh, Vietnam, Egypt, Jordan, Nigeria, Poland
Active preparation with no final decision	Chile, Indonesia, Malaysia, Morocco, Thailand, Saudi Arabia
Considering nuclear power programme	Albania, Algeria, Croatia, Estonia, Ghana, Kazakhstan , Kenya, Libya, Mongolia, Niger, Syria, Sudan, Tunisia, Uruguay
Not planning, but expressed interest in considering issues	Benin, Cameroon, Congo, Laos, Malawi, Namibia, Oman, Qatar Philippines, Singapore, Sri Lanka, Tanzania, Uganda

Operating

Operating and Constructing

Operating with plans to expand

1st NPP Under Construction

Considering nuclear power introduction

Decided to introduce nuclear power

Sources of Radioactive Waste

Modern life is filled with technology whose production or use may generate radioactive waste.

This waste is an **unavoidable by-product** when radioactive material is used for electricity production and in nuclear technology for **beneficial practices** in medicine, agriculture, research and industry.

Medical applications

- in vitro radioassay and research
- in vivo use of radiopharmaceuticals
- radiotherapy using sealed sources for brachitherapy or teletherapy

Application in Research and Education

- calibration
- development of radio-labelled compounds
- study of metabolic, toxicological or environmental pathways
- clinical processes and applications
- basic research (physics, chemistry, engineering)

Industrial, agricultural and other applications

- production and labelling of compounds
- manufacture of radioactive sealed sources
- use of radioactive material for scientific measurements/ calibration
- oil exploration and well logging
- process and plant control
- non- destructive testing and QC
- water treatment
- sterilization
- food irradiation

Consumer products

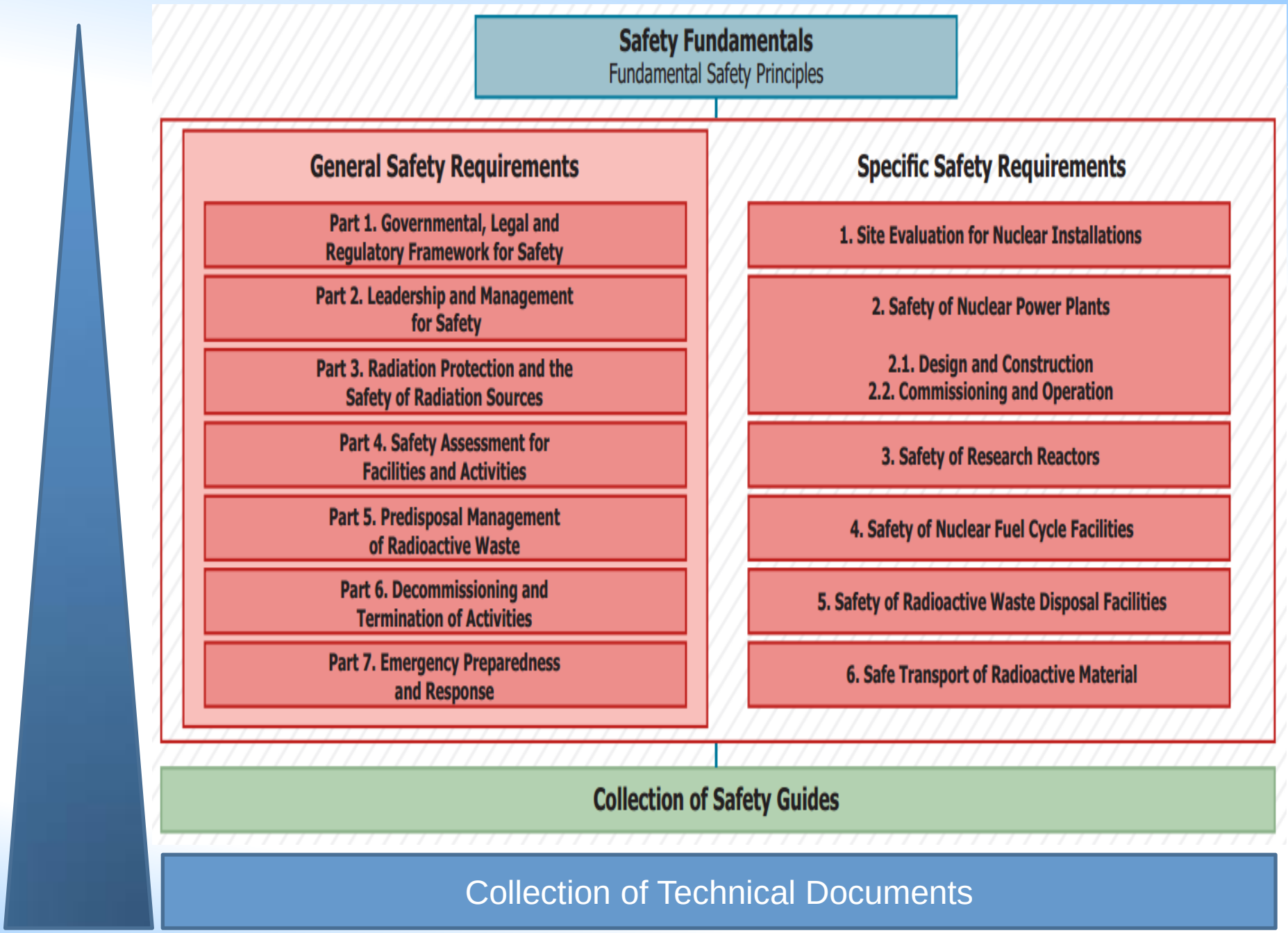
- smoke detectors
- luminous devices
- lightening rods

Radioactive waste to be safely managed

All nations are responsible for the safe & secure management of their national inventory.

Radioactive waste management may be carried out **locally** (on the site of origin, waste generator), at a **national** and/or **regional** waste management facility, or a combination of both.

There are requirements, standards, guides and technical reports for all activities/facilities irrespective of size and complexity.


Safety Fundamentals
Fundamental Safety Principles
General Safety Requirements
Part 1. Governmental, Legal and Regulatory Framework for Safety
Part 2. Leadership and Management for Safety
Part 3. Radiation Protection and the Safety of Radiation Sources
Part 4. Safety Assessment for Facilities and Activities
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
Collection of Safety Guides
Collection of Technical Documents

WS Purpose:

The Workshop aims to gain awareness on the most recent findings of research into radiation effects in nuclear waste forms and their role for waste storage and disposal.

It aims to contribute to the transfer of specific knowledge to Member States towards their capacity building efforts and competence in nuclear waste immobilisation and disposal.

WS Focus:

The workshop will focus mainly on experts on radiation effects in materials to explore the potential of both experimental and theoretical/computational approaches aiming to understand the consequences of irradiation of materials under extreme conditions, particularly focusing on long-term irradiation conditions envisaged for nuclear waste forms containing long lived fission products and actinides.

WS Topics:

- Fission and fusion **power generation**: challenges in the use of materials;
- **Role of irradiation** at different stages of material use in the nuclear industry;
- Nuclear **waste forms** and envisaged irradiation storage and disposal conditions;
- **Behaviour of materials** containing actinides and long lived radionuclides;
- **Experimental** techniques to investigate and simulate radiation effects;
- **Theoretical**/computational methods to investigate and simulate radiation effects;
- **Performance** of nuclear waste forms accounting for radiation effects.

WS modus operandi

Presentations by the invited lecturers:

Presentations by the IAEA lecturers:

National presentations

- The scientific report in the context of the national waste management.
- 20 minute slots to include time for discussion and questions / answers (5 mins).

What to highlight in the national reports

- Research of the individual or research group, giving a summary of important or recent results on wasteform, spent fuel or nuclear materials of relevance to radiation damage studies, typically from own research programmes.

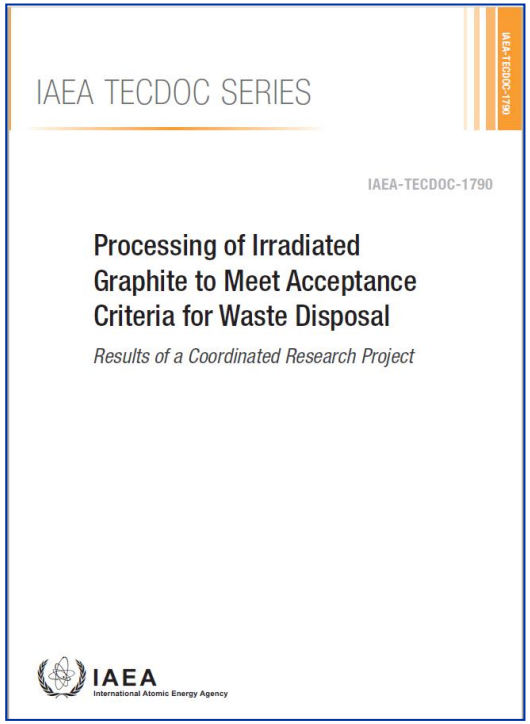
- The scientific report in the context of the national waste management strategy (first give a brief overview of the types of waste produced and managed in your nation state and the current status of waste conditioning and disposal practice.

Proceedings arising from the workshop

Participants should prepare an extended abstract of up to six pages for each presentation at the meeting, using the template provided. This should be submitted on the first day of the conference.

Extended abstracts for scientific reports will be peer reviewed by the organising committee and feedback provided during the meeting to participants.

The accepted extended abstracts will be published as an IAEA TECDOC.



How to get the most out of WS?

This workshop belongs to you and its success rests largely with you!

- Say what you think;
- Enter into the discussion, enthusiastically;
- Don't be shy asking questions;
- Ask for clarification or more explanation;
- Make comments.

Be open to reveal concerns, problems, challenges!

- You can challenge the lecturers;
- Be patient with other members;
- Appreciate others point of view;

Avoid private conversation while someone else is speaking!

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Have a good Workshop!

Thank you!