

IAEA

SAFETY PROGRAMME FOR EMBARKING COUNTRIES

KINS-IAEA Workshop on Safety Review and Inspection Methodologies for
Quality Assurance

Korea Institute of Nuclear Safety (KINS)

13-17 May 2019

Zia H. Shah

***Regulatory Activities Section
Nuclear Safety and Security Department***



IAEA

International Atomic Energy Agency

CONTENT

- IAEA Safety Standards
- SSG-16 IAEA Safety Guide
- IAEA Assistances for Capacity Building at Countries Embarking on Nuclear Power
- Review Services for Countries Embarking on Nuclear Power

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- Review Services for Countries Embarking on Nuclear Power

International Atomic Energy Agency



- ✓ Established 1957
- ✓ 170 MSs (as of 30 April 2018)
- ✓ 2,500 staff

3 pillars

- Nuclear Science and Technology
- Safety and Security
- Safeguards and Verification

IAEA Safety Standards

IAEA Statute (Article III.A.6)

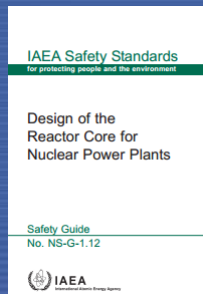
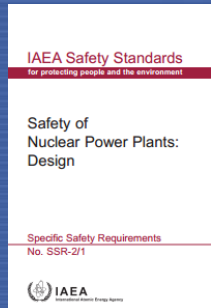
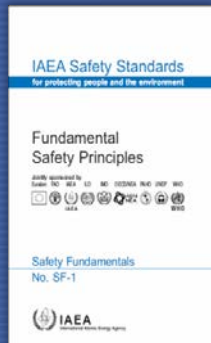
- “To establish or adopt... [in consultation with...] standards of safety for the protection of health and minimization of danger to life and property”
- “...and to provide for the application of these standards”

Status of the IAEA Safety Standards

Safety Standards are:

- Non-binding on Member States, but may be adopted by them;
- Binding for IAEA's own activities;
- Binding on States in relation to operations assisted by the IAEA or States wishing to enter into project agreements with IAEA; or
- Voluntarily binding for States that have embedded IAEA SSs in their national regulations.

Hierarchy of the Safety Standards



Safety Fundamentals

Fundamental safety objective and principles for protecting people and environment

What shall be done

Requirements that must be met to ensure protection of people and environment – 'shall'

Safety Requirements

How it should be done

Recommended ways of meeting the requirements – "should"

Safety Guides

Fundamental Safety Principles

**“To protect people and the environment
from harmful effects of ionizing radiation”**

**Responsibility
for Safety**

**Role of
Government**

**Leadership
and
Management
for Safety**

IAEA Safety Standards
for protecting people and the environment

**Fundamental
Safety Principles**

Jointly sponsored by
Euratom FAO IAEA LO MO OECDE/NEA RWHO UNEP WHO

Safety Fundamentals
No. SF-1



**Protective
Actions to
Reduce Existing
Or Unregulated
Radiation Risks**

**Emergency
Preparedness
and Response**

**Prevention
of Accidents**

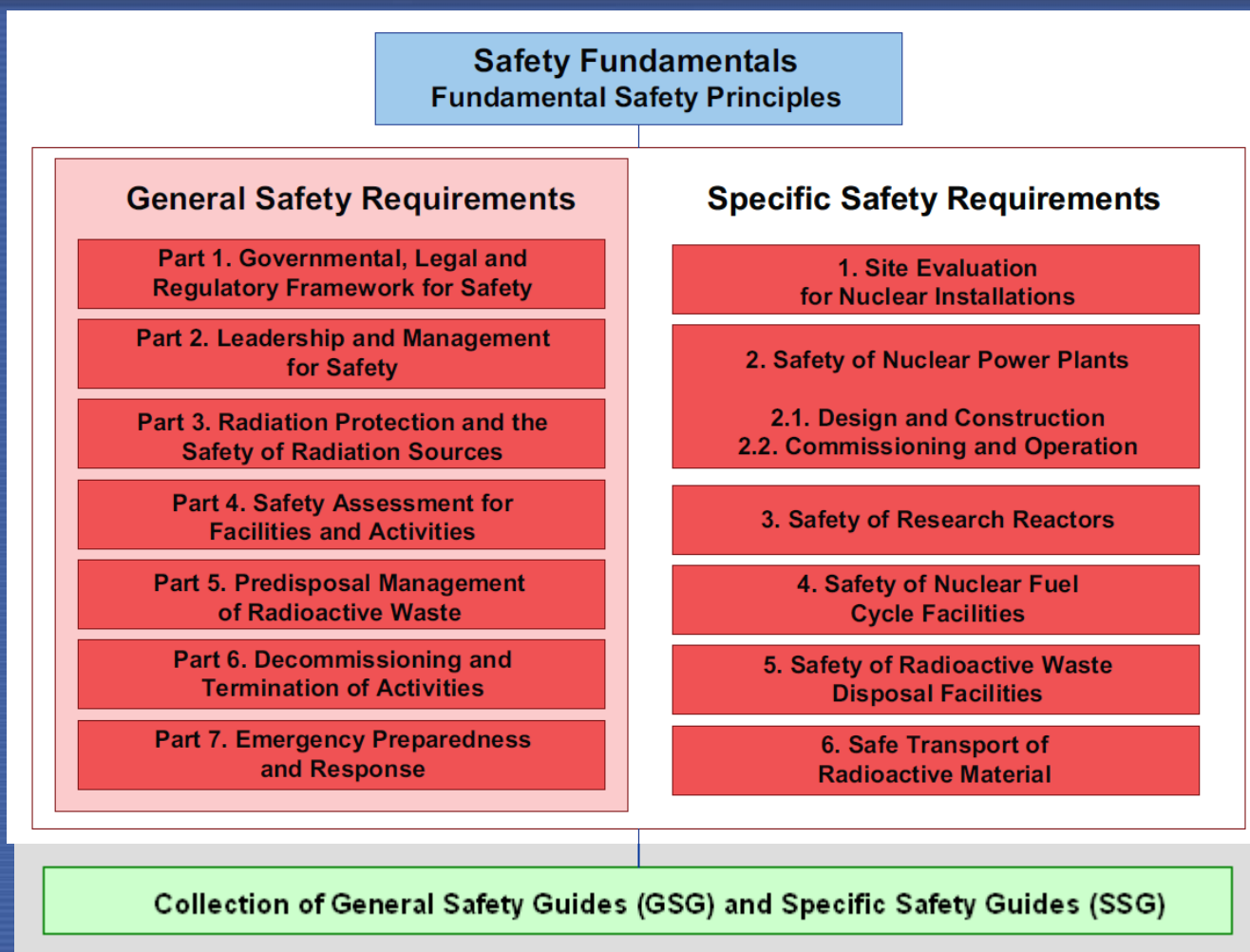
**Justification of
Facilities and
Activities**

**Optimization
of Protection**

**Limitation of
Risks to
Individuals**

**Protection of
Present and
Future
Generations**

Coverage of the Safety Standards



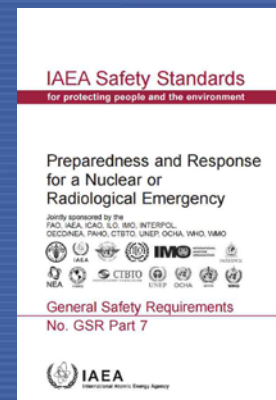
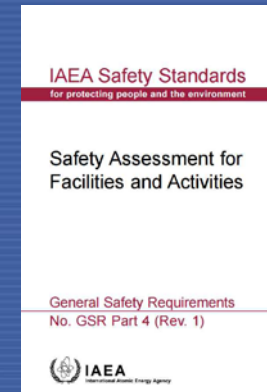
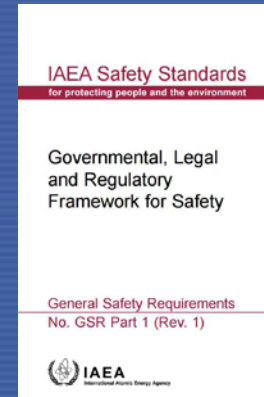
Application of the Safety Standards

Notable use by MSs:

- Adoption/Adaptation into a MSs legal framework (e.g. China, Netherlands, Pakistan, etc.)
- Use of standards as main reference to establish regulations (e.g. Canada, Czech Republic, Germany, India)
- Use of standards as reference to review national standards (by many other States and also by Industry) and as benchmark for harmonization

Application of the Safety Standards

- By the IAEA:
 - Safety reviews;
 - TC missions;
 - Training activities.
- Through the process of safety related conventions.
- Cosponsoring organizations.



CONTENT

- IAEA Safety Standards
- SSG-16 IAEA Safety Guide
- IAEA Assistances for Capacity Building at Countries Embarking on Nuclear Power
- Review Services for Countries Embarking on Nuclear Power

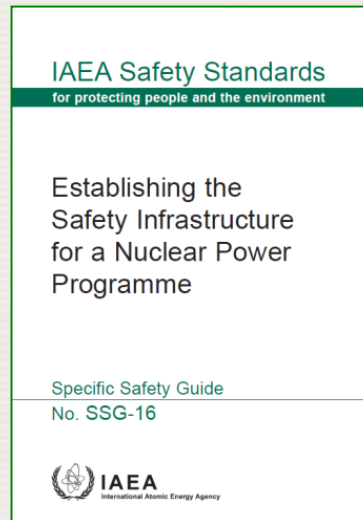
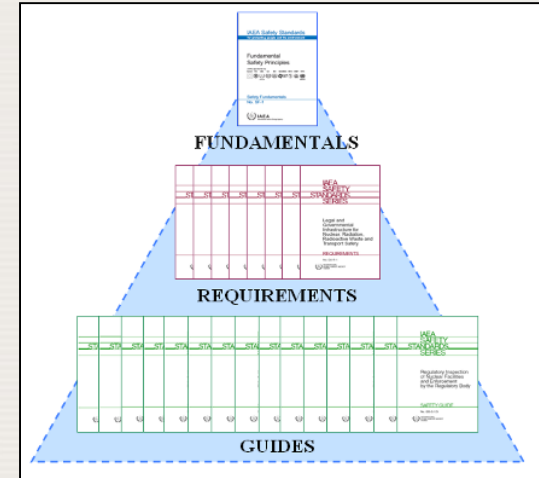
Embarking on Nuclear Power



Increasing number of countries considering the introduction of nuclear power

(~30 countries declared their interest or intention)

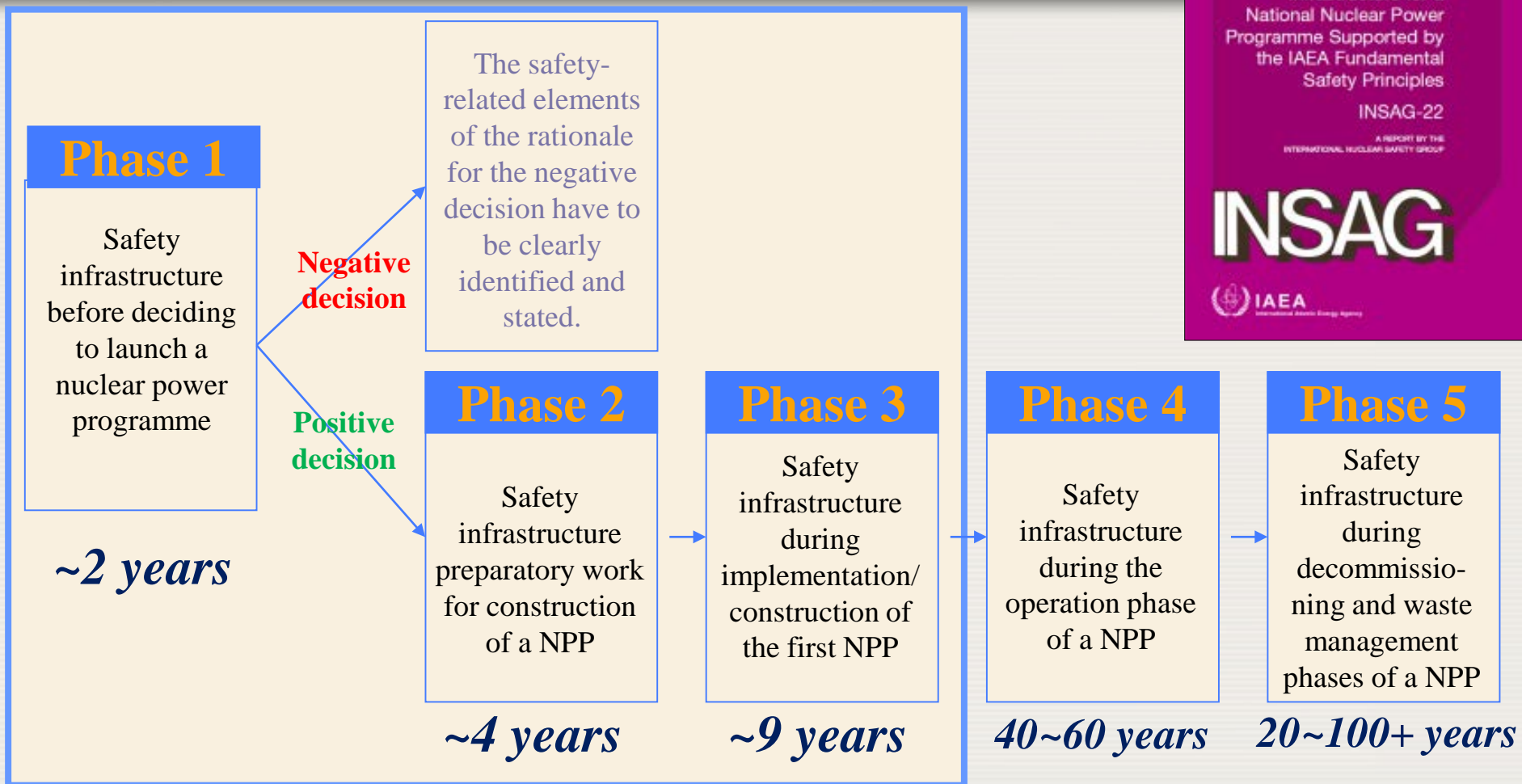
(having no or little experience in building, operating or regulating nuclear facilities)



Need to establish an appropriate and comprehensive national safety infrastructure in compliance with the IAEA SSs

- to ensure safety and
- to gain public trust at national and international level.

Why a new Specific Safety Guide?



Why a new Specific Safety Guide?

- Existing IAEA SSs were providing all requirements that should be met for establishment of an adequate and effective nuclear infrastructure,
- But, guidance was missing on
 - how this should be established progressively in different phases of implementation of a nuclear power project; and
 - how they will identify their needs in a timely manner.
- A number of embarking countries had requested from the IAEA this guidance, which will show them
 - which elements of a nuclear safety infrastructure that they will need for ensuring safety in different phases of implementation of a NPP; and
 - what&when they should do for progressive establishment of an nuclear safety infrastructure defined in relevant SSs.
- Work started in 2008, completed in 2011, SSG-16 issued on December 2011.

The main 4 roles of SSG-16

1. Road-map for gradual application of the relevant IAEA Safety Standards

2. Reference document for self-assessment of the national safety infrastructure

3. Training framework for embarking countries

4. Terms of Reference for the Safety Review Services

IAEA Safety Standards
for protecting people and the environment

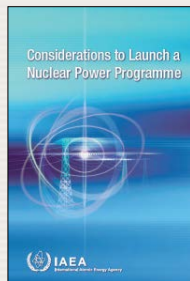
Establishing the
Safety Infrastructure
for a Nuclear Power
Programme

Specific Safety Guide
No. SSG-16

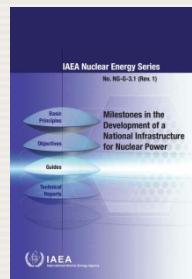
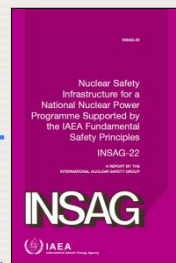


The Relation with Other Relevant IAEA Docs

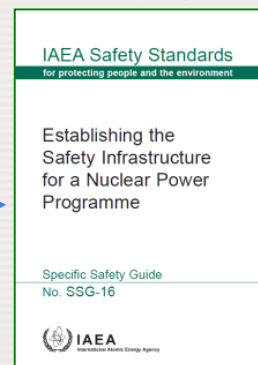
IAEA Nuclear Power Support Group's Brochure



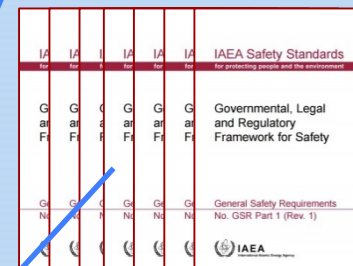
International Nuclear Safety Group's Report-22



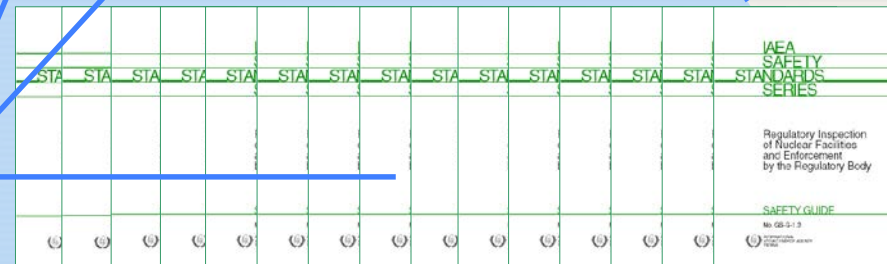
IAEA publication NG-G-3.1



FUNDAMENTALS



REQUIREMENTS

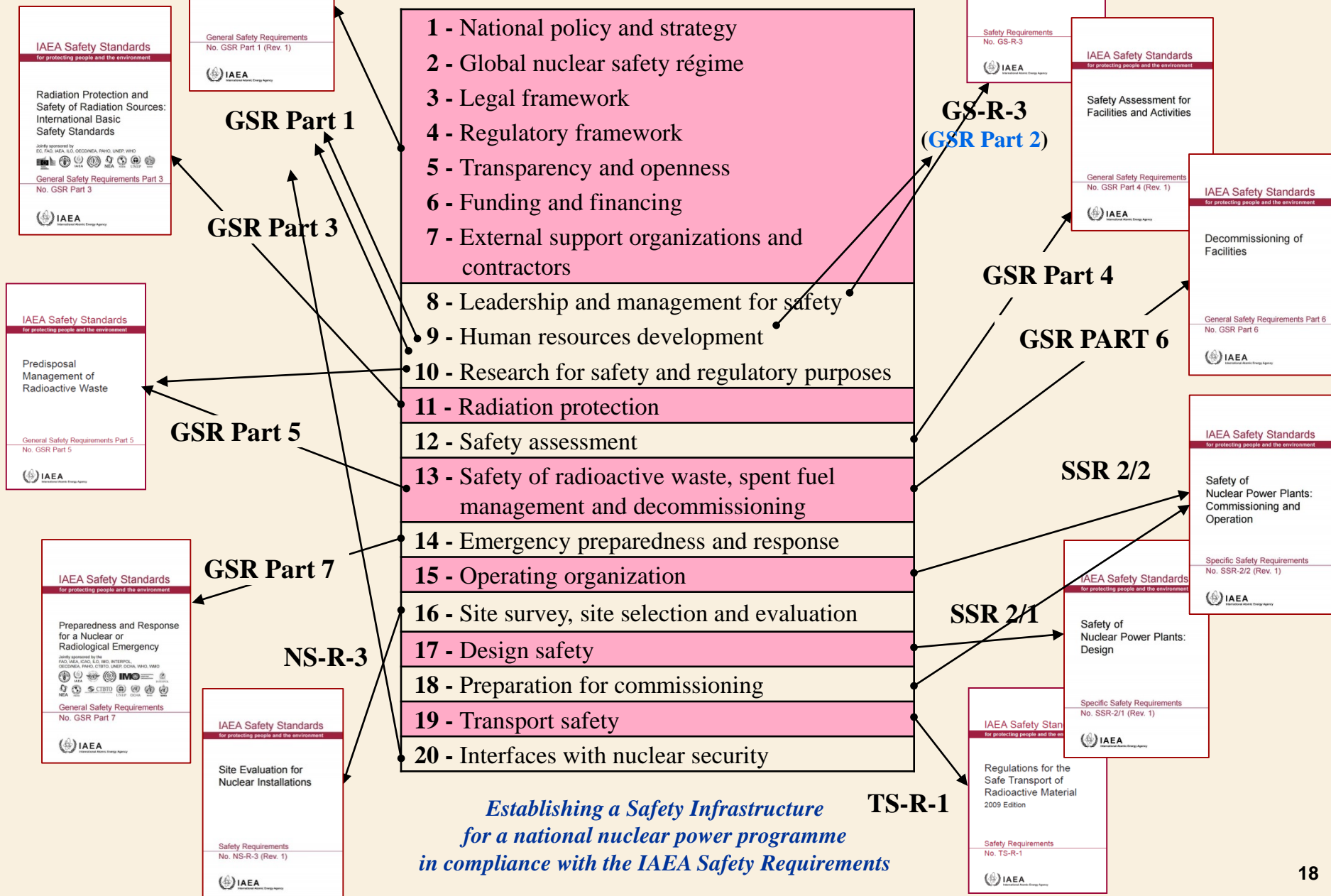


GUIDES

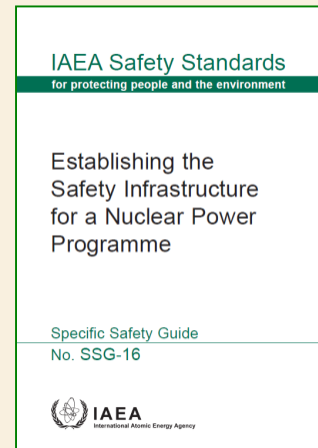
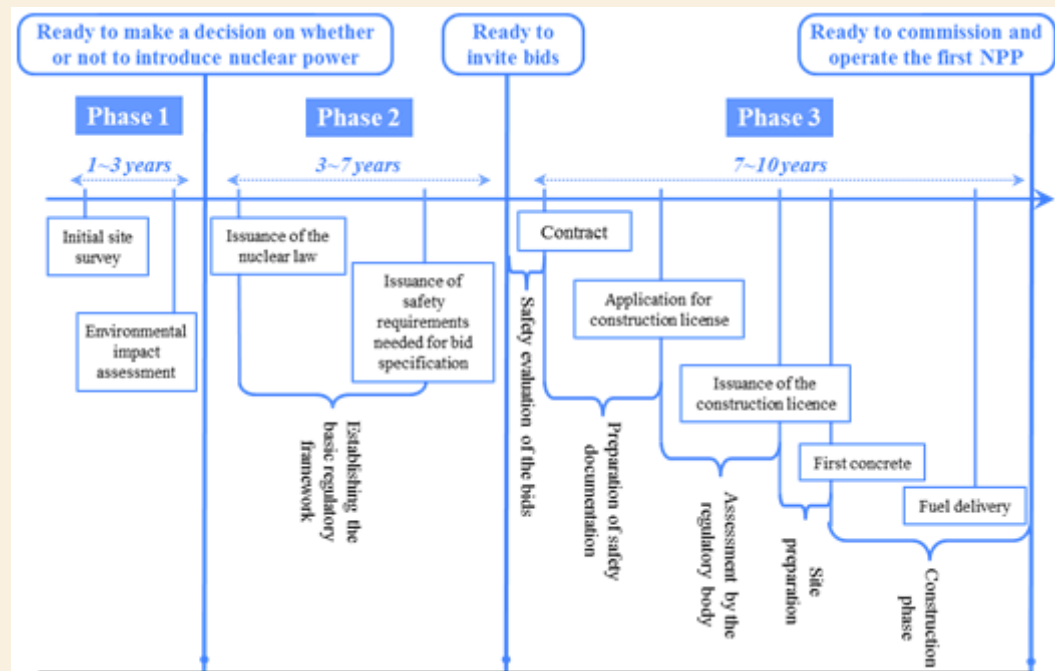
IAEA SAFETY STANDARDS

Relation with the Safety Requirements

The 20 elements/topics of SSG-16

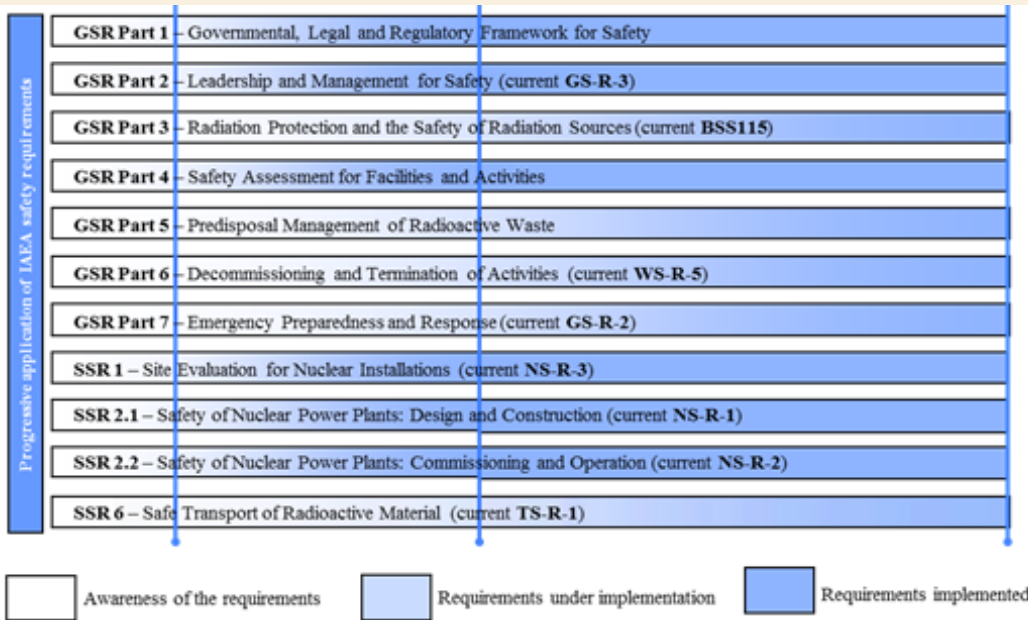


Progressive implementation of the IAEA Safety Requirements



for each relevant IAEA Safety Requirements publication, at which stages:

- there should be awareness of the requirements;
- implementation of the requirements should be started;
- requirements should be fully implemented.



The initial degree of the application of these requirements may vary from State to State depending on the use of radioactive sources and nuclear installations other than NPPs before considering the nuclear power option.

SSG 16 Self-Assessment

Methodology

- Question sets derived from actions,
- Completed and reviewed in March 2011.

IT tool

- A user-friendly software (**IRIS**) developed to facilitate the conduct of the self-assessment, (<http://www-ns.iaea.org/tech-areas/regulatory-infrastructure/iris-tool.asp>)
- Available since September 2013.

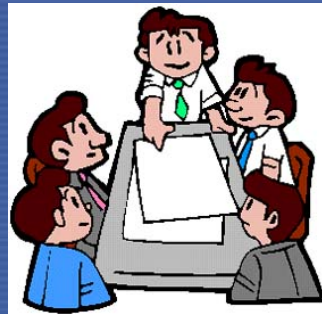
Relevant IAEA Assistances

- Training workshops on SSG-16, the self-assessment methodology and the utilization of the self-assessment software (**IRIS**),
- Expert missions to assist preparation and/or implementation of action plans based on the self-assessment results.

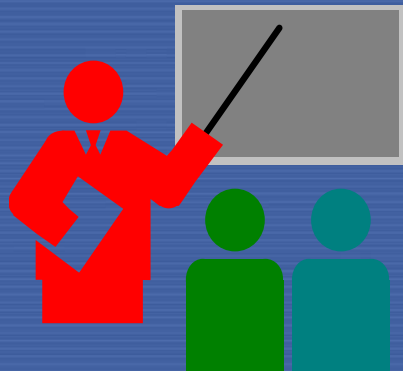
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- Review Services for Countries Embarking on Nuclear Power

IAEA Assistancess concerning safety

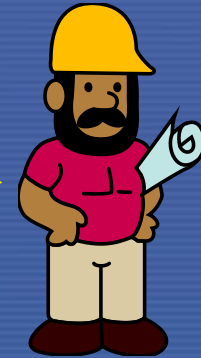


Workshops



Training Courses
Training Materials

**Delivery
Mechanisms
(TC, EBP, etc.)**



Expert
Missions



Peer-Review
Services

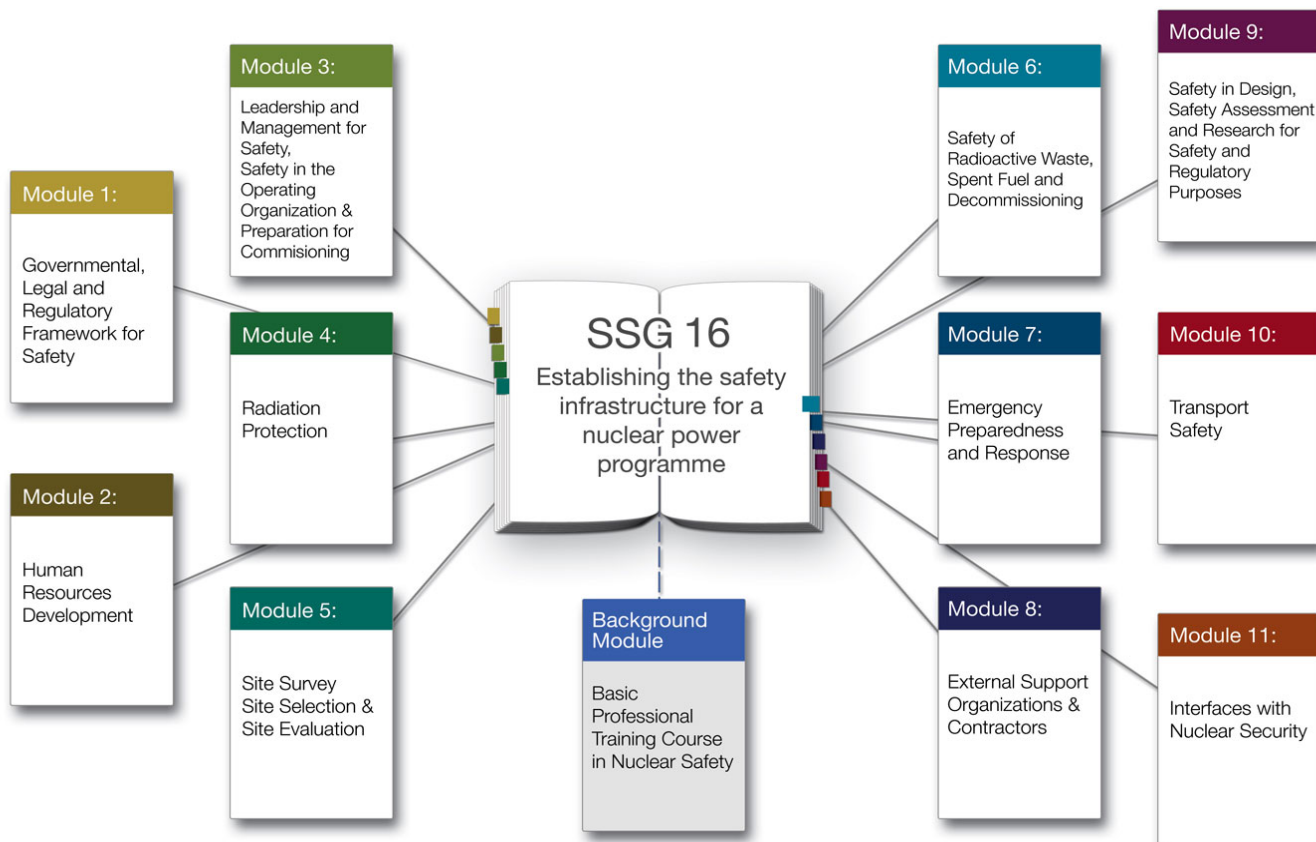


Fellowships/
Scientific Visits



IAEA

SSG 16 Modules



Example: Safety Package for Module 1

The screenshot shows a web browser window displaying the IAEA website. The address bar shows the URL: <http://www-ns.iaea.org/tech-areas/safety-infrastructure/ssg-16-module-1.asp?s=0&l=94>. The page title is "Module 1".

The IAEA logo and name are visible at the top left. The navigation menu includes: About Us, Our Work, News Center, Publications, and Nucleus. A search bar is located on the right.

The main content area is titled "Nuclear Safety & Security". Below this, there is a sidebar with a list of links: Nuclear Safety & Security, Safety & Security Framework, Technical Areas (Incidents and Emergencies, Nuclear Installations, Radiation Transport & Waste, Security), Services for Member States, Safety & Security Publications, Conventions & Codes, Education & Training, Meetings, and Special projects.

The main content area features the title "Establishing the Safety Infrastructure" in red. Below it, the section "Safety Package for Module 1: Governmental, Legal and Regulatory Framework for Safety" is displayed. The text states: "This module combines the following elements of SSG-16:"

- National policy and strategy for safety (Actions 1 – 10)
- Global nuclear safety regime (Actions 11 – 19)
- Legal framework (Actions 20 – 23)
- Regulatory framework (Actions 24 – 38)
- Transparency and openness (Actions 39 – 47)
- Funding and financing (Actions 48 – 60)

Below the list, it says "Related SSG-16 Actions: 1 – 60".

The text describes the phases of the safety package:

In Phase 1, the Government is building awareness related to the establishment of safety infrastructure and other aspects of infrastructure necessary to support a knowledgeable decision. The safety package for this module addresses these elements with that goal. At the end of Phase 1, the government should be fully aware that a nuclear power programme needs a firm and long term commitment to ensuring safety.

In Phase 2, the Government should establish a clear national policy and strategy for meeting safety requirements and ensure the efficient development of the safety infrastructure including funding provisions. Furthermore, the Government should enact essential elements of the Legal framework and establish an independent regulatory body. Following its creation, the

On the right side, there is a "Safety Packages" section with a list of links: Safety Infrastructure, Basic Professional Training Course in Nuclear Safety, Module 1 - Governmental, Legal and Regulatory Framework for Safety, Module 2 - Human Resources Development, Module 3 - Leadership and Management for Safety, Module 4 - Radiation Protection, Module 5 - Site Survey, Site Selection & Site Evaluation, Module 6 - Safety of Radioactive Waste, Spent Fuel and Decommissioning, Module 7 - Emergency Preparedness and Response, Module 8 - External Support Organizations and Contractors, and Module 9 - Safety in Design, Safety Assessment and Research for Safety.

At the bottom left, there is a "rate this page" button with a scale from Good (4) to Poor (0).

IAEA Assistance for Embarking Countries

Specific Workshops under the Module 1

- WS1: Workshop on Developing National Infrastructure including Governmental, Legal and Regulatory Infrastructure for Safe Implementation of Nuclear Power Programme
- WS2: Workshop on Regulatory Framework
- WS3: Workshop on Safety Regulations
- WS4: Workshop on Licensing Process
- WS5: Workshop on Safety Review and Assessment by the Regulatory Body
- WS6: Workshop on Regulatory Inspection and Enforcement
- WS7: Workshop on Interactions with the Public and Other Interested Parties in Regulatory Activities
- WS8: Workshop on Management System for the Regulatory Body
- WS9: Workshop on Staffing the Regulatory Body and Development of the Competencies for the Conduct of Regulatory Functions, including the Use of External Support Organizations

Expert Missions under the Module 1

- licensing/authorization process for NPPs
- regulations and guides relevant to the licensing of an NPP
- planning safety review and assessment for an NPP by the regulatory body, including workforce planning
- planning and performing regulatory oversight and regulatory enforcement
- communication with public and involvement of interested parties in the regulatory process
- management system of the regulatory body
- staffing and competence building for the regulatory body

Expert Missions under the Module 1

- **For countries that have no already existing system or implementation on the areas/subjects for which the expert mission is requested:**

The experts will help to develop/establish a national system by providing guidance and assistance on the areas/subjects listed.

- If NPP technology and vendor has not been determined by the requesting embarking country yet, this guidance and assistance will be based on relevant IAEA safety standards and therefore it will be technology neutral.
- If the requesting embarking country has already decided NPP technology and vendor, the guidance and assistance may also refer to/based on vendor country system, approach or method where appropriate.

Expert Missions under the Module 1

- **For countries that have an already existing system or implementation on the areas/subjects for which the expert mission is requested:**
 - To explore the effectiveness, efficiency, adequacy and consistency of the existing national system or implementation concerning the areas/subjects listed above and to identify gaps and inconsistencies to fix and to identify opportunities for improvement
- For this purpose, the expert mission will review existing system or implementation of the requesting embarking country to identify gaps, inconsistencies and opportunities for improvement and then will provide guidance, recommendations and/or assist the requesting embarking country for filling identified gaps, correcting identified inconsistencies and applying appropriate improvements. When conducting the initial preliminary review part of the expert mission, relevant parts of the IRRS Guidelines may be referenced.

IAEA Assistance for Embarking Countries

- Education and training
 - oriented towards sustainability of national programmes.
 - focus on train the trainers.
 - extensive collection of training packages for self learning and class room use developed and distributed world wide.
- FEs and SVs



Education & Training in Nuclear Installation Safety

Main Page - <http://www-ns.iaea.org/training/ni/materials.asp?s=9&l=75>

The screenshot shows the IAEA website's 'Education & Training in Nuclear Installation Safety' page. The page features a blue header with the IAEA logo and navigation links. A left sidebar contains a 'Nuclear Safety & Security' menu with a 'Training' sub-menu. The main content area has a title 'Education & Training in Nuclear Installation Safety' and a large image of people in a meeting. Below the image is a paragraph about the IAEA's role in nuclear safety training, followed by a list of training activities. A 'Sign up for' section promotes the 'NUCLEAR INSTALLATION SAFETY TRAINING NEWSLETTER'. A 'Latest Online Videos' section features a video presentation on the safety of research reactors. A 'Related documents' section lists guidance for regulatory bodies, an INSAG report, and an E&T leaflet. Annotations with yellow boxes and arrows point to various elements: 'Main webpage navigation' points to the left sidebar; 'NIS Training Resources' points to the 'Resources' section; 'Sign up for our Newsletter' points to the newsletter sign-up box; 'Most Recent Training Activities' points to the video presentation; and 'Documents related to Training' points to the 'Related documents' section.

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International Atomic Energy Agency

NSO IAEA

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Nucleus
Specialized Resources

Nuclear Safety & Security

Nuclear Energy Nuclear Applications Safeguards Technical Cooperation

Resources

- Safety Standards webpage
- SSG 16 Safety Infrastructure
- Education and Training
- Training Events Calendar
- Nuclear Installation Safety

Sign up for

NUCLEAR INSTALLATION SAFETY
TRAINING NEWSLETTER

Latest Online Videos

Watch online:
E & T Video
Presentations

Presentations on Safety
of Research Reactors

A set of 14 Video Presentations on
Safety of Research Reactors»

Related documents

- Guidance for Regulatory
Body (2 mb)
- INSAG Report
- E&T Leaflet

Education & Training in
Nuclear Installation Safety

The IAEA is assisting Member States to develop sustainable systems to maintain technical competence in nuclear safety. The following is the structure established in the IAEA's nuclear safety programme to address these current safety issues:

- Safety Standards Training
- SARCoN
- Regulatory Body Training (NPPs)
- Fundamentals and basic professional training courses (BPTC)
- Online Video Presentations
- Knowledge and experience sharing workshops
- Training tools and Networking

Integrated Strategy

Complementary to its training courses and workshops, the Division of Nuclear Installation Safety (NSNI) is concentrating its efforts on assisting Member States to establish national sustainable education and training programs that are in line with international safety standards. An essential element of this effort is the development of model type training material for use by lecturers and students and to train the trainers who will ultimately implement the national programs in a harmonized way. The strategy is described in terms of vision, objectives and outputs and activities required for implementation.

Advisory group meeting on Education and Training in Nuclear Safety

Good 4 3 2 1 0 Poor
rate this page

NIS Training
Resources

Sign up for our
Newsletter

Most Recent
Training Activities

Documents
related to
Training

Training for Regulatory Bodies

<http://www-ns.iaea.org/training/ni/train-reg-bod.asp>

Superseeds
TECDOC 1254

Nuclear Safety & Security


Nuclear Energy Nuclear Applications Safeguards Technical Cooperation

- Nuclear Safety & Security
 - Safety & Security Framework
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 - Nuclear security
 - Radiation, transport & waste
 - Meetings
 - Special projects

Good 4 3 2 1 0 Poor
rate this page

Training for Regulatory Bodies

Steering Committee Reports



Following the conclusions of various IAEA Technical Meetings related to developing and ensuring regulatory competence in Member States with nuclear power plants, the establishment of a Steering Committee to discuss issues, exchange information and advise the IAEA on how best to support the Member States's training programmes was strongly recommended. Terms of Reference for the Steering Committee were prepared and approved. The Steering Committee was established formally in 2009, and since then it has been successfully implementing its strategic work plan.

Amongst the achievements of the Steering Committee on competence of human resources of regulatory bodies in Member States with nuclear power plants, it can be noted the following:

- Revision and updating of the Systematic Assessment of Competence Needs and its associated questionnaires and software based self-assessment tool
- Research on best systems to ensure and manage regulatory competence. A safety report collecting current knowledge and good practices on management systems for regulatory competence is under preparation
- Sharing training courses and documentation amongst its members and creating a compilation of websites and internet resources useful for training of regulatory bodies available from the Member States and the IAEA
- Promoting and giving advice on the IAEA safety standards related to developing, ensuring and managing regulatory competence.

Resources

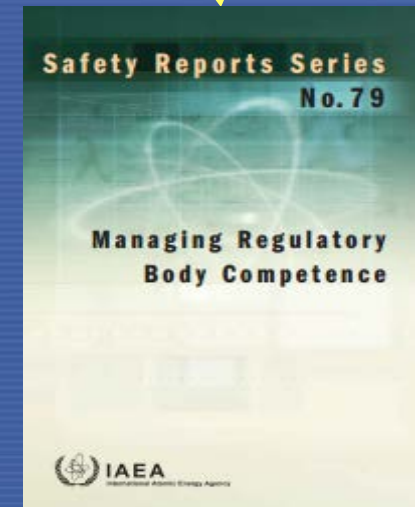
- SSG-16 Safety Infrastructure
- Education and Training
- Nuclear Installation Safety
- RegNet

Related documents

- TECDOC 1254 (2 mb)
- E&T Leaflet

Page links

- Steering Committee
- Training the Staff
- Regulatory Control of NPPs



Regulatory Control of Nuclear Power Plants (NPPs)



The purpose of this book is to support IAEA training courses and workshops in the field of regulatory control of nuclear power plants as well as to support the regulatory bodies of Member States in their own training activities. The target group is the professional staff members of nuclear safety regulatory bodies supervising nuclear power plants and having duties and responsibilities in the following regulatory fields: regulatory framework; regulatory organization; regulatory guidance; licensing and licensing documents; assessment of safety; and regulatory

inspection and enforcement. Important topics such as regulatory competence and quality of regulatory work as well as emergency preparedness and public communication are also covered.

Regulatory Control of Nuclear Power Plants - Part A & B (2.4MB)

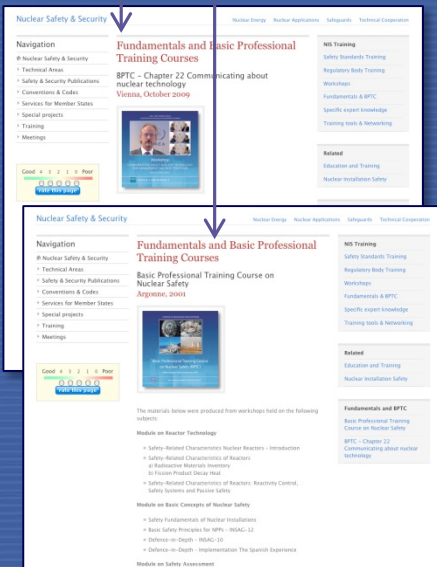


**Regulatory Control Book
(Textbook + Workbook)**

Training Courses

1- Basic Professional Training Course on Nuclear Safety (BPTC), and 2- Training Course on Regulatory Control of Nuclear Power Plants

DVD Training Materials



Dedicated page for every workshop



Nuclear Safety & Security

Nuclear Energy Nuclear Applications Safeguards Technical Cooperation

Navigation

- Home page
- Events calendar
- Incidents & emergencies
- Nuclear installation safety
- Nuclear security
- Radiation, transport & waste
- Meetings

Fundamentals and Basic Professional Training Courses

Please note that the E-Textbooks below are not IAEA publications. The Textbooks have been made available hereby to the interested reader in order to support self-study for those who are unfamiliar with basic nuclear engineering.

- OPEN E-TEXTBOOK: Reactor Physics
- OPEN E-TEXTBOOK: Fundamentals of Thermal Hydraulics
- OPEN E-TEXTBOOK: Basic Safety Concepts
- OPEN E-TEXTBOOK: EDF NPP Operating Safety Handbook (RC)

NIS Training

- Safety Standards Training
- Regulatory Body Training
- Workshops
- Fundamentals & BPTC
- Specific expert knowledge
- Training tools & Networking

Fundamentals and BPTC

- Basic Professional Training Course on Nuclear Safety
- BPTC – Chapter 22: Communicating about nuclear technology

Basic Professional Training Course on Nuclear Safety (BPTC)

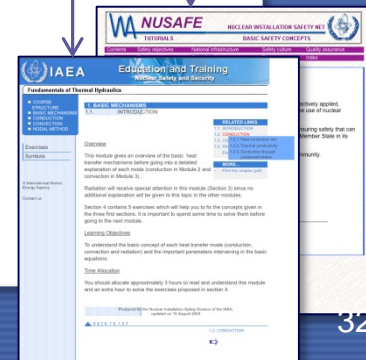
BASIC PROFESSIONAL TRAINING COURSE ON NUCLEAR SAFETY
Argentine, August 2001
[read more](#)

BPTC – CHAPTER 22
COMMUNICATING ABOUT NUCLEAR TECHNOLOGY
Vienna, August 2010
[read more](#)

The Basic Professional Training Course on Nuclear Safety (BPTC) is intended to provide a broad overview of all the safety concepts and their application to nuclear power plants and research reactors design and operation. Its nature and scope are primarily oriented to junior professionals recently involved in nuclear safety-related activities. It is also appropriate for highly specialized professionals who lack a broader view of nuclear safety.

OPEN E-TEXTBOOK: Basic Professional Training Course on Nuclear Safety

E-Textbooks



<http://www-ns.iaea.org/training/ni/fund-bpc.asp>

Basic Professional Training Course in Nuclear Safety (BPTC)

- To provide training on basic safety concepts and their application to NPP, Research Reactors and Fuel Cycle Facilities
- To present the basic principles and key issues of nuclear safety
 - . Radiation protection in nuclear facilities
 - . Design of a nuclear reactor, interfaces with security;
 - . Safety classification of structures, systems and components
 - . Deterministic accident analysis and probabilistic safety analysis
 - . Links between probabilistic, deterministic analysis and risk informed decision making
 - . Siting and environmental impact assessment
 - . Operational safety, including operational feedback
 - . Limiting conditions for operation;
 - . (...)
 - . Public communication.

Regulatory Control Course

- understanding of
 - the safety infrastructure needed for a nuclear power programme
- overview of
 - the nuclear safety issues to be faced by a country having a nuclear power programme

1. Regulatory Framework
2. Regulatory Organisation
3. Regulatory Guidance
4. Licensing and licensing document
5. Safety in the Construction Phase
6. Safety in Operation

Knowledge and Experience Sharing Workshops

<http://www-ns.iaea.org/training/ni/workshops.asp>

Nuclear Safety & Security

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Radiation, transport & waste
Meetings
Special projects

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Knowledge and Experience Sharing Workshops

In order to foster the exchange of knowledge and experience amongst the Member States, the IAEA has facilitated the production of video presentations and other materials from the training workshops below.

Read disclaimer

Workshops

- SAFETY CULTURE DURING PRE-OPERATIONAL PHASES OF NEW NUCLEAR POWER PLANTS**
These materials were produced from the workshop on the following subjects... [read more](#)
- LEVEL 2 PROBABILISTIC SAFETY ASSESSMENT FOR NUCLEAR POWER PLANTS**
These materials were produced from the workshop on the following subjects... [read more](#)
- SEVERE ACCIDENT ANALYSIS FOR NUCLEAR POWER PLANTS**
These materials were produced from the workshop on the following subjects... [read more](#)
- LEVEL 1 PROBABILISTIC SAFETY ASSESSMENT FOR NUCLEAR POWER PLANTS**
These materials were produced from the workshop on the following subjects... [read more](#)
- EMERGENCY PREPAREDNESS & RESPONSE FOR RESEARCH REACTORS**
This training package contains a manual on course organization, PowerPoint presentations with associated... [read more](#)
- RESEARCH REACTOR AGEING & SELF-ASSESSMENT METHODOLOGY**
The content is based on the material prepared for the Workshop on Research Reactor Ageing and Self-Assessment... [read more](#)
- MANAGEMENT OF OPERATIONAL SAFETY OF NUCLEAR POWER PLANTS**
The Regional Training Course on Management of Operational Safety of Nuclear Power Plants was held at... [read more](#)
- EQUIPMENT QUALIFICATION OF NPP COMPONENTS IMPORTANT TO SAFETY**
This workshop deals with the qualification of electrical, electronic, electromechanical and mechanical equipment for... [read more](#)
- WS-07 EXPERIENCE FROM CONSTRUCTION & REGULATORY OVERSIGHT OF NUCLEAR POWER PLANTS**
Helsinki, August/September 2010
[read more](#)
- WS-06 ESTABLISHING A SAFETY INFRASTRUCTURE FOR A NATIONAL NUCLEAR POWER PROGRAMME**
Argonne, Dec 2010
[read more](#)
- WS-05 TRANSPARENCY, OPENNESS & INVOLVEMENT OF THE PUBLIC & STAKEHOLDERS IN THE REGULATORY PROCESS**
Sinalia, May 2009
[read more](#)
- WS-04 SITE SELECTION AND EVALUATION FOR NUCLEAR POWER PLANTS**
Vienna, November 2008

Resources

- SSG-16 Safety Infrastructure
- Education and Training
- Nuclear Installation Safety

Related documents

- E&T Leaflet

Workshops

- Safety culture during pre-operational phases of new NPPs
- Level 2 Probabilistic safety assessment for NPPs
- Severe accident analysis for NPPs
- Level 1 Probabilistic safety assessment for NPPs
- Emergency preparedness & response for research reactors
- Research reactor ageing & self-assessment methodology
- Management of operational safety of NPPs
- Equipment qualification of NPP components important to safety
- WS-07 Experience from construction & regulatory oversight of NPPs
- WS-06 Establishing a Nuclear Safety Infrastructure
- WS-05 Transparency, openness & involvement of...
- WS-04 Site selection and evaluation for nuclear...
- WS-03 Licensing and regulatory oversight of new...
- WS-02 Further needs in the area of management systems
- WS-01 Effective manag. of organizational changes...

List of workshops, with date, location and topic. Most recent WS is on top.

Nuclear Safety & Security

Nuclear Energy Nuclear Applications Safeguards Technical Cooperation

Knowledge and experience sharing workshops

WS-04 Site selection and evaluation for nuclear power plants

Vienna, April 2008

The materials below were produced from workshops held on the following subjects:

- Introduction
- Overview - Global Nuclear Safety Regime
- Site Selection Process, IAEA Safety Guide No. 45-08, licensing process and the process
- Site Survey and Site Selection / Technical, environmental, environmental and risk aspects
- Site Selection Process: New Projects, Multiple Sites
- Overview and integrated approach of siting as a part of the milestone in the development of a national infrastructure for nuclear power
- Public Acceptance, Public Engagement
- IAEA Safety Requirements on Site Evaluation
- Licensing Process for Site Evaluation
- IAEA Safety Guide on the evaluation of seismic hazards
- Geological Aspects of Nuclear Power Plant Site Evaluation and Foundation
- Population Distribution
- Dispersion in air
- Evaluation of extreme meteorological events
- IAEA Safety Standards of Planning Hazards - Site Evaluation and Design Aspects
- Quantification of the Feasibility of Emergency Plan
- External Human Induced Events on site Evaluation
- Member States' Site Experiences

Full workshops available on DVD upon request.

Target group: Experts in NPP regulation and operators

Module 1 DVD with Video Supplemental Power Point Presentations

WS-05 Transparency, openness & involvement of...

WS-04 Site selection and evaluation for nuclear...

WS-03 Licensing and regulatory oversight of new...

WS-02 Further needs in the area of management systems

WS-01 Effective manag. of organizational changes...

Dedicated page for every workshop



Safety Assessment Advisory Programme (SAAP) for Countries Embarking on a Nuclear Power Programme

The objective of the Safety Assessment Advisory Programme (SAAP), performed at the request of a Member State embarking on nuclear power, is to advise on the systematic identification of nuclear safety assessment competency and capacity needs for establishing a nuclear power plant (NPP) programme and to support the development of an action plan for competency and capacity building based on the Safety Assessment Education and Training (SAET) Programme.

The SAAP is organized in two phases with the aim to actively engage the recipient Member State in the process of identifying the needs and establishing the safety assessment capacity building programme.

The first phase (Introduction to safety assessment and screening of initial situation in the country) is usually implemented through a workshop and has the objective to familiarize the management of all organizations involved in the new nuclear power programme with the basic concepts of safety assessment and to support them in identifying the specific needs of their organization in this area.

The second phase (Translating identified national safety assessment priorities into a comprehensive competency building programme) is based on the results of the phase 1 and aims at developing a detailed nuclear safety assessment competency and capacity map for the beneficiary Member State as well as a capacity building action plan based on the SAET

CONTENT

- IAEA Safety Standards
- SSG-16 IAEA Safety Guide
- IAEA Assistances for Capacity Building at Countries Embarking on Nuclear Power
- Review Services for Countries Embarking on Nuclear Power

Review Services for Embarking Countries

- Integrated Nuclear Infrastructure Review (**INIR**)
- Integrated Regulatory Review Service (**IRRS**)
- Site and External Events Design (**SEED**)
- Design and Safety Assessment Review Service (**DSARS**)
- Pre-Operational Safety Review Team (**Pre-OSART**)
- Emergency Preparedness Review (**EPREV**) Service

Review Services for Embarking Countries

INIR

The Integrated Nuclear Infrastructure Review (INIR) is a holistic, IAEA coordinated peer review.

The major objective of an INIR mission is to assist the MS in determining its infrastructure status and to identify further development needs;

It intends to build upon the MS self-evaluation in order to determine areas where further work would be beneficial.

The INIR is geared to helping the MS to identify areas for further action and assistance, including that from the IAEA.

“The Integrated Regulatory Review Service ” - *IRRS*

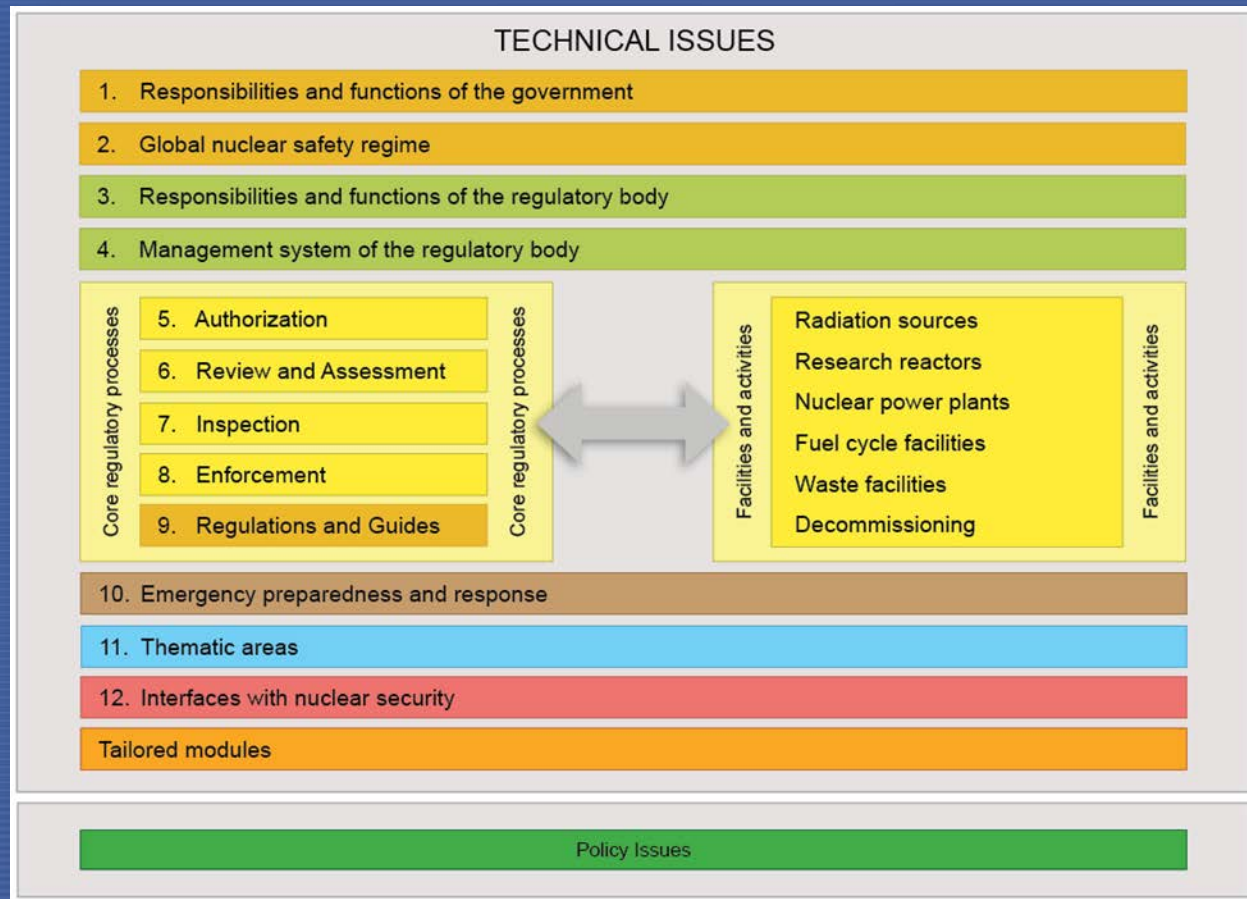
- The ‘Integrated Regulatory Review Service’ (IRRS), a peer review
 - evaluates the status of compliance of States’ regulatory infrastructure with the Safety Standards
 - provides for discussion among experienced regulators regarding both regulatory technical and policy issues
 - provides an opportunity to share regulatory experiences and to harmonize regulatory approaches among States
- **Objective:** to strengthen and enhance the effectiveness of the national regulatory infrastructure of Member States for nuclear, radiation, radioactive waste and transport safety and security of radioactive sources whilst recognizing the ultimate responsibility of each State to ensure safety in the above areas.



“The Integrated Regulatory Review Service ” - *IRRS*

Structure of the IRRS ‘Core’ and ‘Additional’ Areas

- **Modules 1 – 10 and ‘Policy Issues’** represent the *core areas* of every IRRS mission.
- **Modules 11 and 12 and ‘Tailored Module’** represent additional areas which may be included in the scope, in accordance with the regulatory oversight in the host country.



“The Integrated Regulatory Review Service ” - *IRRS*

Structure of the IRRS

‘Additional’ Areas of the IRRS

- ‘*Additional*’ areas of the IRRS are optionally included as appropriate to the State and upon its request.
- Modules 11 & 12

Additional areas which may be included in IRRS:

- Transport (TS-R-1)
- Control of medical exposures (BSS + RS-G-1.5 + ICRP)
- Occupational radiation protection (BSS, RS-G-1.1 ~1.4, 1.6)
- Control of radioactive discharges and materials for clearance (BSS + GSR Part 5 + WS-G-2.3)
- Environmental monitoring for public radiation protection purposes (BSS + RS-G-1.8)
- Control of chronic exposures and remediation (BSS + WS-G-3.1)
- **Interface with nuclear security**

“The Integrated Regulatory Review Service ” - *IRRS*

Structure of the IRRS

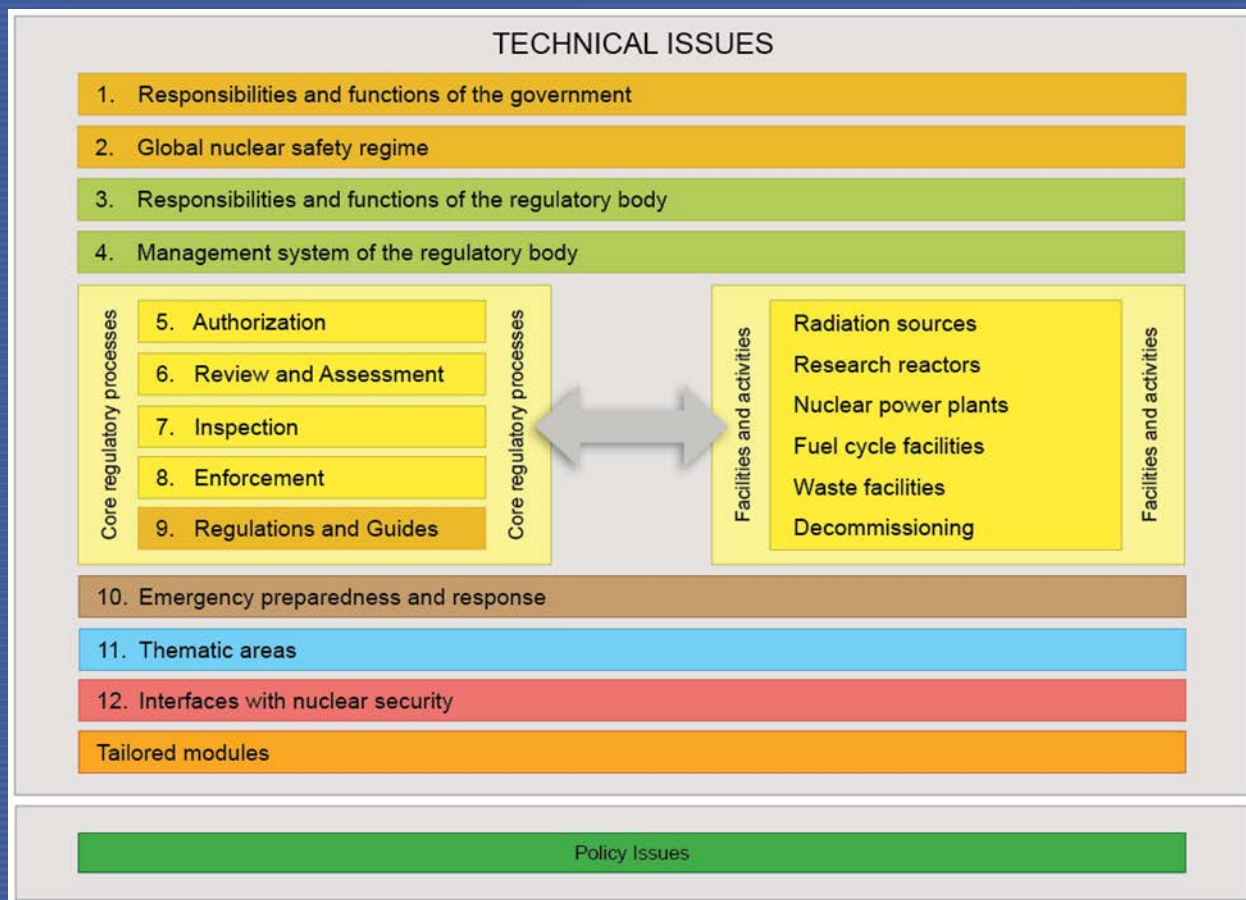
Modular Structure of the IRRS

- The IRRS has a modular form designed to be tailored to address both generic and country-specific needs and to review circumstances where the scope of regulatory responsibility may be changing.
- Each IRRS Module is divided into various sub-sections or ‘elements’ which correspond to the requirements set out in the relevant IAEA Safety Standards.

“The Integrated Regulatory Review Service ” - *IRRS*

Structure of the IRRS - Modular Structure of the IRRS

- **Modules 1 to 4 cover the essential elements of the framework for safety at the State level.**
- **Modules 5 to 9 represent the five core regulatory processes which apply to all regulated facilities and activities.**



Tailored Module for Countries Embarking on Nuclear Power

- Tailored Module for Countries Embarking on Nuclear Power
 - The IRRS is generally structured to review existing regulated facilities or activities.
 - A separate and unique module has been developed to review the status of national preparedness to embark on a safe nuclear power programme. IAEA safety guide SSG 16 - “*Establishing the Safety Infrastructure for a Nuclear Power Programme*” - forms the basis of this IRRS tailored module.

Tailored Module for Countries Embarking on Nuclear Power

Implementation of SSG-16 target organizations

IRRS Guidelines Section 5.3.1 and Appendix II.

- *The SSG-16 actions considered would be those that are to be implemented by **the government** (in the context of legal and regulatory framework) and the regulatory body.*
- *Regarding **the operating organization**, the IRRS review would be to ensure there was an underlying regulation in place or planned such that there would be a required action to be taken by the operating organization.*

Review Services for Embarking Countries

SEED

- The Site and External Events Design (SEED) review service is a bundled service designed to assist the Member States through the different stages of the site selection, site assessment and design of structures, systems and components against the site specific external and internal hazards.
- The SEED review service provides an independent review the site evaluation and the designed safety of the nuclear installation against the demands of the external hazards both natural and human induced and internal hazards.
- SEED is a bundled service designed to assist the IAEA's Member States through the different stages of nuclear installation site selection, site assessment, and design of structures, systems and components, taking into consideration site-specific external and internal hazards.
- On request from a Member State, SEED provides an independent review of site evaluation and safety design of a nuclear installation against the demands posed by external hazards, whether natural or human-induced, as well as internal ones. The service consists of the following six modules, out of which the requesting Member State can select one or more depending on needs.

Review Services for Embarking Countries

SEED

- **Module 1**

Review on Site and Design Safety Regulations: Reviews on conformance of national regulations for siting and design of nuclear installations with the IAEA Safety Standards.

- **Module 2**

Review of the Site Selection Process: Reviews on the process related to safety to select a suitable site for a nuclear installation. The process aims at assessing those site-related factors, which ensure that the combination of site and installation does not pose an unacceptable risk to people and the environment over the lifetime of the installation.

- **Module 3**

Site Evaluation Review: Includes an independent review of the adherence to IAEA safety requirements and the level of detail in site investigation to establish the site's capacities to support the installation's design needs. Also reviews the application of management systems and quality assurance programme in site evaluation.

Review Services for Embarking Countries

SEED

- **Module 4**
Environmental Impact Assessment Review: Reviews the adherence to IAEA environmental impact assessment requirements covering collection and analysis of data, analysis of impacts, mitigation of impacts and environmental monitoring programmes.
- **Module 5**
Site Monitoring Review: Reviews methodologies and plans of monitoring of safety-related site characteristics and external natural and human-induced hazards covering both pre-operational and operational stages of monitoring programmes.
- **Module 6**
Safety Review of Structures, Systems and Components against External Hazards: Reviews the adherence to the IAEA safety requirements in the design of an installation's structures, systems and components to meet the demands of a site-specific hazard. It covers assessments of design, safety margins and probabilistic safety assessment against external events.

Review Services for Embarking Countries

TSR (Technical Safety Review (TSR))

- The IAEA provides to the requesting MS a tailored, independent evaluation of the plant design safety and safety assessment documentation and to make recommendations for enhancements and improvements to safety. It incorporates services dedicated to different subject areas:
 - Design Safety (DS)
 - Generic Reactor Safety (GRS)
 - Safety Requirements (SR)
 - Probabilistic Safety Assessment (PSA)
 - Accident Management (AM)
 - Periodic Safety Review (PSR)

Review Services for Embarking Countries

Design Safety (DS)

Description

Review service conducted by the IAEA staff and international experts to review the safety of designs of nuclear power plants against the IAEA Safety Standards. The review can be limited to specific technical areas

Objective

To assist the requesting Member State to review the safety documentation for nuclear power plants and to make recommendations in order to enhance safety

Process

The process includes preparatory work by the review team and review meetings that usually last two weeks. Funded by the requesting party or through technical cooperation projects

Output

A report summarizing the findings of the review and, if needed, includes a set of recommendations to improve the adherence to the IAEA Safety Standards.



Review Services for Embarking Countries

Generic Reactor Safety (GRS)

Description

Review service conducted by the IAEA staff and international experts to review the safety case of new reactor design against the requirements of IAEA Safety Standards on Safety Assessment for Facilities and Activities (GSR Part 4 (Rev.1)) and Safety of NPPs: Design (SSR-2/1 (Rev.1))

Objective

To enable the requesting party to understand to which extent the safety case is complete and comprehensive in addressing the requirements of the safety standards

Process

The process takes between 6 to 8 months to complete. Funded by the requesting party

Output

A report summarizing the extent to which the safety case addresses the requirements and, if needed, recommendations for improvement of completeness and comprehensiveness are provided



Review Services for Embarking Countries

Safety Requirements (SR)

Description

The Safety Requirements (SR) Review is a peer review service conducted by the IAEA staff and international experts to review the national safety requirements for the design or safety assessment of nuclear power plants against the IAEA Safety Standards. The review can be limited to specific requirements of interest

Objective

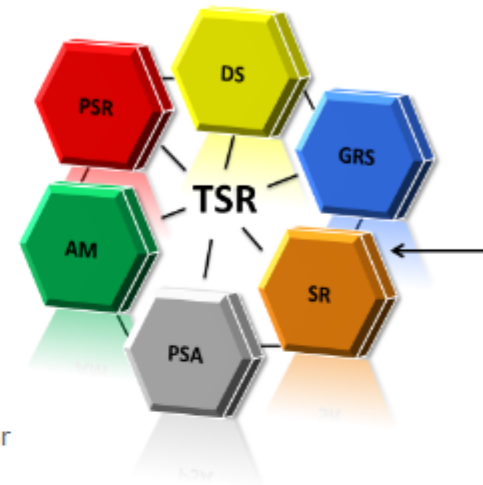
To assist the requesting Member State in the process of issuing or revising national safety requirements for the design or safety assessment of nuclear power plants to enhance safety

Process

The process includes preparatory work by the review team and review meetings that usually last two weeks and is funded by the requesting party or through technical cooperation projects

Output

A report summarizing the findings of the review and, if needed, includes a set of recommendations or suggestions to improve the adherence to the IAEA Safety Standards



Review Services for Embarking Countries

EPREV

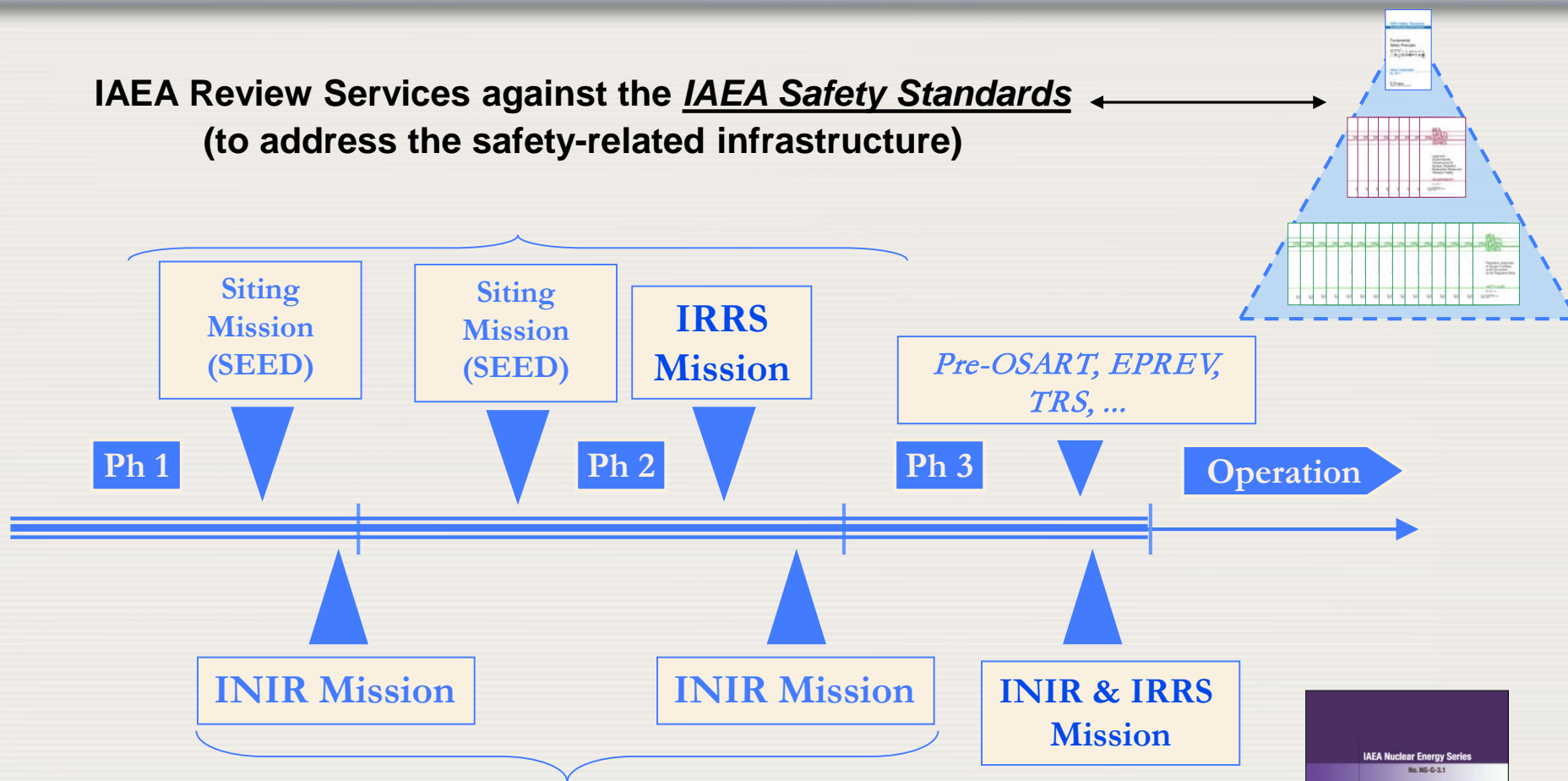
- The Emergency Preparedness Review (EPREV) Service is a service provided by the IEC to appraise preparedness for nuclear and/or radiological emergencies in Member States. Various types of missions are available within the EPREV programme. The scope and depth are decided during discussions between the requesting Member State and the IAEA.

Pre-OSART

- A Pre-operational Operational Safety Review Team (OSART) mission can take place at a nuclear power project during the commissioning phase when many decisions are being taken that will affect operational safety throughout the life of the plant. The mission provides the greatest value if it is conducted from three to six months before the initial fuel loading when plant processes and procedures affecting safety are already established, plant staff are recruited and trained and some systems are taken over for temporary or final operation. This allows the review to focus on how well the plant is prepared for initial fuel loading, reactor start-up and subsequent plant operations.

Safety Review Services for New Comers

IAEA Review Services against the IAEA Safety Standards
(to address the safety-related infrastructure)



Holistic reviews against the Milestones

CONCLUSION



“The Agency has a key role to play in ensuring that this expansion in nuclear power takes place in an efficient, responsible and sustainable manner.”

International Atomic Energy Agency



Thank you for your attention!!!