

# **Regional Workshop on Application of the Code of Conduct on the Safety of Research Reactors**

## **Lecture 6.1**



# **IAEA Assistance in Applying the Code of Conduct on the Safety of Research Reactors**

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# The Structure of the Code

- **Scope**
- **Objective**
- **Application of the Guidance**
- **Role of the State**
- **Role of the Regulatory Body**
- **Role of the Operating Organization**
- **Role of the IAEA**

# Application of the Guidance in the Code

- **“If the State faces difficulties in application of this Code, it should communicate the difficulties and any assistance it may require to the Agency.”**

# Role of the IAEA

- **“The IAEA Secretariat should:**
  - **Disseminate this Code and related information widely;**
  - **Assist States, upon their own request, in application of this Code;**
  - **Continue to collect and disseminate information relating to the safety of research reactors, provide safety review services, develop and establish relevant technical standards and provide for the application of these standards...”**

# IAEA Assistance in Applying the Code

- **Information Collection and Dissemination**
- **Safety Review Services**
- **Expert Missions**
- **Education and Training**
- **Knowledge Sharing and Networking**

# Information Collection and Dissemination

- **INES – International Nuclear Event Scale**
- **IRSRR – Incident Reporting System for Research Reactors**

# INES – International Nuclear Event Scale

- **A means for promptly communicating to the public in consistent terms the safety significance of events reported at nuclear installations.**
- **INES provides a seven-point scale:**
  - **Levels 1-3 are termed incidents;**
  - **Levels 4-7 are termed accidents;**
- **Events having no safety significance are level 0, termed ‘deviations’.**

# INES – International Nuclear Event Scale

- **Events are considered in terms of:**
  - **Off-site impact;**
  - **On-site impact;**
  - **Impact on defense-in-depth.**
- **Refer to the separate brochure for details of the INES scale.**

# Incident Reporting System for Research Reactors

- **Intended to improve research reactor safety through exchange of safety-related information on safety related unusual events.**
- **Provides technical information and lessons learned from events in research reactors to the technical community in a timely manner.**
- **Collects, maintains and disseminates reports on unusual events that are received from participating Member States. 42 States participate as of 8/2004.**
- **Reports are maintained in a database accessible to participating Member States.**

# Safety Review Services

- **IRRT – International Regulatory Review Team**
- **INSARR – Integrated Safety Assessment of Research Reactors**
- **Education and Training Review Service**

# International Regulatory Review Team

- **Provides advice and assistance to Member States to strengthen and enhance effectiveness of the nuclear regulatory body.**
- **A peer review conducted by a team of international experts in the areas of evaluation.**
- **A comparison of regulatory practices of a country with IAEA Standards.**
- **Exchange of experience and good practices.**
- **Generally includes a preparatory meeting, the review itself, and a follow-up mission.**

# International Regulatory Review Team

- **Key objectives:**
  - **Provide objective peer review of regulatory practices with respect to international safety standards;**
  - **Provide recommendations and suggestions for improvement;**
  - **Provide an opportunity for discussion of practices with international experts;**
  - **Provide information on good practices to all Member States;**
  - **Provide the host country with the opportunity to do a self-assessment of regulatory activities.**

# International Regulatory Review Team

- **Review areas may include:**
  - **National legislative and administrative structure;**
  - **Regulatory organization and independence;**
  - **Development and implementation of regulations and guidance;**
  - **Authorization process, review and assessment procedures, inspection and enforcement practices;**
  - **Emergency preparedness.**
- **Scope may include nuclear, radiation, radioactive waste and transport safety.**

# Integrated Safety Assessment of Research Reactors

- **Conduct a comprehensive operational safety review of a research reactor facility based on IAEA Safety Standards.**
- **Provide recommendations and suggestions for improvement.**
- **Mutual transfer of knowledge between reactor personnel and members of the review team.**
- **Generally includes a preparatory meeting, the review itself, and a follow-up mission.**

# Integrated Safety Assessment of Research Reactors

## Topics that may be addressed in an INSARR

- **General topics:**
  - **Regulations, regulatory supervision, licensing;**
  - **Operating organization, reactor management, personnel training;**
  - **Quality assurance;**
  - **Emergency planning;**
  - **Safety culture.**

# Integrated Safety Assessment of Research Reactors

## Topics that may be addressed in an INSARR

- **Nuclear safety:**
  - **Safety analysis and safety analysis report;**
  - **Operational limits and conditions;**
  - **Operating procedures;**
  - **Maintenance and periodic testing;**
  - **Experiments and modifications;**
  - **Conduct of operations, including records and reports.**

# Integrated Safety Assessment of Research Reactors

## Topics that may be addressed in an INSARR

- **Radiation protection;**
  - **Radiation protection program;**
  - **Waste management;**
  - **Airborne and liquid effluents;**
  - **Radiological impact.**

# Integrated Safety Assessment of Research Reactors

## Topics that may be addressed in an INSARR

- **Special issues:**
  - **Siting;**
  - **Design;**
  - **Construction;**
  - **Commissioning;**
  - **Major modifications;**
  - **Reactor aging;**
  - **Decommissioning.**

# Education and Training Review Service

- **Assist Member States to develop and maintain a sustainable and adequate education and training program in nuclear safety.**
- **Address three key areas:**
  - **Basis and framework for nuclear safety education and training;**
  - **Competencies required and training needed to acquire these competencies;**
  - **Maintenance and improvement of competencies and training.**

# Education and Training Review Service

- **Considers education and training for nuclear safety at all levels in a Member State:**
  - **Universities and technical institutes;**
  - **Training organizations;**
  - **The regulatory body;**
  - **Operating organizations.**
- **A self-assessment of the Member State's program of education and training in nuclear safety is an essential part of preparation for the review mission.**

# Expert Missions

- **Assistance of experts from the Agency staff or elsewhere can be provided on many topics.**
- **Such assistance may be provided through the regular budget, technical cooperation projects or extrabudgetary programs.**
- **Some recent missions have addressed:**
  - **Legal and governmental infrastructure;**
  - **Safety analysis reports;**
  - **Seismic safety;**
  - **Aging management issues and upgrading;**
  - **Etc.**

# Education and Training

- **Training events – courses and workshops – can be organized on a regional or national basis, either through technical cooperation or through extrabudgetary programs.**
- **Assistance from the Agency is available in the form of expert instructors, training material, and in organizing the event.**
- **For regional events, the Agency may provide for travel to the venue of the event.**

# Education and Training (contd.)

- **Regional events:**
  - **Organized by the host country and the Agency in cooperation;**
  - **Instructors are recruited from the host country, the Agency and elsewhere;**
  - **Participants are from countries in the region sponsoring the event;**
  - **The event is conducted in English or other agreed common language.**

# Education and Training (contd.)

- **National events:**
  - **Organized by the country involved, with assistance from the Agency;**
  - **Most instructors should be from the organizing country, with minimum assistance from the Agency;**
  - **Participants are from the organizing country;**
  - **The event may be conducted mostly in the language of the organizing country;**
  - **Assistance may be available for translation of important documents.**

# **Nuclear Safety Education and Training Material**

- **A wide variety of nuclear safety education and training material is now available from the IAEA.**
- **Some of the material is available on the Web.**
- **Most of the material is available on CD-ROM.**
- **The goal is to make all of the material available on the Web.**
- **Material is always being added and revised.**

# Nuclear Safety Education and Training Material

- **Standard Training Material:**
  - **Basic Professional Training Course in Nuclear Safety, Textbook and Workbook, on CD.**
  - **Regulatory Control of NPPs, Textbook on CD and Web.**
  - **Workshop materials on CD for:**
    - **Safety Assessment of NPPs to Aid in Decision Making**
    - **Management of Operational Safety of Nuclear Power Plants**
    - **PSA Level 1 and Applications**
    - **PSA Level 2**
    - **Research Reactor Aging and Self-assessment Methodology**

# Nuclear Safety Education and Training Material

- **Distance Learning Material:**
  - **Fundamentals of Nuclear Engineering**
    - **Fundamentals of Reactor Physics (CD and Web)**
    - **Fundamentals of Thermal Hydraulics (CD and Web)**
  - **Basic Nuclear Safety**
    - **Basic Safety Concepts (CD and Web)**
    - **Legal and Governmental Infrastructures for Nuclear Safety (Video on CD)**
    - **Use of the International Nuclear Event Scale (INES) (CD and Web)**
    - **Probabilistic Safety Assessment Pack (PSAPACK) (CD and Web)**

# Nuclear Safety Education and Training Material

- **Distance Learning Material:**
  - **Overview of IAEA Safety Standards (all on CD):**
    - **Safety Standard Program Overview**
    - **Safety Requirements for the Legal and Governmental Infrastructure for Nuclear, Radiation Radioactive Waste and Transport Safety**
    - **Safety Guides for Legal and Governmental Infrastructure**
    - **Safety Requirements and Guides for Site Evaluation (3)**
    - **Safety Requirements and Guides for Design (2)**
    - **Safety Requirements and Guides for Operation (2)**

# Nuclear Safety Education and Training Material

- **Distance Learning Material:**
  - **Lectures on individual Safety Standards (all on CD):**
    - **Commissioning of NPPs**
    - **Evaluation of Seismic Hazards for NPPs**
    - **External Events, Excluding Earthquakes, in the Design of NPPs**
    - **Fire Safety in the Operation of NPPs**
    - **Modifications of NPPs**
    - **Design of Fuel Handling and Storage Systems for NPPs**
    - **Emergency Preparedness and Response for Research Reactors**

# Nuclear Safety Education and Training Material

- **Distance Learning Material:**
  - **Basic Nuclear Safety – Lectures from the Basic Professional Training Course**
  - **31 lectures are available on CD covering a variety of topics:**
    - **Safety fundamentals, safety standards and basic safety principles;**
    - **Safety-related characteristics of nuclear reactors;**
    - **Deterministic accident analysis for DBAs and BDBAs;**
    - **PSA utilization;**
    - **Operational safety and safety culture.**

# Nuclear Safety Education and Training Material

- **A complete listing of the Standard Training Material and Distance Learning Material available is on the IAEA Nuclear Safety and Security Web site at:  
<http://www-ns.iaea.org/training/ni/default.htm>**

# Knowledge Sharing and Networking

- **Preservation and sharing of nuclear knowledge is essential to continued safe operation of nuclear facilities and to safe decommissioning and waste disposal.**
- **The Asian Nuclear Safety Network (ANSN) is a key part of the EBP-Asia aimed at addressing this need. It will be discussed in detail later in the workshop.**