IAEA E&T Programme for Nuclear Safety

Beijing, China
08-11 October 2013

Woodhouse Paul/Lingquan Guo

Safety and Security Coordination Section
Department of Nuclear Safety & Security
International Atomic Energy Agency

Review Mission
Content

- Global Nuclear Safety and Security Framework (GNSSF)
- Global Nuclear Safety and Security Network (GNSSN)
- Asian Nuclear Safety Network (ANSN)
- Strategic Approach to E& T in Nuclear Safety 2013-2020:
  - IAEA Integrated Vision, Common Strategy
  - SARCoN, Safety Report, ETRES,
  - Regional, International Cooperation, Milestones
  - E&T Activities and related web pages
“Nuclear regulators do not have a systematic way of collecting, analysing and sharing regulatory experience”

Conclusion from International Conference on Effective Nuclear Regulatory Systems (Canada 2013)
Global Nuclear Safety & Security Framework

Conventions: NSC, JC, CPPNM, UNSCR 1540...etc

IAEA Safety Standards & Security Guidelines

IAEA Safety & Security Reviews Services

CoCs: RRs & S&S of RSs

 GNSSN

Regulations & Enforcements

National & Regional Nuclear Safety & Security Infrastructure

TSOs, Research, Education & Training

Operation & Use
What is the GNSSN?

The Basic Concept of GNSSN comes from the IAEA document: INSAG 21

STRENGTHENING THE GLOBAL NUCLEAR SAFETY REGIME
A report by the International Nuclear Safety Group (INSAG)

• Introduction of Global Nuclear Safety Regime;
• Promotion of Convention of Nuclear Safety;
• Promotion of IAEA safety standards and their applications;
• Promotion of information exchange, including the operating experience feedback;
• Promotion of international cooperation
What is the GNSSN?

• The GNSSN comprises a set of existing networks and information resources (public and restricted).

• GNSSN aims to ensure that critical knowledge, experience, and lessons learned about safety and security are exchanged as broadly as they need to be and to enable and support interaction and collaboration between professionals and organisations.
Vision

Nuclear Safety and Security information and knowledge are globally managed as a resource (IAEA Standard GS-R-3)

Mission

To ensure that Nuclear Safety and Security knowledge, experience and lessons learned are made visible and available

IT Network - through links between platforms and exchanged as broad as they need to be

Human Network - to enable and support interaction and collaboration between competent people and organizations
Key Objectives

- Strengthening nuclear safety and security infrastructure
- Building capacity for nuclear safety and security
- Enhancing nuclear safety and security culture
**Working Mechanism**

**Global level**
- Support global initiatives
- Encourage MS to take leadership and ownership
- Harmonize and coordinate

**Regional level**
- Implement activities

**National level**
- Interface between national stakeholders and GNSSN
- Networking between national stakeholders
# Organizational Structure

## GNSSN Steering Committee

### Global Safety Networks
- International Regulatory Network (RegNet)
- Global Safety Assessment Network
- Control of Sources Network
- Education and Training Network in Nuclear Waste and Radiation Safety

### Global Safety Forums
- Technical Support Organizations Forum
- Regulatory Cooperation Forum
- WWER Senior Regulators Forum (external)
- CANDU Senior Regulators Forum
- Forum for Embarking Countries
- Forum for Safety and Security of Small Modular Reactors (expected)
- Capacity Building Forum (expected)
- EPR Forum (expected)

### Regional Safety Networks
- Arab Network of Nuclear Regulators
- Asian Nuclear Safety Network
- European Nuclear Safety Regulators Group (external)
- European Technical Safety Organizations Network (external)
- Forum of Nuclear Regulatory Bodies in Africa
- FORO

### National Nuclear Regulatory Portals
## Technical Areas Covered

Number of activities conducted annually > 70

<table>
<thead>
<tr>
<th>Technical Area</th>
<th>Nuclear Safety Action Plan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Safety Analysis</td>
<td>1</td>
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<tr>
<td>Siting</td>
<td>1</td>
</tr>
<tr>
<td>Emergency Preparedness and Response</td>
<td>3</td>
</tr>
<tr>
<td>Leadership and Management for Safety</td>
<td>4</td>
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<td>Operational Safety</td>
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<td>Legislative Framework</td>
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<td>Governmental and Regulatory Infrastructure</td>
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<td>Education and Training</td>
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<td>Capacity Building</td>
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<td>Radiation Protection</td>
<td>10</td>
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<tr>
<td>Communication</td>
<td>11</td>
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<tr>
<td>Radioactive Waste Management</td>
<td></td>
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<tr>
<td>Safety Management of Research Reactors</td>
<td></td>
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<tr>
<td>Interface between Safety and Security (expected)</td>
<td></td>
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<tr>
<td>Safety Issues of SMRs (expected)</td>
<td></td>
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</tbody>
</table>

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GNSSN
Overall Progress
for IAEA-administered networks under GNSSN since 2010

- Number of activities conducted: 189
- Number of countries involved: 118
- Number of participants involved: 2561
109 Member States benefited from activities under GNSSN framework

Europe: 23
Africa: 33
Middle-East: 22
Asia-Pacific: 15
North America: 2
Latin America: 14

17 Member States form GNSSN Steering Committee
**Objective**
- Promote international cooperation on nuclear safety and security
- 2561 experts from 109 countries in events conducted under GNSSN framework
- Build global capacity, enhance regulatory competence, help embarking countries

**Performance**
- Prototype platform
- Global platform with 6 regional networks and 4 forums for regulators
- Mature regulatory framework that supports inter-regional networking

**Sustainability**
- Prototype platform
- Commitments for leadership in topical groups have been secured
- Global Topical Groups and network of regional training centres
Global Network

Global Nuclear Safety and Security Network (GNSSN)
- A set of existing networks and information resources, i.e. internationally accessible information and data sources

RegNet
- Sharing regulatory knowledge, practices and information

Regional Networks
- Network of Network
- FNRBA (Network in Africa)
- FORO (Network in Ibero-America)
- Expanding and Strengthening Human and IT Networks for developing regional capacity building system, well adapted with the regionally unique situation and culture
- Strengthening Inter-regional Human and IT Networks for sharing knowledge and practical experience

• There is a strong need of nuclear safety **Capacity Building in Asia** to establish robust scientific and technological expertise as well as practical problem solving expertise to support dynamic development of nuclear programmes in the region.

• **The Asian Nuclear Safety Network (ANSN)** was launched in 2002 as a strong human and advanced IT network to pool, analyse and share nuclear safety knowledge and practical experience in Asia.

• The ANSN provides a Member States-driven platform with support of the IAEA for facilitating sustainable regional cooperation, coordination and collaboration on continuously improving nuclear safety Capacity Building in Asia to meet challenges of dynamically developing nuclear power programmes.
Introduction (2): Human and IT networking of ANSN

Mutual Learning and Continuous Enhancement for Nuclear Safety Capacity Building

Participating Countries:
- Thailand
- Vietnam
- Malaysia
- Philippines
- Indonesia
- China
- Australia

Supporting Countries:
- France
- Germany
- USA
- EC
- Japan
- China
- Korea
- Bangladesh
- Kazakhstan
- Pakistan
- ASEAN
- Bangladesh

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- ASEAN

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www.ansn.org

www.ansn.org
Structure (1): ANSN Management Structure

**ANSN Steering Committee**
- Planning, coordination, monitoring and evaluation of ANSN activities
- Promotion of ANSN

**Strategy Dialogue meetings**
- Policy-Making for ANSN

**Capacity Building Coordination Group**
- Implementation of ANSN activities
- Selection and control of uploaded knowledge

**IT Support Group**

**Topical Groups**
Structure (2): Topical Groups: “A Human Network”

Topical Groups:
- Education and Training
- Emergency Preparedness and Response
- Governmental and Regulatory Infrastructure
- Management System for Regulatory Bodies
- Operational Safety of Nuclear Power Plants
- Public Communication
- Radioactive Waste Management
- Safety Analysis
- Safety Management of Research Reactors
- Siting

- Forums composed of specialists
- Identification of regional common needs
- Planning and implementation of workshops and regional training courses
- Implementation of specific activities
- Selection and quality management of information to be shared in the IT network

Workshop organized by Topical Group on Siting

Workshop on Radiation Emergency Medical Preparedness
Activities: ANSN Programme Management Cycle

Safety Evaluation (ISE)  
(Self-assessment and Peer discussion)

Planning & Coordination  
(Human network)

Workshops, Training courses, Expert missions

Knowledge Sharing  
(IT network)

<table>
<thead>
<tr>
<th>1. Basic responsibilities</th>
<th>Country A</th>
<th>Country B</th>
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<tbody>
<tr>
<td>1. NCA</td>
<td></td>
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<tr>
<td>2. Functions and responsibilities</td>
<td></td>
<td></td>
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<tr>
<td>3. Regulatory and inspection</td>
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</table>

2. Assessment of threats

Feedback
Public Communication: ANSN Newsletter

ANSN Newsletter is published biweekly and has almost 1,000 external subscribers.

ANSN Newsletter

In order to increase the outreach of the ANSN, a newsletter is published on a biweekly basis since March 2006 to more than 800 subscribers. The newsletter provides an overview of recent technical activities carried out and those planned.

Sign up for the ANSN Newsletter

If you wish to receive directly the ANSN Newsletter by e-mail as soon as it is published, please send your e-mail organization or company to:

Mr. Yasuaki Fukuda
E-mail: y.fukuda@iaea.org

Do not hesitate to use the above address to send any comments or suggestions related to the Newsletter.

The following ANSN newsletter has been published.

ANSN Newsletter Issue No. 118
- Regional Conference on 21st Century Capacity Building and Virtual TSO in Asia
- Issue Date: 15 November 2010

ANSN Newsletter Issue No. 117
- 12th Meeting of Steering Committee
- 3rd Meeting of Capacity Building Coordination Group (CBCG)
- Issue Date: 01 November 2010

ANSN Newsletter Issue No. 116
- Annual Meeting of the Topical Group on Education and Training (ESTTG) and Workshop Training
- Training Course on Regulatory Control of Nuclear Power Plants
- Issue Date: 15 October 2010

ANSN Newsletter Issue No. 115
- Round Table Discussion on Nuclear Safety Knowledge Networking
- Issue Date: 01 October 2010

Examples

Special Issue: 100th Anniversary of ANSN Newsletter

A Message from the IAEA

T. Taniguchi, IAEA Deputy Director General, Head of the Department of Nuclear Safety and Security

On this important occasion of the 100th Anniversary of the ANSN Newsletter, I am pleased to convey my sincere congratulations to all ANSN Newsletter readers. The first ANSN Newsletter was issued in March 2006. Since then, significant achievements have been made to help the ANSN countries develop and improve their nuclear safety infrastructure and capacity.

Trends and issues, such as the ambitious introduction of new nuclear power plants, the rapid expansion of existing nuclear power programmes and the wider use of radioactive sources highlight the need for continued and improved international cooperation and coordination. The increasing multilateral nature of today’s nuclear business underscores this need. In this context, the establishment of adequate nuclear safety capacity building and infrastructure is particularly important and cannot be ignored: ANSN will be expected to play an essential role in this effort.

Through consideration of the global trends, three key issues and challenges have been identified for ANSN: (1) continuing international cooperation and emerging coordination for new and expanding nuclear power programmes, (2) capacity building for sustainable nuclear safety and (3) strengthening of global and regional networking activities.

Capacity Building

The international nuclear community has continued its focus on capacity building for sustainable nuclear safety. Capacity building is much broader than traditional education and training.
Vision and Strategy (3): Regional Capacity Building System in Asia

Planning

- Annual Work Plan
- Online-based requests and timely clearance
- Integrated Safety Evaluation (ISE)
- Online Planning System
- e-Library
- Internet & Video Communication
- Expert Pool Database

Capacity Building IT Module

- Outcome-based Performance Evaluation

IT Network in Asia

Infrastructure Development

- Use of Safety Standards & Guidelines
- Implementation of International Instruments
- Regional Peer Review & Support Arrangement

Network of Capacity Building Centres in Asia

Experts Community in Asia

Problem Solving and Solution Support

Virtual TSO

Common Knowledge

Specific Knowledge

New & Creative Knowledge
The new Strategic Approach was noted by the BoG March 2013

Vision

Adequate and sustainable programmes for education and training in nuclear safety consistent with the Agency’s safety standards are to be implemented by Member States in order to ensure that the highest possible levels of safety are achieved.
Objectives

• Maintenance and continual improvement of Member States’ capacity building in nuclear safety, consistent with the Agency’s safety standards and best practices. Development of an education and training support programme by the Agency in cooperation with Member States and, as appropriate, other international organizations to support Member States’ implementation of their education and training programmes at a national and regional level.

• Development by the Agency of a process for the effective and efficient implementation of the education and training support programme and ensuring the continuous improvement of its implementation.
Outputs

- An education and training support programme in nuclear safety developed by the Agency in line with the Agency’s safety standards and based on a harmonized approach and standard materials.
- Knowledge networks and training networks to foster cooperation, exchange of information, and dissemination of best practices and materials.
- Establishment and support of national and regional training centres, delivering education and training programmes in line with the Agency’s safety standards.
Outcomes

- Strengthened nuclear safety in Member States.
- Improved national infrastructure for education and training based on a national strategy.
- Increased application of the Agency’s safety standards in Member States.
- Enhanced networking and cooperation within and among Member States.
Key Roles

• The successful implementation of this strategic approach will require effective interaction between the Secretariat and Member States. In particular, it is expected that Member States will take responsibility for ‘ownership’ over the course of implementation of the strategic approach as Member States have the primary responsibility for building and maintaining capacity for nuclear safety.

• The Secretariat, within its statutory function of providing for the application of the IAEA safety standards, has responsibility for overseeing the implementation of its training and educational activities. Consideration should also be given to utilizing the expertise available in regulatory bodies, operators, vendors, professional bodies, scientific societies and regional or international organizations.

• It is important to monitor the implementation of the strategic approach, progress made and outputs. The Steering Committee on competence of human resources for regulatory bodies, representing Member States’ regulatory bodies, can play an important role in this regard.
Components of the Strategic Approach

The proposed strategic approach for 2013–2020 is based on four key components:

• National strategies for capacity building;
• Capacity building mechanisms;
• Effective use of networking and regional and international cooperation;
• Management systems, management of competence and knowledge management.
Main components of the strategy

National Strategy for CB through E&T

Capacity Building Mechanisms

Regional Cooperation

Management Systems, Competence & Knowledge Management

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GNSSN
Systematic Process

1. Assessment of the education and training needs
2. Design of the education and training programme
3. Development of the education and training programme
4. Implementation of the education and training programme
5. Evaluation of the education and training programme
Training Framework

**Primary Audience**
- Regulatory Body Staff
- Technical Support Organizations
- Operators and Utility Staff
- Research Organizations and Educators
- Regulatory Body Staff, Faculty Operators and TSOs

**Basic Knowledge Standard Training Courses**
- Basic Professional Training Course on Nuclear Safety
- Fundamentals on Nuclear Engineering

**Specialized Knowledge Standard Training Courses**
- Safety Training Packages for Countries Embarking on a Nuclear Power Programme or Developing the First Research Reactor
- Regulatory Control of NPPs
- Safety Assessment of NPPs
- Operational Safety of NPPs
- Safety of Research Reactors and Fuel Cycle Facilities
- Site Safety

**Specific Expert Knowledge Tailored Topical Courses or Workshops**
- Authorization Process
- Review and Assessment
- Inspection and Enforcement
- Development of Regulations and Guides
- Regulatory Effectiveness
- Accident Analysis Methods
- Probabilistic Safety Assessment
- Accident Management
- Aging Management
- Safety Assessment of Modifications
- Safety Culture and Management of Safety
- NPP Operator Regulatory Interface
- Operational Experience and Feedback
- Operational Practices
- Regulatory Aspects and Safety Documentation
- Safety Analysis
- Safety in Operation and Utilization
- Management of Aging
- Safe Shutdown and Decommissioning
- General Training Courses
- Site Safety and External Hazard Assessment
- Seismic Design and Qualification of Nuclear Installations

**On the Job Training and Practical Experience**
- Scientific Visits, Fellowships,
- Observers in IAEA Safety Missions
Steering Committee of Training for Regulators for Nuclear installations

BPTC

New Video lectures, updated web, e-learning

SARCON

ANSN/ETTG, ETRES, other
Objective:

- To give guidance for the systematic analysis of required competences of the regulatory body based on the regulatory functions
- To provide examples of a questionnaire for self assessment.
SARCoN developed by the IAEA through Regulators' Steering Committee on Competence of Human Resources for Installation Safety

SARCoN guidelines are a step based procedure to systematically analyse the competences needs for a regulatory body with a focus on nuclear Installations safety

SARCoN use a Competency model for Regulators based on TECDOC 1254, now revised by a draft safety report “Managing Regulatory Competence”

It has a software tool and associated questionnaires with more than one hundred regulatory competences
SARCoN Tool experience of use

Validated through more than 4 TMs

Questionnaires and guidelines enhanced through 4 meetings of the Steering Committee

The EC recommended the use of SARCoN as a condition for regulatory training proposals to be financed by the EC

Ibero American Foro of Regulators
New Project on SARCON and Regulatory Job Profiles

The questionnaires are a comprehensive compilation of competences as a shopping list but must be adapted to the particular regulator, nuclear programme, cultural/regulatory approach
Scope:

- Review service will address three key areas relative to the education & training safety programme of a MS:
  1) The basis and framework for nuclear safety education and training
  2) Competencies and training in nuclear safety
  3) Maintenance (Sustainability) and improvement of competences and training

Pilot mission in Indonesia
26-29 June, 2012
Pilot mission in Indonesia 26-29 June
Integrates old TECDOC 1254 and SARCON

Broader Scope: Facilities and Activities

New Appendix for NPP newcomer countries
Objective:

• To make available adequate tools for helping national regulatory bodies to establish and implement an adequate competence management system.

• To set up a system for sharing knowledge on best practices, training materials and exchanging information on training events.

• To incorporate the outcomes of the Committee’s work into the development of IAEA safety standards that deal with the competencies of regulatory bodies.
Objective:

- To review progress of, and provide advice with respect to the implementation of IAEA Strategic Approach 2011-2020
- To identify appropriate performance indicators
- To provide advice on the development of networking.
- To advise on the priorities for development of standardised training material and training activities
- To provide advice with respect to how Member States may monitor effectiveness of their own E&T Programmes
- To provide advice regarding Steering Committee membership
Capacity Building Concept

Education and Training
Human Resource Development
Knowledge Management
Knowledge Networks

GOVERNMENT
REGULATORS
Operators
TSOs

Educational Institutions
Others

Capacity building

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A systematic and integrated approach that includes education & training, human resource development, knowledge management and knowledge networks to develop and continuously improve governmental, organizational and individual competences and capabilities necessary for achieving safe, secure and sustainable nuclear power programme.
Guidance and Methodology for Assessment of Capacity Building in Member States with Nuclear Power Programmes and those Planning to Embark on such a Programme

A. Guidance and Methodology for Assessment of Capacity Building in the Member States with Nuclear Power Programmes and those Planning to Embark on such a Programme

A.1. Introduction

The accident at TEPCO’s Fukushima Daiichi Nuclear Power Plant has deeply enhanced focus on the need to develop, strengthen, enhance and implement the capacity building programmes at national levels (and, where possible, regionally) to ensure, planning to embark on such a programme. The working group of the Ministerial Conference on Nuclear Safety organized by IAEA from 13–16 June 2011 after the Fukushima accident, The Ministerial Declaration adopted by the Conference requested the Director General of the IAEA to prepare a draft Action Plan for Nuclear Safety, building on the conclusions and recommendations of the working group of the Ministerial Conference, the Declaration and the guidance and knowledge...
Methodology
D.2. Key Milestones

The 2013–2020 strategic approach is a continuation of the activities initiated in the previous strategic approach, with additional activities included. Implementation of this strategic approach can be divided into three phases (see Table 1).

**TABLE 1: THE THREE PHASE APPROACH**

<table>
<thead>
<tr>
<th>Activities</th>
<th>Phase I Preparation</th>
<th>Phase II Promotion</th>
<th>Phase III Implementation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Complete the development of tools and guidance for capacity building through education and training in nuclear safety</td>
<td>Dissemination of tools and guidance at regional level and among Member States</td>
<td>Development and implementation of national strategies in Member States</td>
<td></td>
</tr>
<tr>
<td>Major role*</td>
<td>Secretariat</td>
<td>Agency, regional and knowledge networks, RTCs</td>
<td>Member States</td>
</tr>
</tbody>
</table>

* The Secretariat, RTCs, collaborating centres and training centres in Member States will all be involved in specific tasks as appropriate.
Integrated Vision, Common Strategy

Education and Training complementary approaches

Global Approach
IAEA: Defining policies, frameworks and providing materials and support for E&T activities

Regional Approach
Supporting IAEA Regional Networks, and Centres, providing E&T resources and expertise

National Approach
Member States: Establishment and maintenance of HR and national E&T infrastructure

Global Networking

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GNSSN
Technical Areas in Nuclear Safety & Security

- Nuclear Installations
- Radiation, Transport & Waste
- Incident & Emergencies
- Security
Education & Training Activities (Nuclear Installations)

Fundamentals and Basic Professional Training Courses

Fundamentals
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)

Basic Professional Training Course on Nuclear Safety (BPTC)
Read disclaimer

- BASIC PROFESSIONAL TRAINING COURSE ON NUCLEAR SAFETY
  Argonne, August 2001
- BPTC - CHAPTER 22
  COMMUNICATING ABOUT NUCLEAR TECHNOLOGY
  Vienna, August 2010

Knowledge and Experience Sharing 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

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Education & Training Activities
(Radiation Transport & Waste)

Postgraduate Educational Course in Radiation Protection

Specialized Training Courses
Education & Training Activities
(Emergency preparedness and Response)
Education & Training Activities (Emergency preparedness and Response)

Training material for developing a national capability for response to radiation emergencies.

Generic assessment procedures for determining protective actions during a reactor accident.

Training material for reactor accident assessment and response.

Generic procedures for assessment and response during a radiological emergency.

Training material for generic procedures for assessment and response during radiological emergencies.

Generic procedures for monitoring in a nuclear or radiological emergency.

Training material for emergency monitoring procedures.
Education & Training Activities
(Nuclear Security)

- International School on Nuclear Security
- Essential Elements of Nuclear Security Seminar
- Nuclear Security Culture Workshop
- Physical Protection of Nuclear Material and Facilities
- Practical Operation of Physical Protection Systems
- Physical Protection Inspections at Nuclear Facilities
- Evaluation of the Effectiveness of a Physical Protection System
- etc
http://www.iaea.org/Publications/Training/index.html

IAEA Main Training Page

Interdepartmental Training Page:

Categories:

• Main Training and Information Pages
• Training Materials
• Training Services and Tools
• Training Courses and Fellowships
• E-learning and Online Courses
• Links to IAEA Support - Regional Cooperation Networks
Thank you for your attention

http://www-ns.iaea.org/training/ni/materials.asp?s=100&l=75

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