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Capacity Building, Education and Training in Nuclear Security

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# Capacity Building, Education and Training in Nuclear Security

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# Contents

- Nuclear Security & Nuclear Security Plan 2010-2013
- IAEA Nuclear Security Training Programme
- Nuclear Security Support Centre Concept
- IAEA Support for Nuclear Security Education
- International Nuclear Security Education Network (INSEN)
- International Educational Projects and Initiatives
- Conclusion



## Nuclear Security Plan 2010—2013

#### Objective:

Contribute to global efforts to <u>achieve worldwide, effective</u> <u>security</u> wherever nuclear or other radioactive material is in use, storage and/or transport, and of associated facilities, by supporting States, upon request, in their efforts to establish and maintain effective nuclear security through assistance in capacity building, guidance, <u>human resource development</u>, sustainability and risk reduction.





# **Training Programme**

- General Training
  Specialized Training
  Training-of-Trainers
- Fellow-ships
- On-the-Job Training
- Technical Visit





From 2002 – 2010: More than 380 training activities implemented 9650 participants trained from more than 120 countries

# **Training Audience**

Policy Makers Regulators Operators Carriers

Law Enforcement Police, Customs Intelligence Border Guards Emergency Responders Military/Defence



# **Training Activities - Examples**

Elements of Nuclear Security - International	International Training Course on Physical
Seminar	Protection of Nuclear Material and Facilities
Combating Illicit Trafficking in Nuclear and other Radioactive Material	Computer Security at Nuclear Facilities
Practical Operation of Physical Protection Systems	Nuclear Material Accounting and Control at Facilities
Nuclear Security Culture	The Security in Transport of Radioactive Material
Physical Protection Inspections at Nuclear Facilities	Radiation Detection Techniques
Nuclear Information Security Management	Radiological Crime Scene Management and Introduction to Nuclear Forensics



# International School on Nuclear Security



IAEA-ICTP International School on Nuclear Security 11-22 April 2011 ICTP, Trieste - Italy

# **Applications & Participants**

### Overwhelming interest

- More than 250 applications from more than 45 countries
- 45 participants from 39 countries
- 20% women
- 80% men
- Average age: 35
- Regulatory authorities, universities, research institutions, different national ministries and law enforcement agencies;



# **Training of Trainers**

# Building-up nuclear security instructors in States

- Radiation Detection Techniques
  - Francophone African countries
  - Arabic speaking countries
  - Poland & Ukraine (MPE)
    KIR, KAZ, TUR, UBZ

Security of Radioactive Sources
Republic of Korea

Nuclear Security Culture
Pilot in the UAE
IAEA





# Training for Nuclear Security at Major Pubic Events

#### 2010 - 2013





28th African Cup of Nations 2012 Gabon, Equatorial Guinea



POLAND UKRAINE

**UEFA EURO 2012** 



## Computer Based Training for Front Line Officers



#### **Objectives:**

- Increase the overall operating capabilities of radiation detection equipment
- Complement inclass training
- Serve as refresher training



#### Translation in all UN languages by Q2 2011

# How is the program arranged?



#### **Screenshot from Module 2**

#### **Eight modules:**

- **1.** Introduction
- **2.** Radiation Overview
- 3. Introduction to Radiation Detection Equipment
- 4. Main Operation of Radiation Detection Equipment
- 5. Verification of Alarms and Confirmation of Incidents
- Scenario 1 Land Border crossing
- 7. Scenario 2 Airport passenger arrival
- 8. Assessment



## Nuclear Security Support Centre (NSSC) Concept

#### **Primary objectives are:**

- Develop <u>human resources</u> through the implementation of a tailored training programme
- Develop a <u>network of</u> <u>experts</u>
- Provide <u>technical support</u> for lifecycle equipment management and <u>scientific</u> <u>support</u> for the detection of and the response to nuclear security events

- Long-term sustainable nuclear security capabilities
- Improved communication among nuclear security stakeholders

Roll-out of concept in Ghana, Malaysia, Morocco, Tanzania, Colombia.



# NSSC: Human Resource Development



# Systematic Approach to HRD



## **Training Programme may consist of:**

One or more classroom • training course(s) integrated into existing national training programmes (i.e. police or customs academies, or training programmes for personnel responsible for radioactive material and associated facilities)

- A variety of national drills\*
- Fellowship programmes for junior staff
- On-the-job training, technical visits for senior staff
- Systematic attendance of individuals to IAEA nuclear security training courses or training offered by other organizations
- Activities to create awareness among the public

\* Suitable for different audiences, like anti-bomb squads, ambulance, police, customs and fire brigade



EA

.... should cover two years.

# NSSC: Development of Expert Network



# **Network of Experts**

#### Database

- Forum to exchange experience and information
- Joint activities
- Regional outreach



# **NSSC:**

# **Technical and Scientific Support**



#### Technical Support – Equipment Management 1/1

## **Functions**

- Monitoring status of health (physical checks or remote diagnostics)
- Developing diagnostics and checklists for maintenance procedures
- Conducting performance checks and routine calibration
- Performing corrective maintenance
- Providing advice/recommendations for procurement of equipment
- Procuring replacement components or system upgrades from suppliers
- Assist in development of operational procedures for the equipment

#### Technical Support – Equipment Management 1/2

## **Functions**

### Administration of computer systems

- Maintenance of virus protection and 'clean' computers
- Maintenance knowledge and materials Software and network shooting
- Performance of data and/or database back-up
- Maintenance knowledge and materials required for reinstalling software

#### **Technical Support – Resource Management**

#### **Functions**

- Maintaining trained staff (radiation safety, equipment maintenance and repair, equipment operation)
- Performing refresher training
- Maintaining equipment and radioactive source inventories (what exists, and where)
- Establishing and maintaining pools of frequently spare parts
- Maintaining appropriate annual budget to encompass all staff, activities, and materials needed
- Obtaining and renewal of licenses for radioactive source usage and storage for performance testing

#### Technical Support – End-User Relationship Management

### **Functions**

- Establish and maintain authorization to work at deployment sites
- Establish and communicate schedules for routine maintenance activities
- Implementing appropriate reporting and information security procedures
- Providing feedback on best practices for equipment use and care to end users
  - Acquisition of statistical overview of number of passages, number of real, false and innocent alarms aiming optimization of the radiation detection system
  - Assist in refining operations or recommending upgrades with end users

#### **Scientific Support**

### **Functions**

#### *Remote and/or On-site Support:*

- Categorization of detected radioactive material **Remote monitoring through networking:** MEST
  - Hot line for radiological assessment
  - Coordination of safe and secure transport of contaminated material, nuclear forensics support, decontamination, etc

#### **Other functions:**

- **Development of MEST capability**
- **Development and establishment of effective** communication schemes, etc



# **IAEA** Assistance for NSSC

- Two technical guidance documents under development:
  - Concept on how to establish a Nuclear Security Support Centre
  - Methodology on how to self assess nuclear security training needs
- NSSC Review Mission to States
- Qualification of instructors through training of trainers Courses provided by the IAEA:
  - Radiation Detection Techniques
  - Transport Security
  - Security of Radioactive Sources
- Provision of training material
- Support for licensing of training centre
- Assistance in the evaluation of the training programme
- Facilitation of training for technical and scientific support
- Provision of technical equipment\*
- etc







\* limited amount

# IAEA SUPPORT FOR NUCLEAR SECURITY EDUCATION



#### Nuclear Security Series No. 12 Educational Programme in Nuclear Security



#### Addressed to:

- university curriculum developer
- faculty members
- human resource development managers

#### **Objectives:**

- Provide a comprehensive and current overview of nuclear security educational needs
- Provide guidance for developing a curriculum of a Master of Science and a Certificate Programme in Nuclear Security
- Emphasize on both, the theoretical knowledge and the practical skills necessary to meet nuclear security requirements
- Propose concepts on how to establish the new discipline of nuclear security at educational institutions

http://wwwpub.iaea.org/MTCD/publications/PDF/Pub14 39\_web.pdf

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## Recommended Courses for M.Sc. Programme in Nuclear Security

Prerequisite courses

- NS.PR1. Applied mathematics
- NS.PR2. Basic nuclear physics

**Required courses** 

- NS1. Introduction to nuclear security
- NS2. International and national legal framework regulating nuclear security
- NS3. Nuclear energy, nuclear fuel cycle and nuclear applications
- NS4 Methods and instruments for nuclear and other radioactive material measurements
- NS5. Effect of radiation, safety and radiation protection
- NS6. Threat Assessment
- NS7. Physical protection systems design and evaluation
- NS8. Physical protection technologies and equipment
- NS9. Security of nuclear and other radioactive material in transport
- NS10. Detection of criminal or unauthorized acts involving nuclear and other radioactive material out of regulatory control
- NS11. Interdiction of, and response to, criminal or unauthorized acts involving nuclear and other radioactive material
- NS12. Crime scenes investigation and forensic techniques





## Recommended Courses for M.Sc. Programme in Nuclear Security Con't

#### **Elective courses:**



- NS13. Nuclear material accounting and inventory control of other radioactive material
- NS14. Vulnerability assessment of physical protection systems
- NS15. Risk assessment and management of State nuclear security measures
- NS16(a). Physical protection systems for nuclear and other radioactive material, sources and facilities
- NS16(b). Physical protection systems for radioactive material and sources
- NS17. Import/export and transit control mechanism and regime
- NS18. Nuclear security at major public events
- NS19. Nuclear forensics and attributions
- NS20. Infrastructure and procedures for detection and response to incidents involving nuclear or other radioactive material
- NS21. Cooperation of stakeholders at national and international level
- NS22. IT/Cyber-security



## **Nuclear Security Careers**



Educational programmes should be addressed to people interested in careers in nuclear security working at different entities.

## International Nuclear Security Education Projects

 Trilateral Education Project (Ukraine – Russian Federation – IAEA)

2005: Sevastopol National University of Nuclear Energy and Industry introduced <u>Master in Physical Protection</u>, Control & Accountancy of Nuclear Material

#### The IAEA supported :

- Curriculum development
- Professional development
- Equipment of two laboratories





# International Nuclear Security Education Projects

 Bilateral Education Project (Russian Federation – IAEA)

2009: Tomsk Polytechnic University launched M.Sc. Nuclear Control and Regulation in Nuclear Security

- based on the IAEA Educational Programme in Nuclear Security
- accredited by the Russian competent authority
- planned to be fully established by end 2012
- open to national & regional audience
- IAEA assists in curriculum development & textbook development (NS3 & NS4 – in Russian)



# International Nuclear Security Education Projects Cont'

## Multilateral Education Project

(League of Arab States – IAEA)



2009: Naif Arab University for Security Sciences added Nuclear Security Course to existing M.Sc. Programme in Security Sciences

 IAEA assisted in development of curriculum, development of teaching material (NS 1) and facilitated guest lecturer

2011: Naif Arab University for Security Sciences launches Diploma Programme in Nuclear Security

 IAEA assists in development of teaching material (NS2, NS5, NS6) and provides technical advice on nuclear security equipment



AEA

# International Nuclear Security Education Projects Cont'

- Nuclear Security Training Centre & Pakistan Institute of Engineering and Applied Sciences (PIEAS)
  - 2008: Master in Nuclear Engineering with specialization in Nuclear Security
    - IAEA supported a one week On-the-Job-Training for 6 faculty members at Sevastopol National University of Nuclear Energy and Industry, Ukraine
      - Organization of educational programme
      - Development of teaching material & practical exercises
      - How to set up knowledge management
- University of Pittsburgh, U.S.



# International Nuclear Security Education Projects Cont'

#### University of Florence, Italy

 IAEA reviewed a five day course syllabus on "Diplomacy and Policy of Nuclear Security" which is based on the IAEA Nuclear Security Series No 12 Educational Programme in Nuclear Security. The University of Florence launched this course in April 2011.

#### University of Pisa, Italy

• IAEA provided advice on the curriculum of the Nuclear Safety and Securiy Specialization Course which is planned to be launched in spring 2012.



# **Other Initiatives Supported by IAEA**

- Delft University of Technology and other institutions plan to establish a European Master of Science Programme in Nuclear Security with the support of the European Commission Erasmus Funding.
  - IAEA advisory role
  - This imitative will support INSEN efforts
- University of Stockholm and other institutions plan to establish the European Nuclear Security Research Network (ENSERN) under the EU Framework 7 (Security).
  - WP 4: Creating the program "Train the educators" IAEA advisory role
  - This initiative would support INSEN WG II efforts



# **Supporting Universities**

- Pre-diploma Practical Training for University Students with Specialization in Nuclear Security at Interdepartmental Special Training Centre, Obninsk, RF
- Pilot 2009 for Russian & Ukrainian universities
- 2010 for Russian and Ukrainian universities
- 24 Oct 3 Nov 2011 open to all universities





## International Nuclear Security Network



IAEA Workshop, 29-31 March 2010 <u>36 participants:</u> 17 universities 2 international organizations several other stakeholders A partnership between the IAEA and universities, research institutions and other stakeholders has been established:

International Nuclear Security Education Network (INSEN)

#### **<u>Mission:</u>** To enhance global nuclear security by developing, sharing and promoting excellence in nuclear security education

INSEN Working Groups Working Group I: **Exchange of information and development of** materials for nuclear security education Working Group II: Faculty development and cooperation among educational institutions

Working Group III: **Promotion of nuclear security education** 



# Achievements in the first year



Annual INSEN Meeting Vienna, Austria 8-12 August 2012

- Manuscript for NS1 textbook (Introduction to Nuclear Security) is underway.
- Development of a professional development course on NS1 for potential faculty members.
  - Pilot course: Sep 2011, King's College London, UK
- Initiated development of promotional materials, and promoted the program at several events around the world.
   IAEA

# **IAEA** Assistance

- Nuclear Security Series No. 12 Educational Programme in Nuclear Security;
- Promotion of Nuclear Security Education;
- Encouragement for participation in nuclear security academic programmes;
- Review of academic curricula;
- Support for development of teaching material;
- Support for development of faculty members;
- Facilitation of networking among academic institutions and research institutes through INSEN;

Etc:

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# Conclusion

Effective nuclear security can be achieved through training & education.

The IAEA through its Nuclear Security Human Resource Development Programme supports the sustainable development of experts able to carry out the required functions for strengthening global nuclear security.



#### For further information please visit our website

#### http://www-ns.iaea.org/security/

